भारत सरकार
GOVERNMENT OF INDIA
भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

CLIMATE OF WEST BENGAL

ISSUED BY
NATIONAL CLIMATE CENTRE
OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL
OF METEOROLOGY (RESEARCH)
INDIA METEOROLOGICAL DEPARTMENT
PUNE - 411 005

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Preface

The importance of meteorology and its economic and social benefits are being increasingly realised all over the world. In our country also, various sectors like agriculture, aviation, energy, industry require climatological information pertaining to different regions of the country, for planning and executing projects, with a view to derive maximum advantage from meteorological and/or climatological conditions. Keeping these requirements in view, it was decided by India Meteorological Department to publish a series of “Climatological Summaries” for each state in the country incorporating the district climatological summaries. The fourteenth issue in the series of ‘State Climatological Summaries’ is “Climate of West Bengal”.

The present publication contains extensive information on rainfall in West Bengal state and various districts of state, based on the available rainfall data for the period 1951-2000. The climatological data in respect of temperature, wind, clouds and other weather parameters for the period from 1971-2000 and information on droughts, excessive rainfall, depressions and cyclonic storms are also included in the publication.

The climatological summary and related maps were prepared by Shri S.M. Deshpande, Smt. U.S. Satpute, Smt. P.R. Iyer, Shri R.S. Wayal, Smt. P.P. Bhagwat

and Shri A.B. Dhule, from “Revision of Climatological Publications” section of the Office of the Additional Director General of Meteorology (Research), India Meteorological Department, Pune. The contributions of Smt. P.R. Joshi, Shri B.V. Potdar and Shri V.W. Mhaske, have been very vital.

The designing and printing has been done by DTP Unit, under the supervision of Shri A. Philipose.

The publication was prepared by Smt. P.G.Gore, Director and reviewed by Shri Thakur Prasad, DDGM(C) and Shri A.K. Srivastava, Director. Dr. R.D. Vashistha, DDGM(SI), LACD-ADGM(R), provided the overall guidance for this publication. I appreciate their sincere efforts.

New Delhi
July, 2008

Ajit Tyagi
Director General of Meteorology

Introduction

The climatology of the state of West Bengal in terms of various meteorological parameters is described in the first chapter. It is followed by a detailed description of the climate of each district in the succeeding chapters. In this publication, the districts of West Bengal state have been considered from the map approved by Survey of India and the climatology of these districts, arranged in alphabetical order is presented.

The normals of meteorological parameters used for describing the climate are generally based on data for the period 1971 to 2000, except in the case of rainfall. The normals of rainfall are based on the data for the period 1951 to 2000. These data are obtained from National Data Centre, Pune. The extreme values of temperature and rainfall presented in the publication are based on the data updated upto the year 2000 and 1999 respectively.

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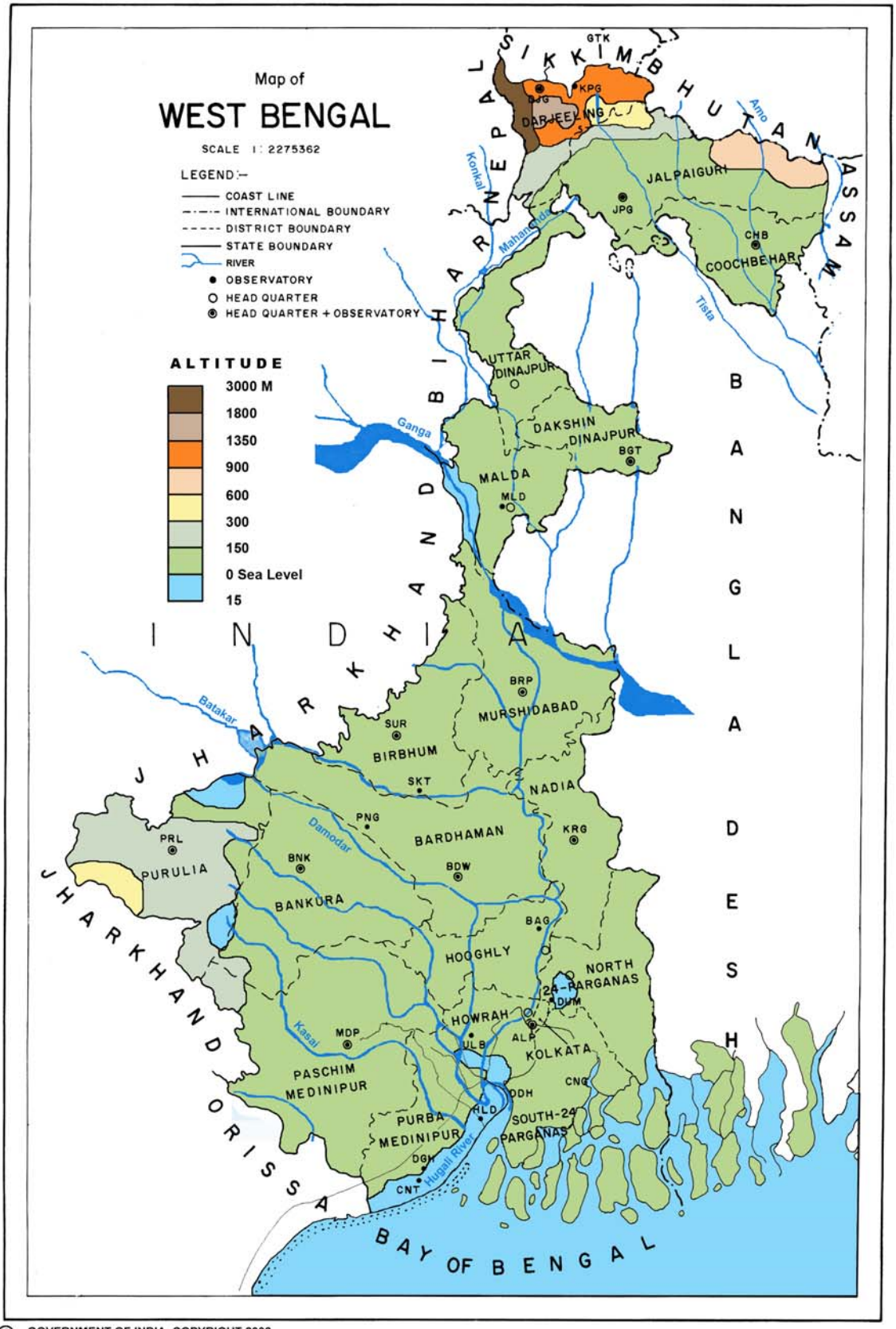

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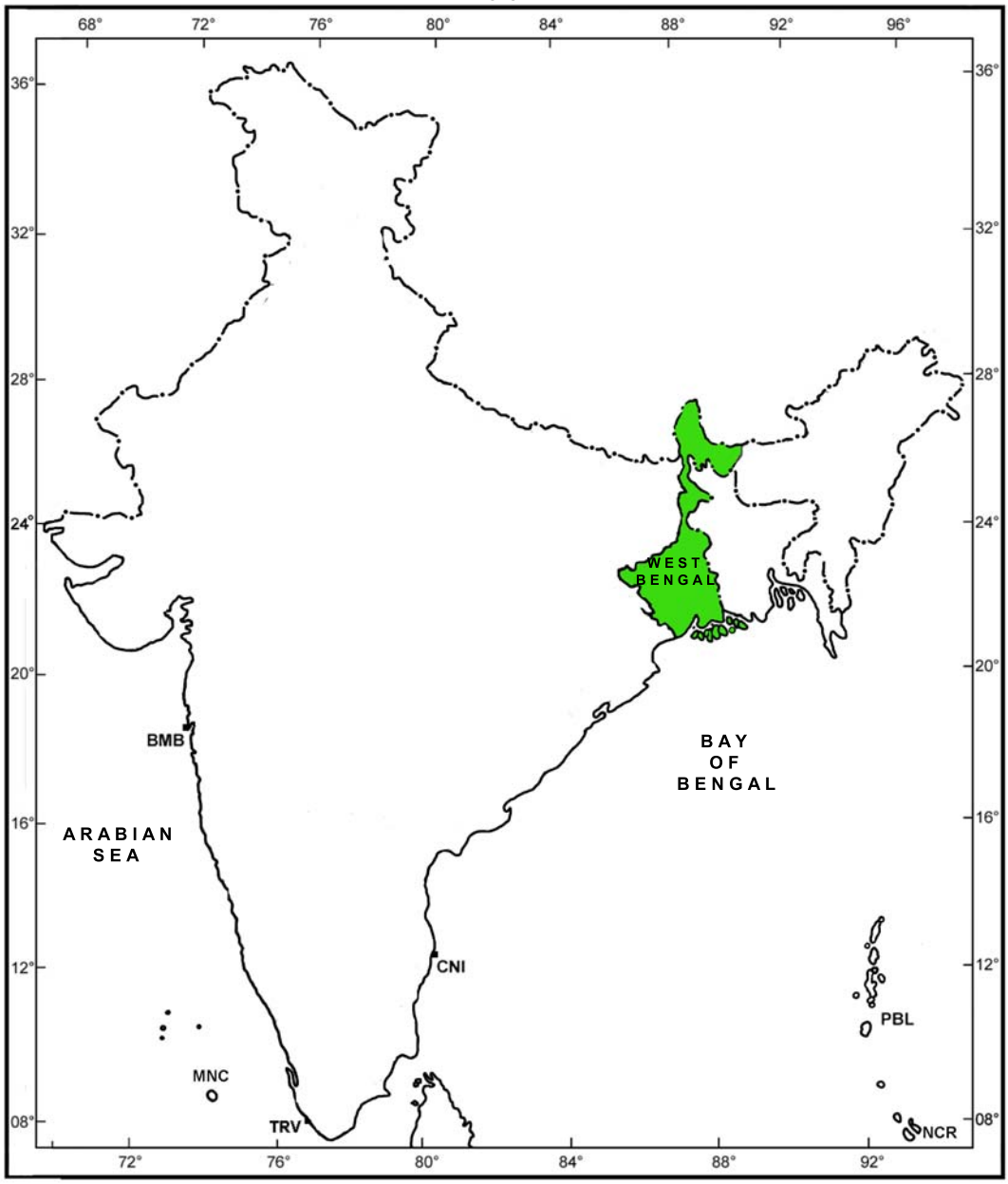
68°
72°
76°
80°
84°
88°
92°
96°
36°
32°
28°
24°
20°
16°
12°
08°
WEST BENGAL
BMB
ARABIAN SEA
BAY OF BENGAL
CNI
PBL
MNC
TRV
NCR

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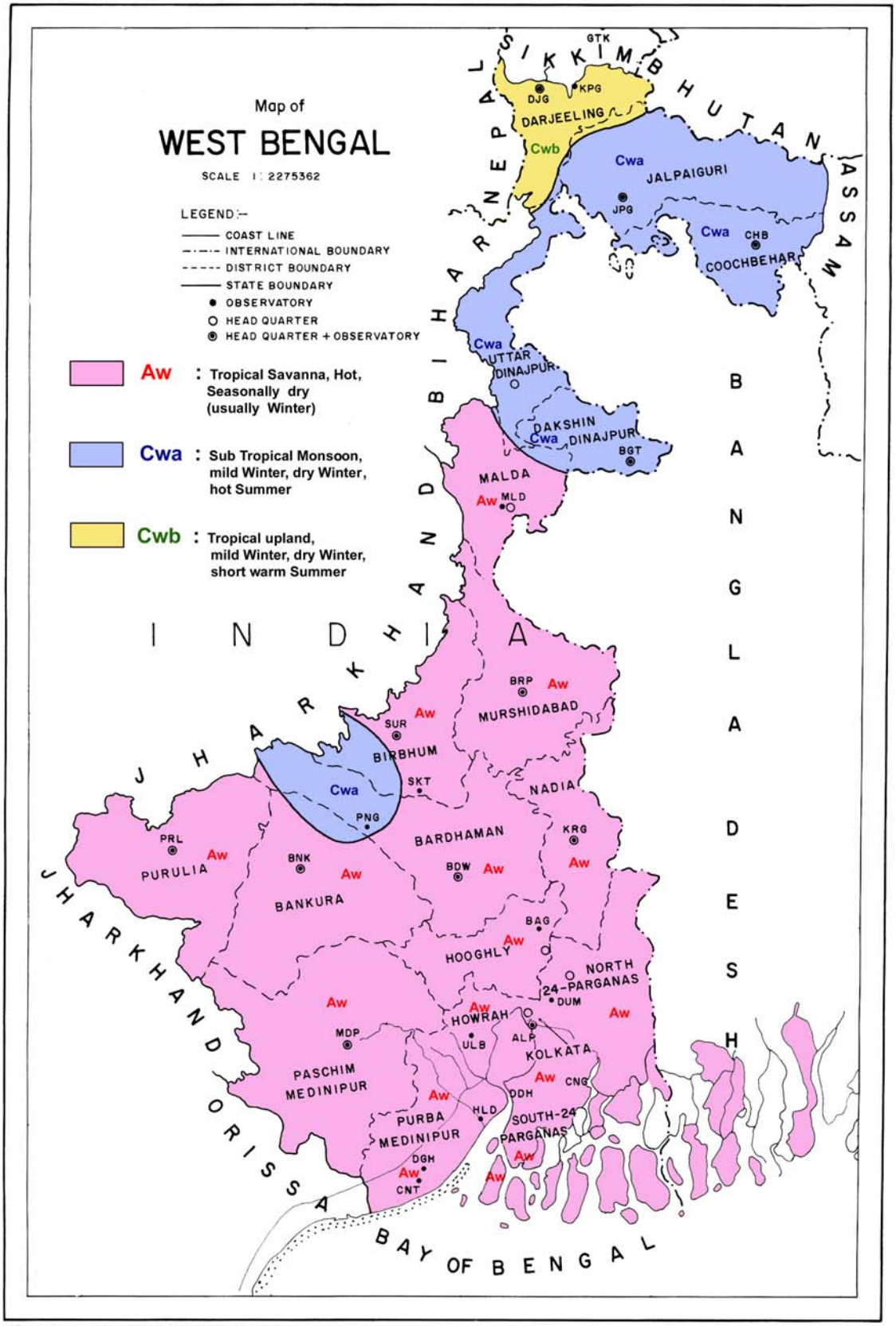

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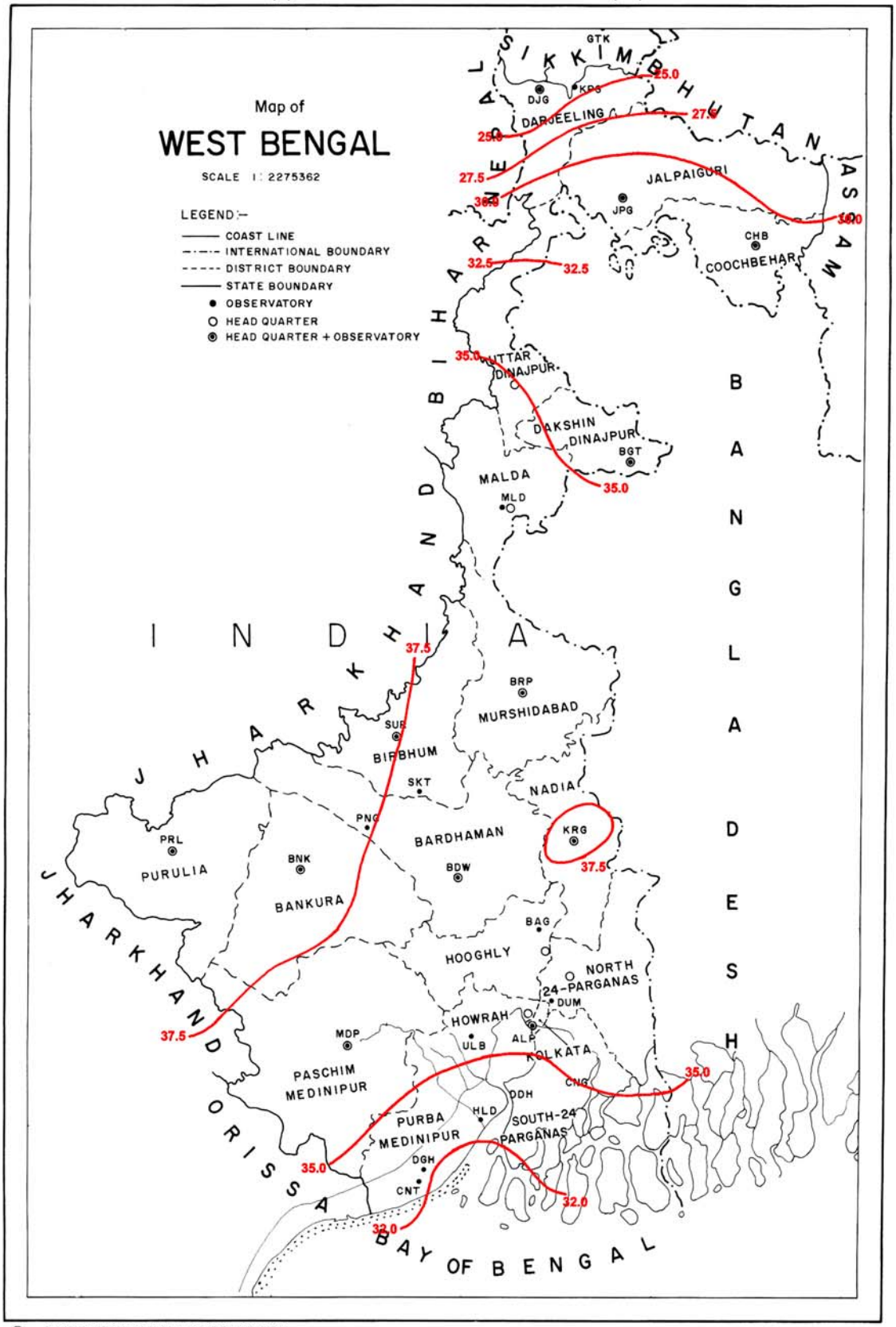

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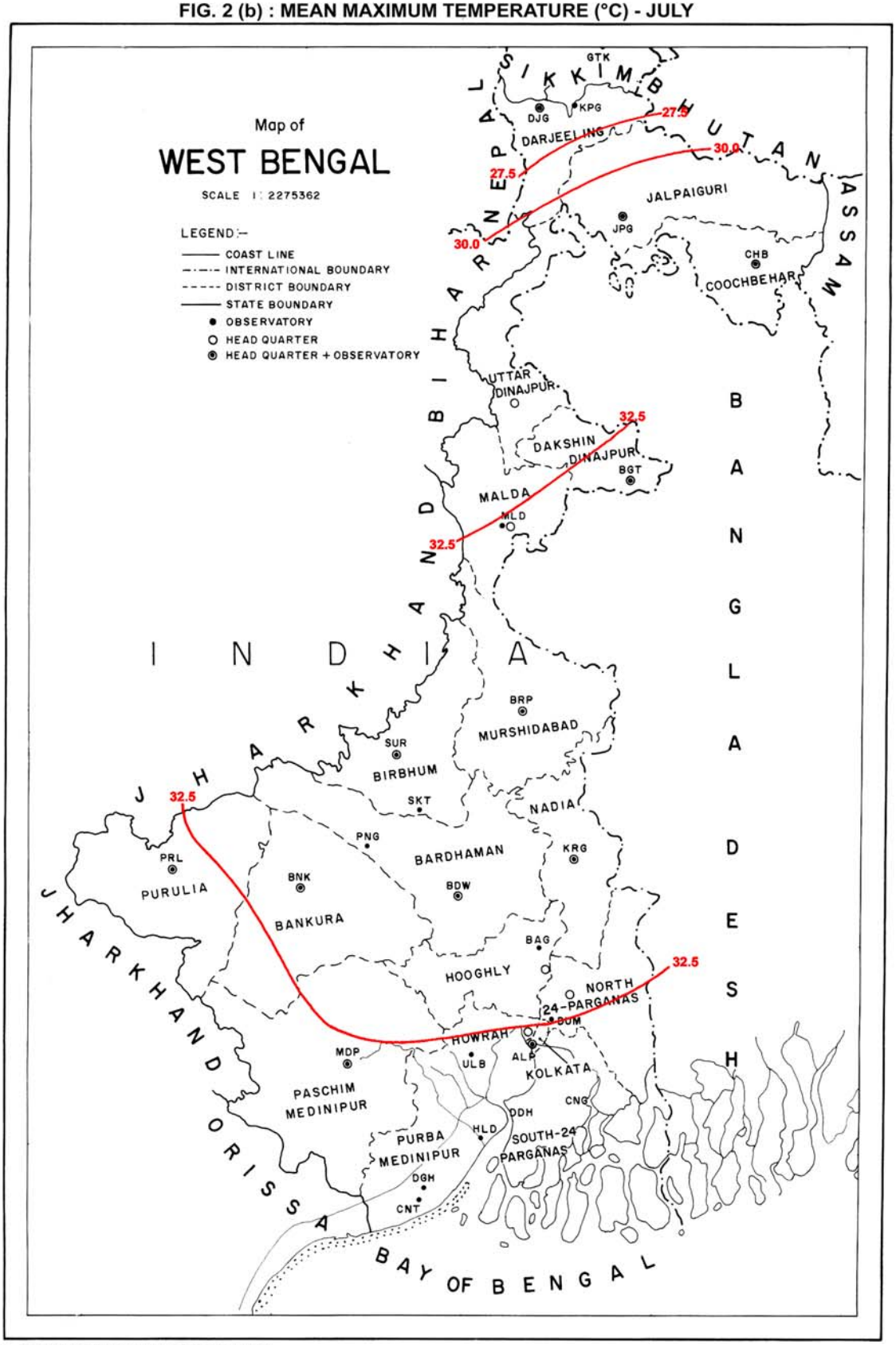

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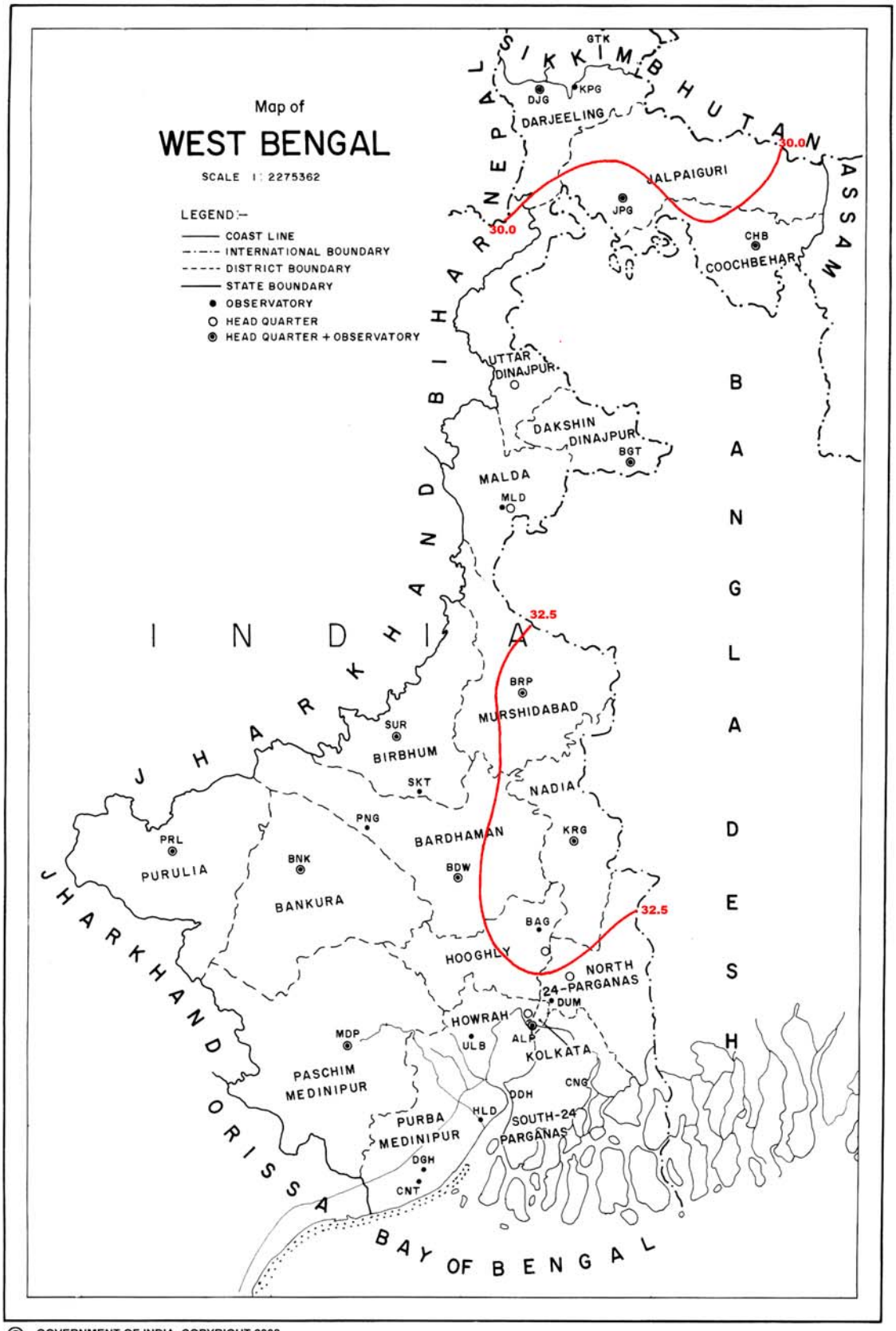

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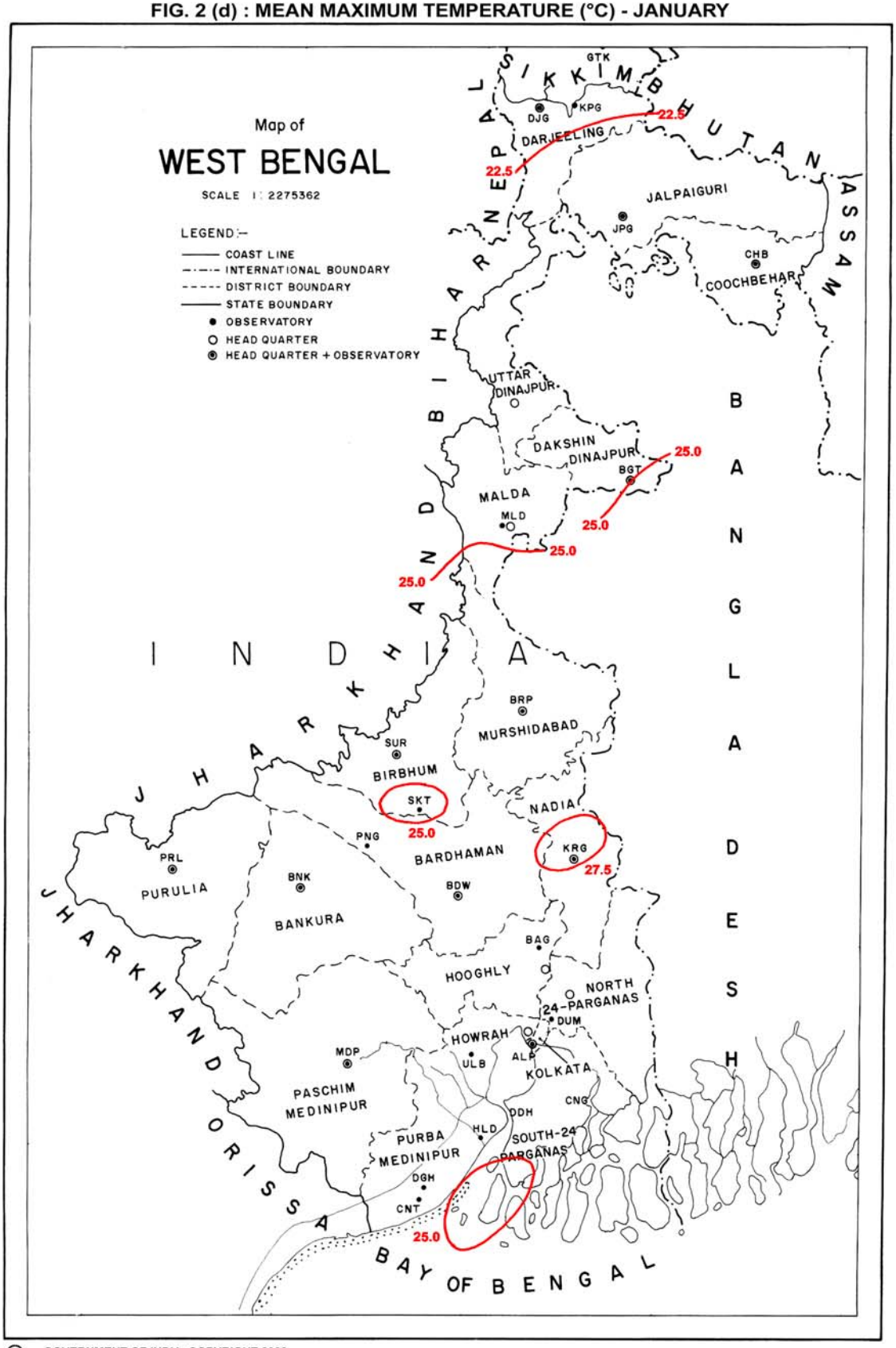

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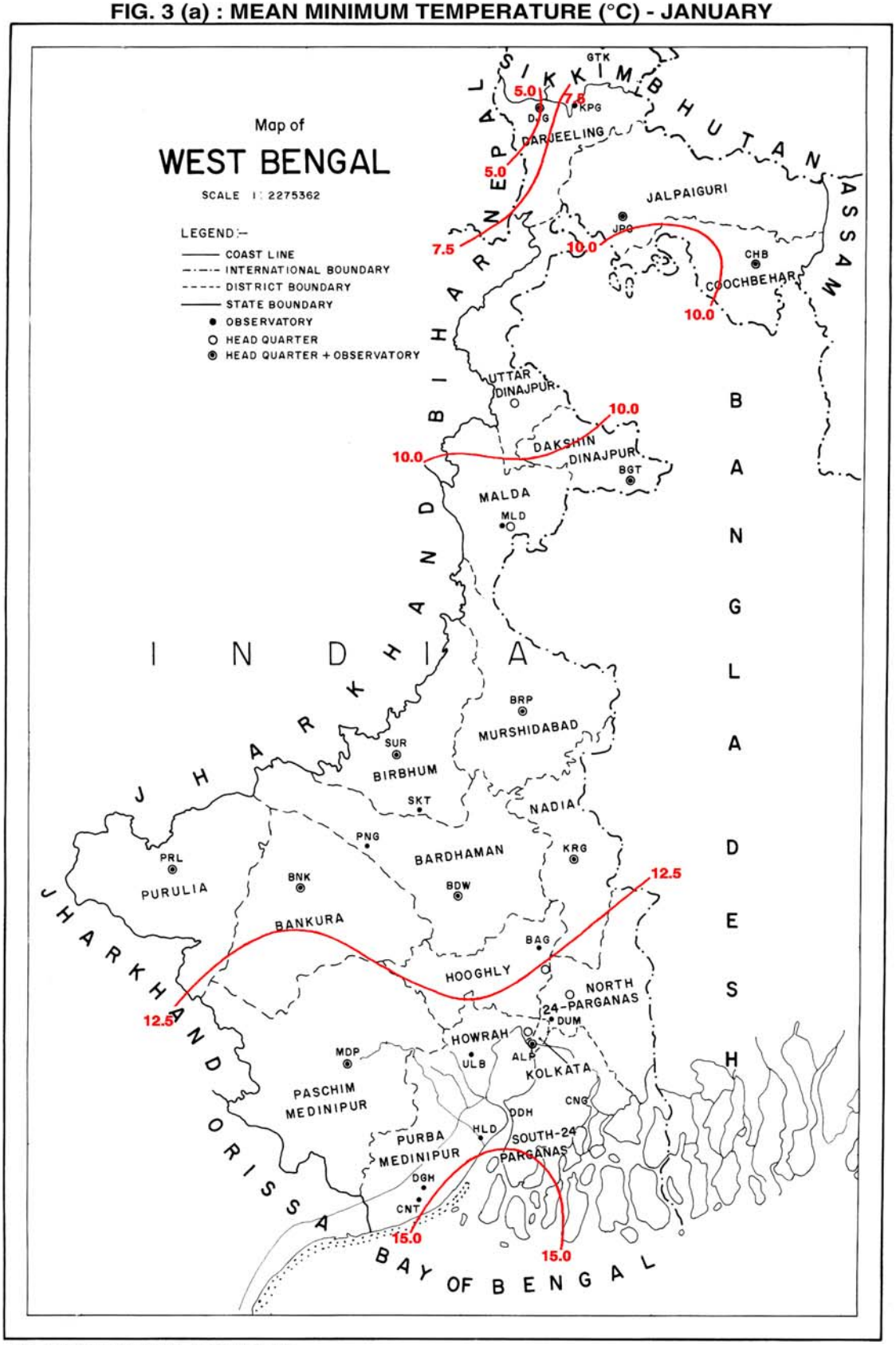

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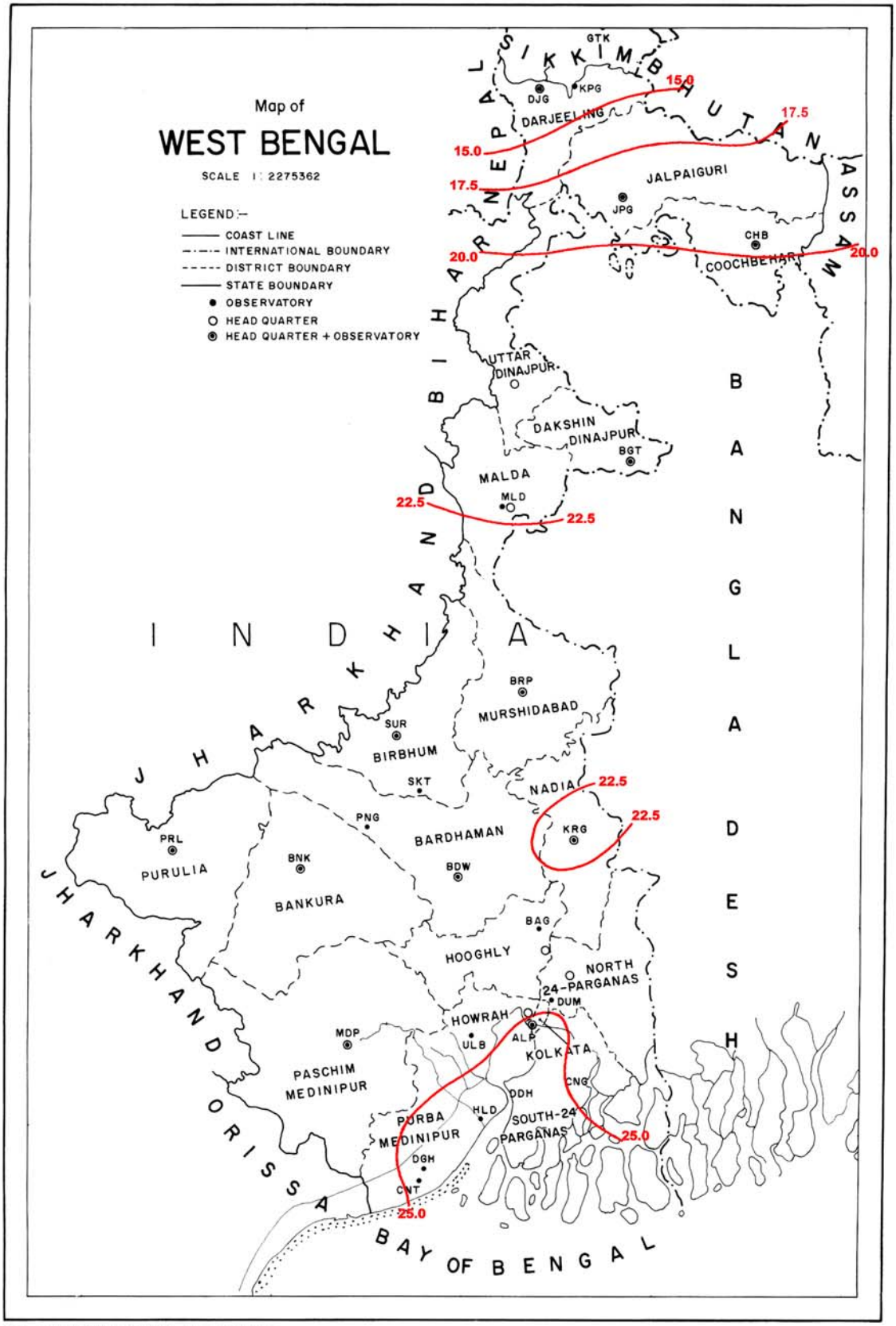

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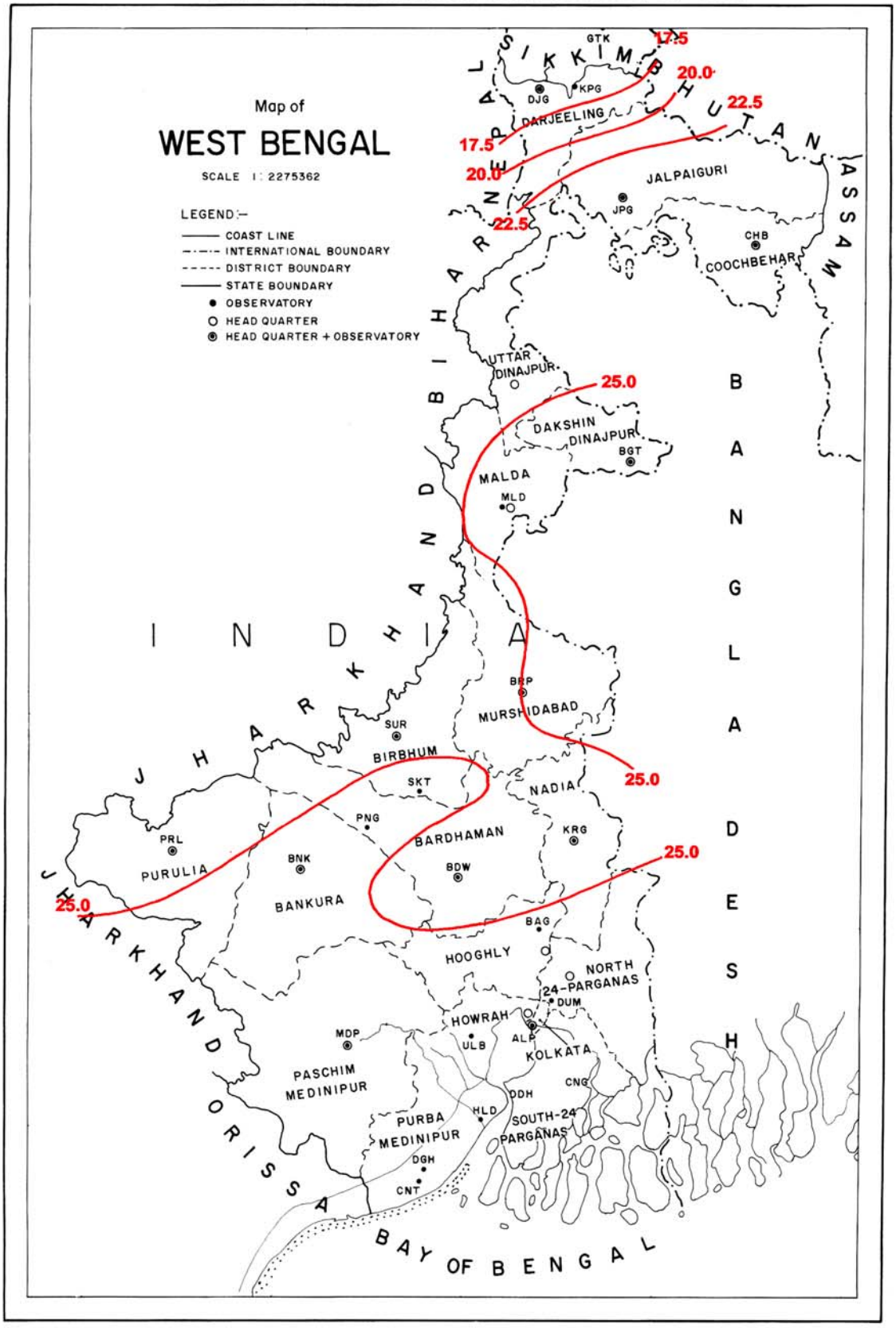

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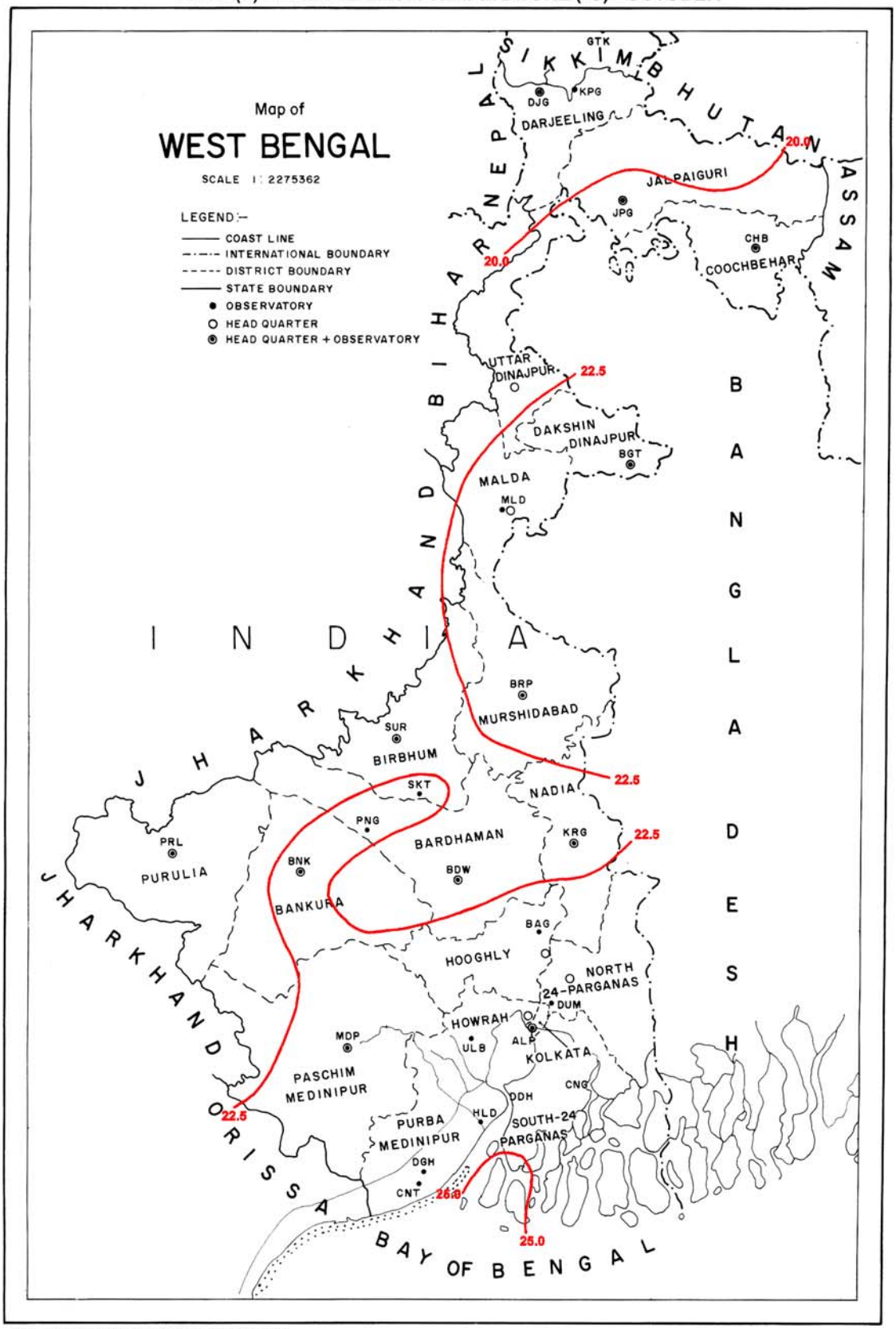

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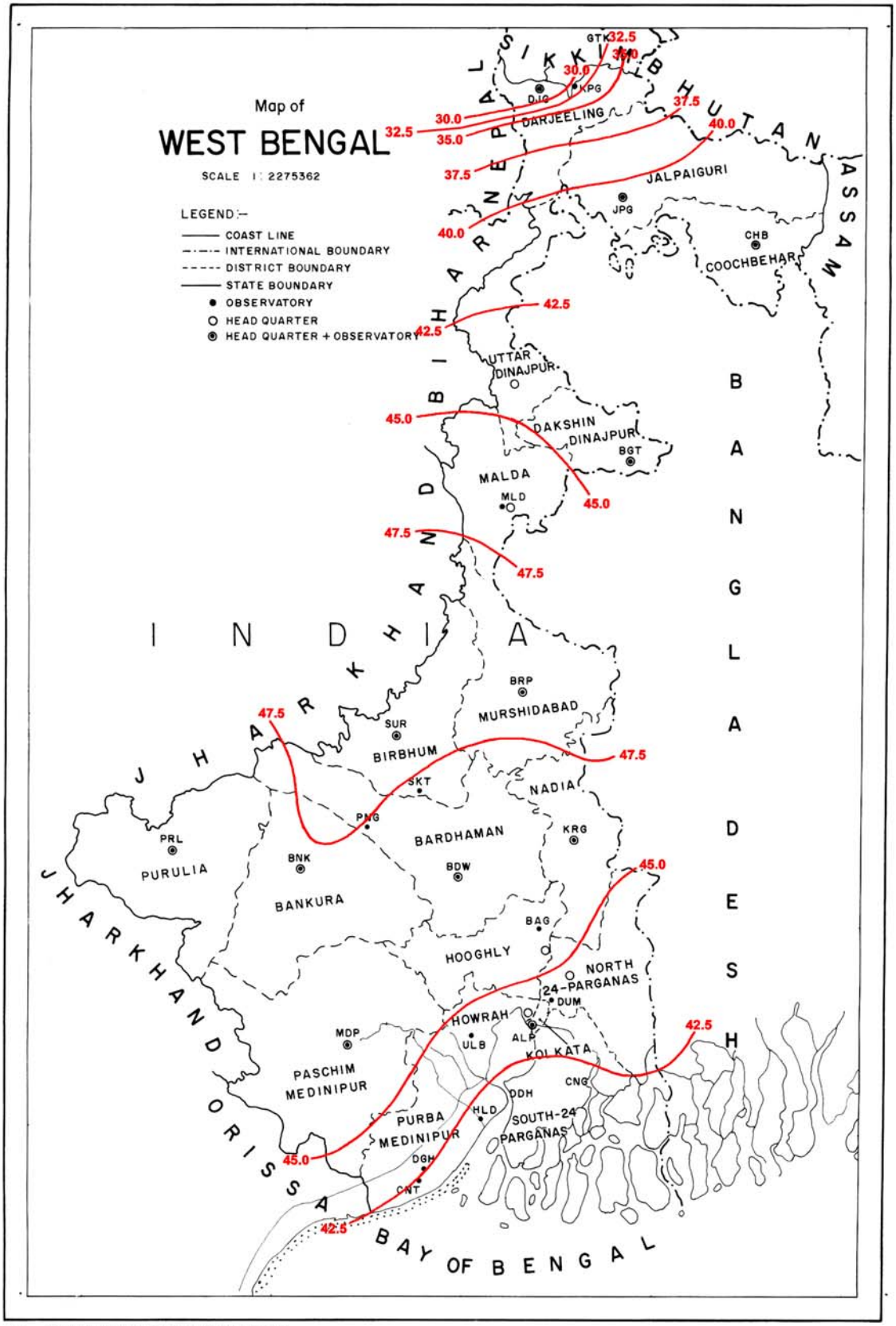

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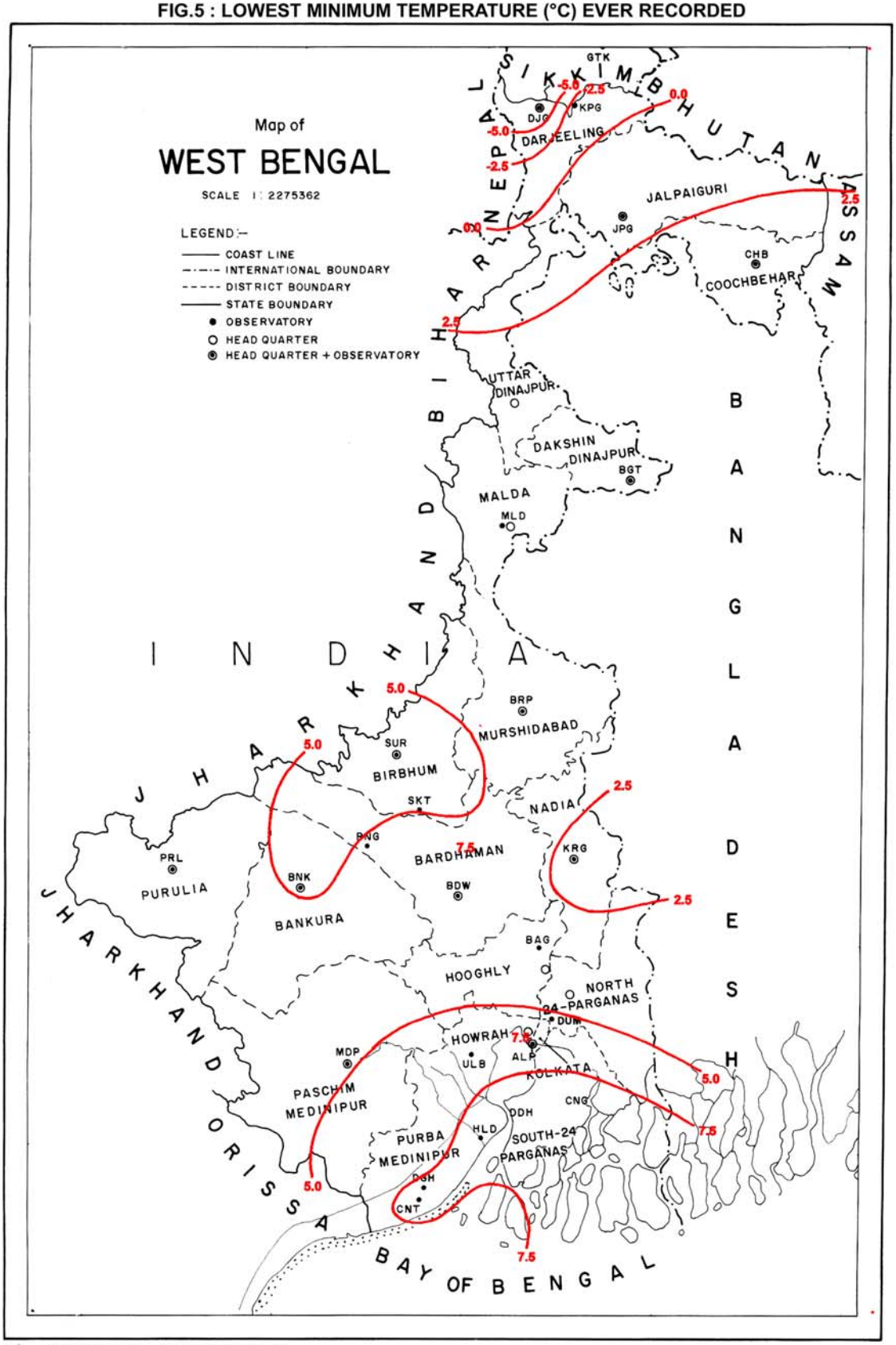

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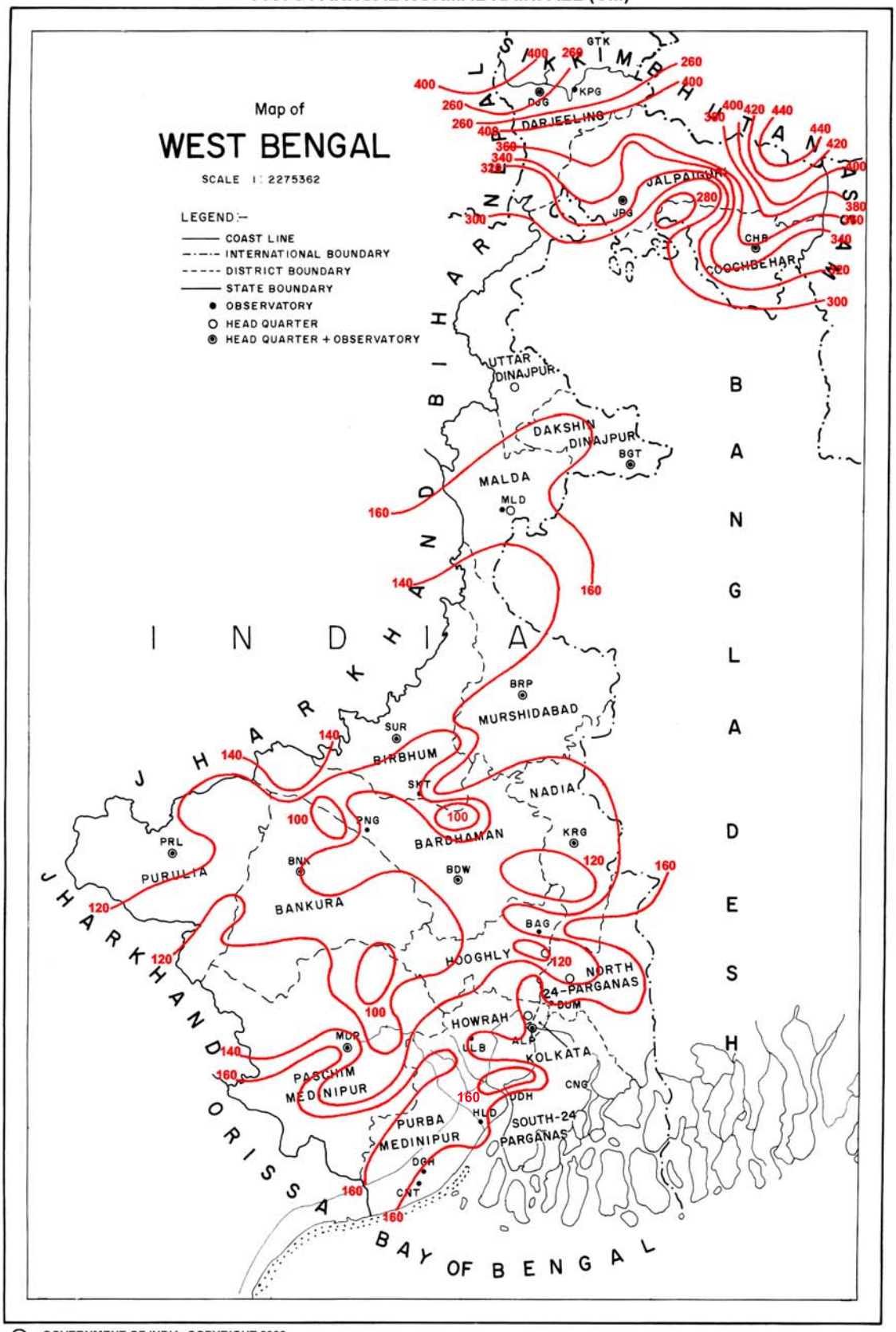

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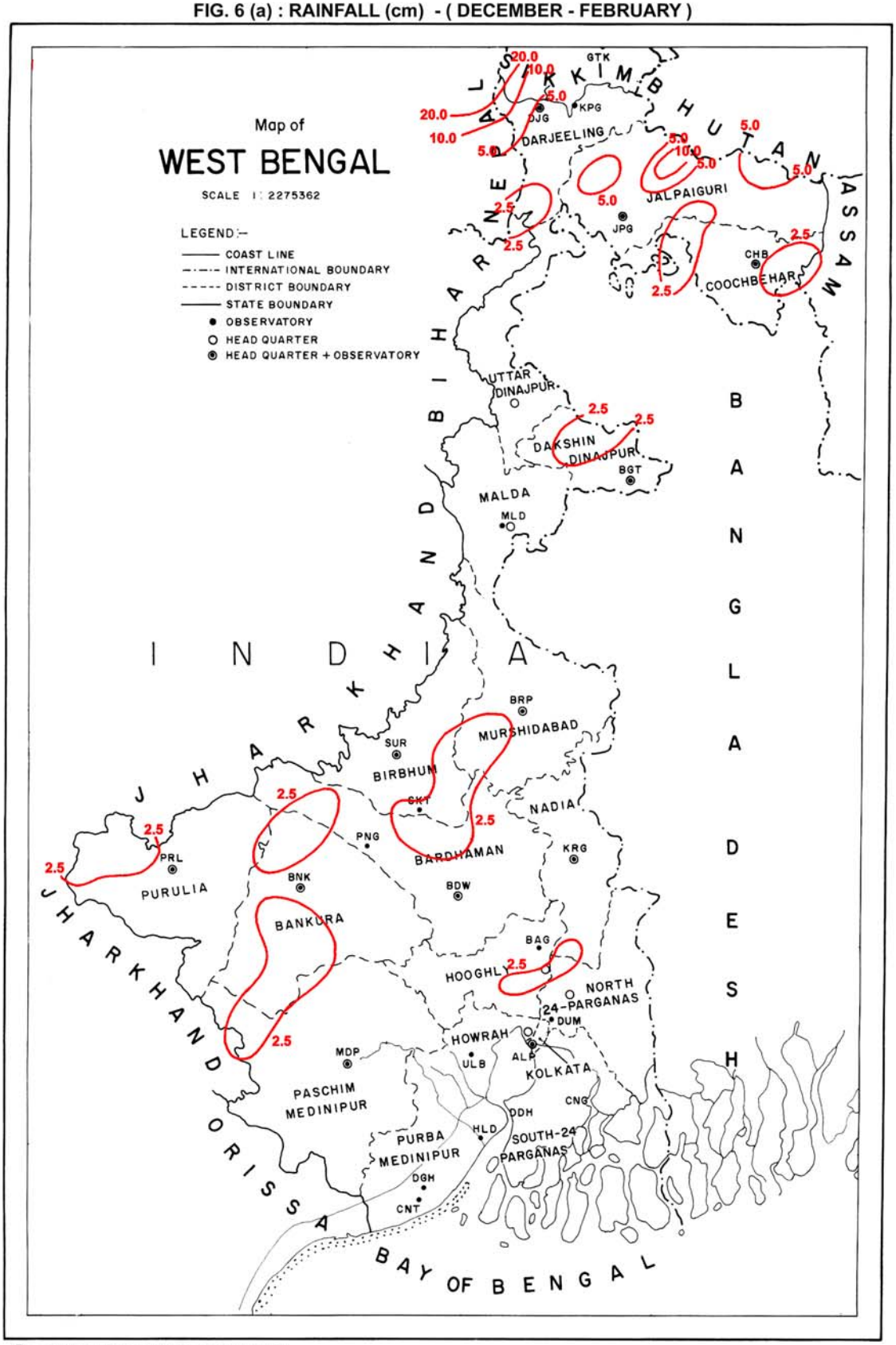

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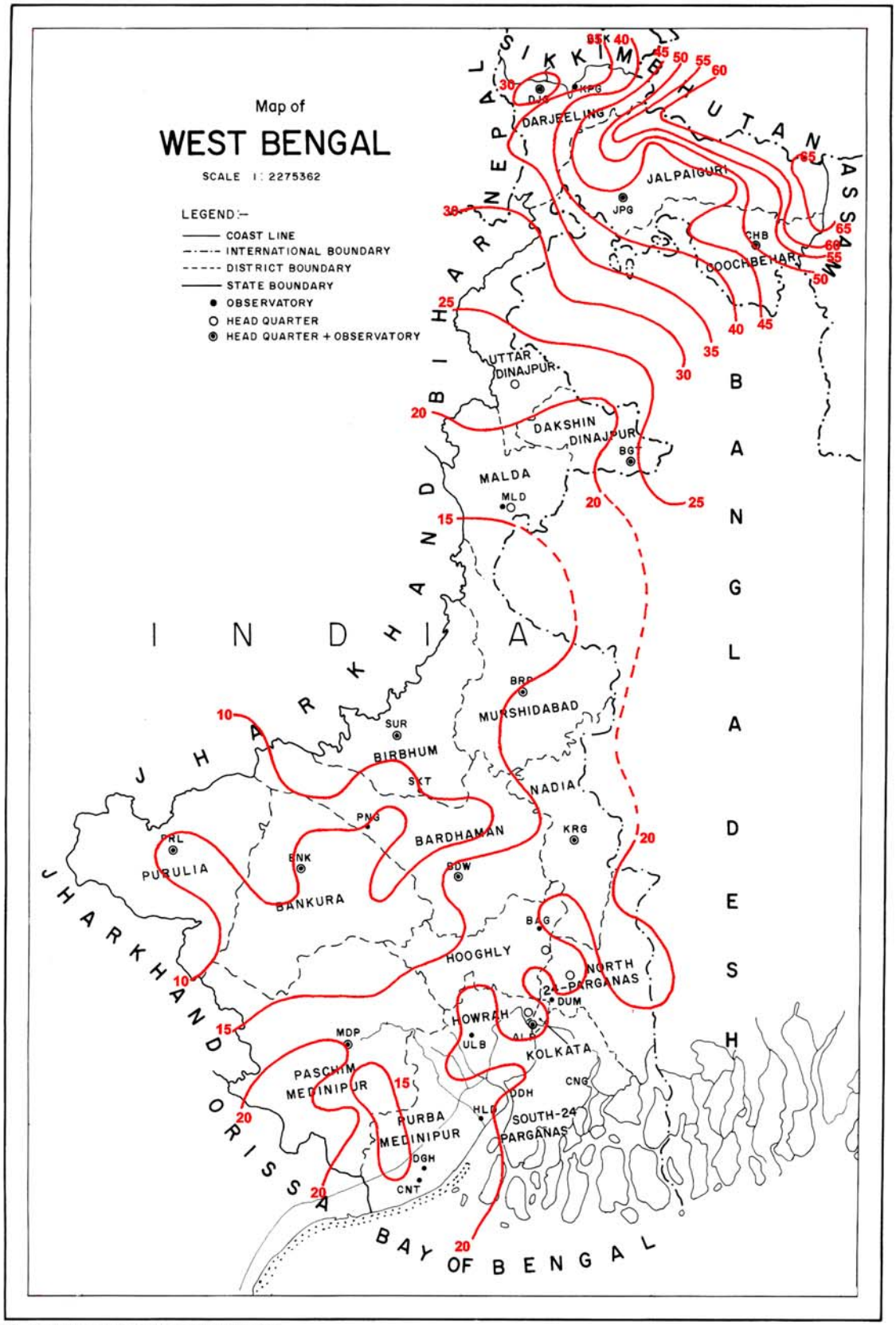

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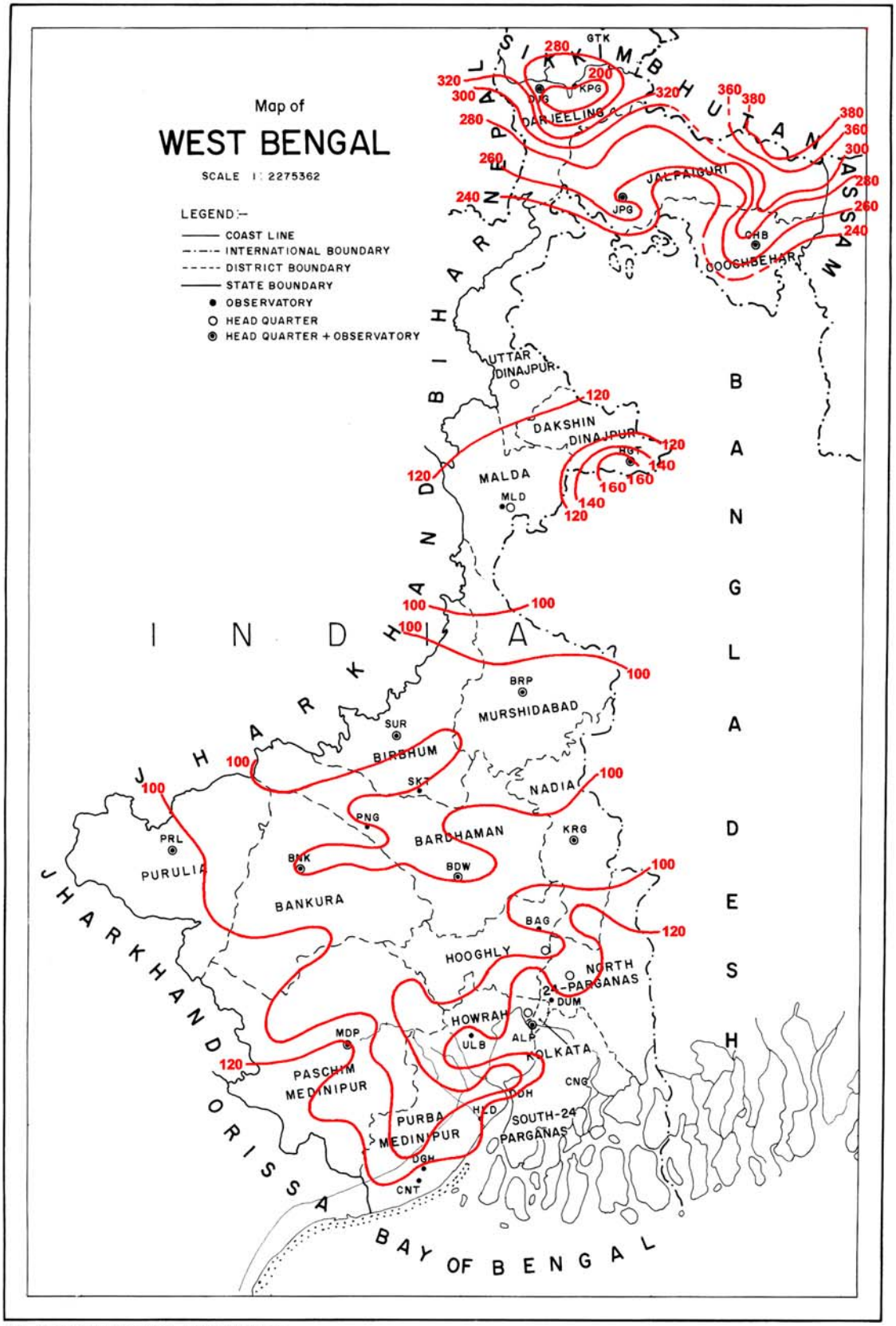

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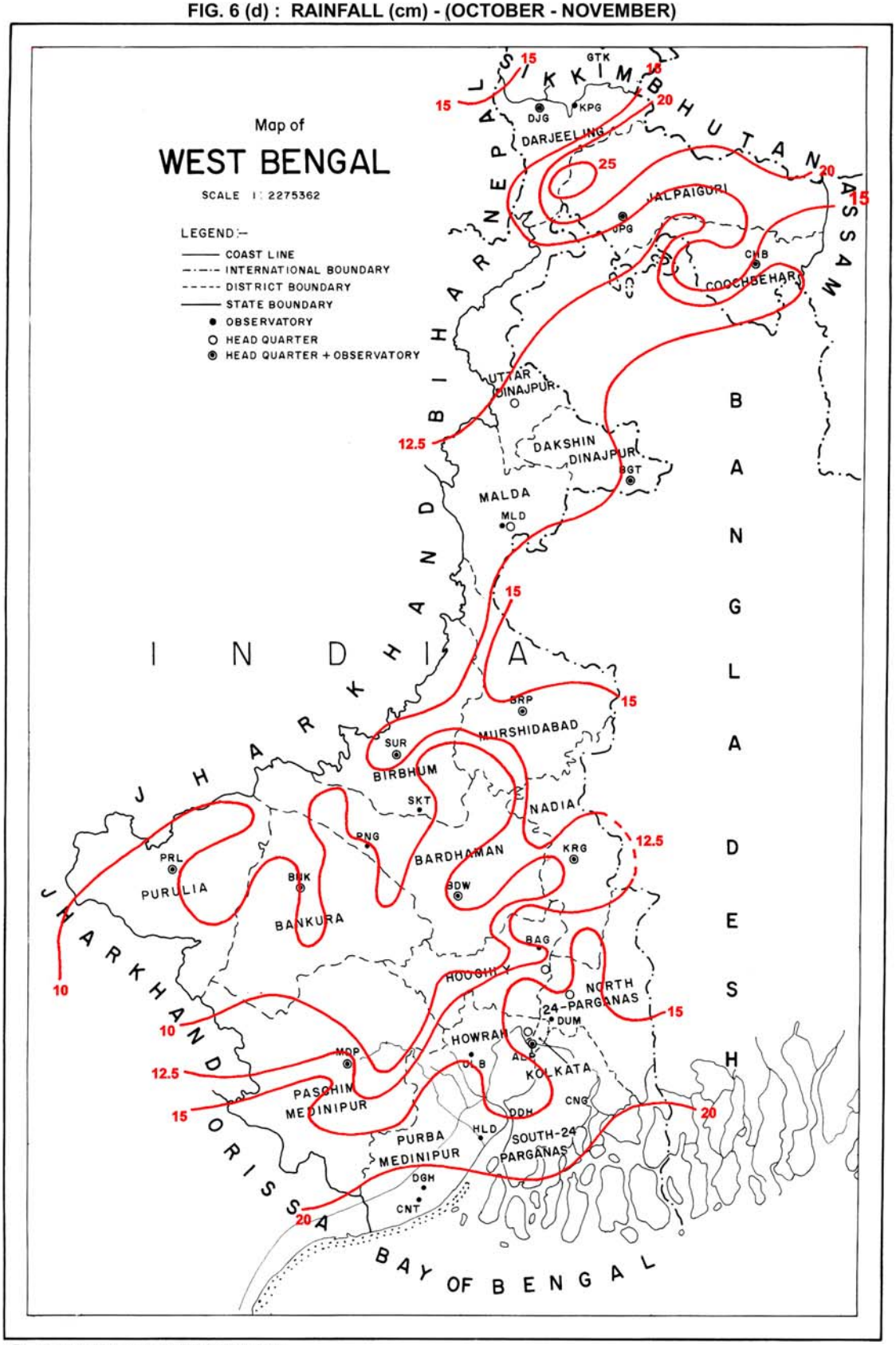

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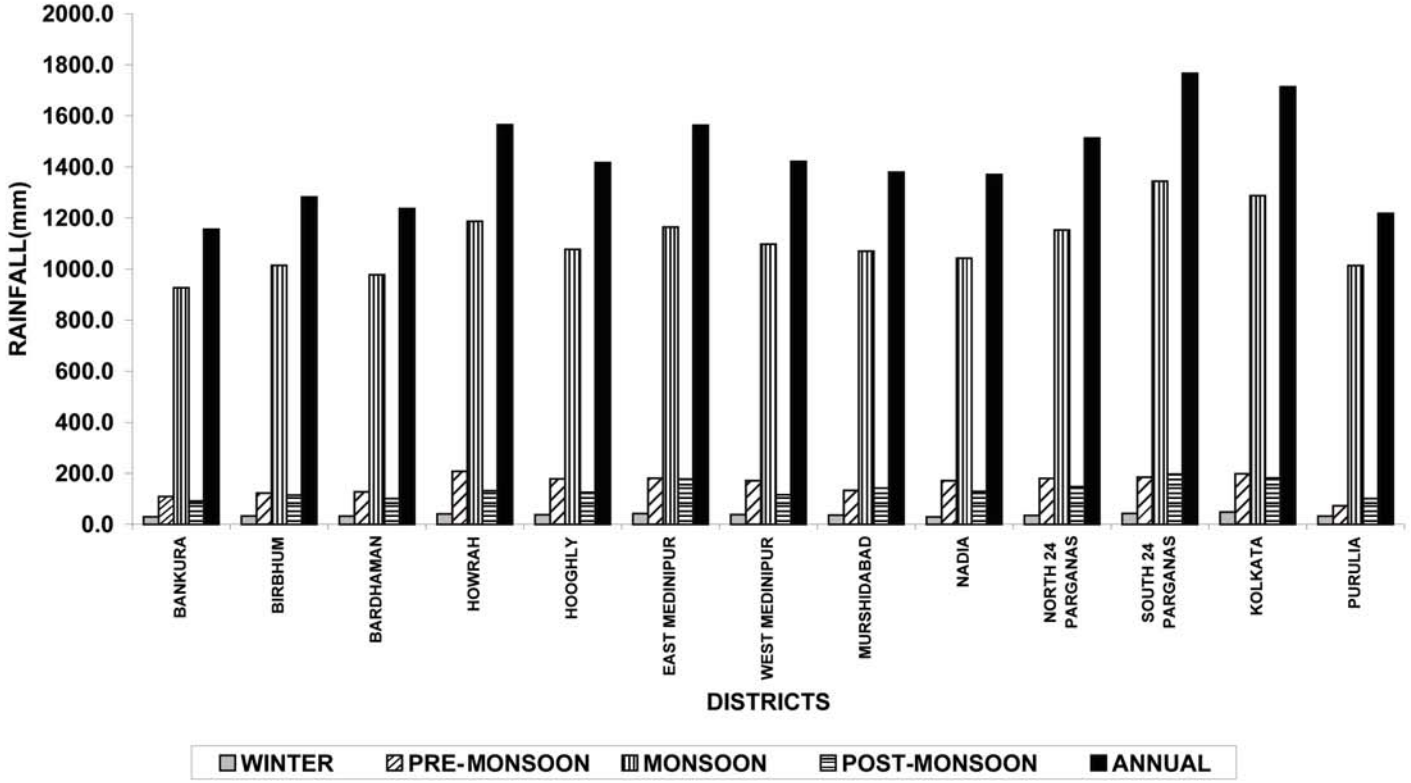

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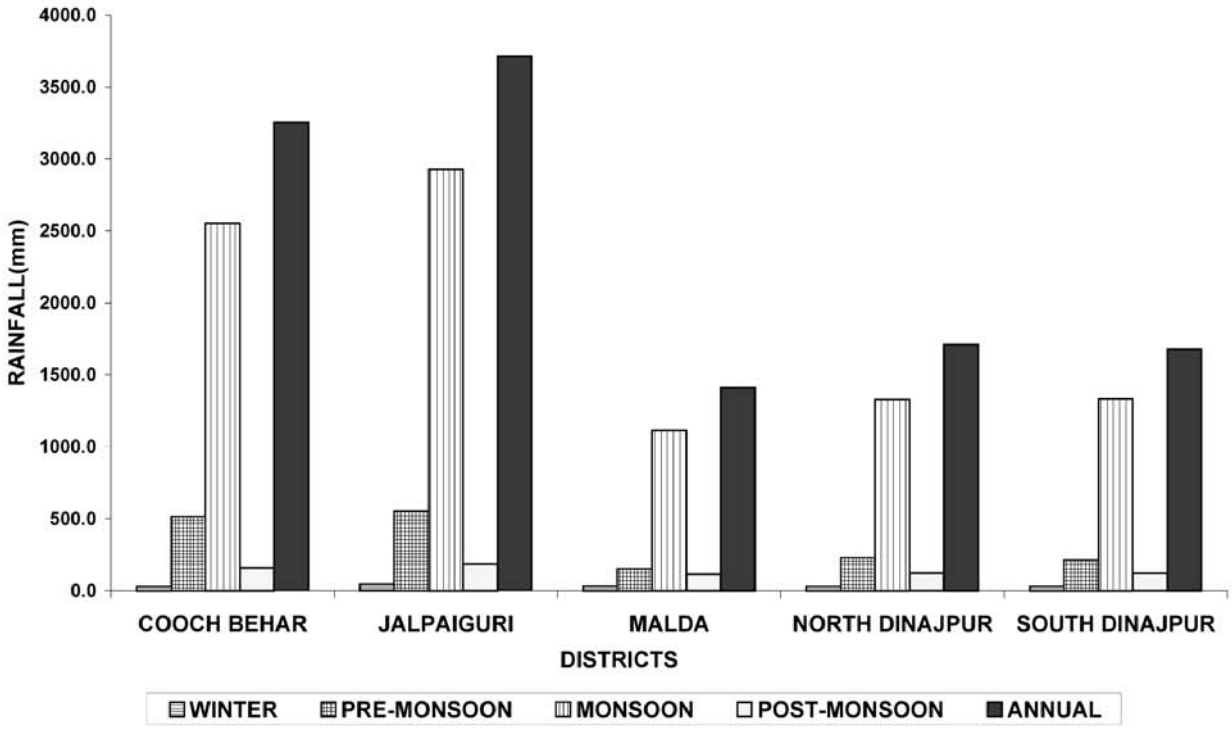

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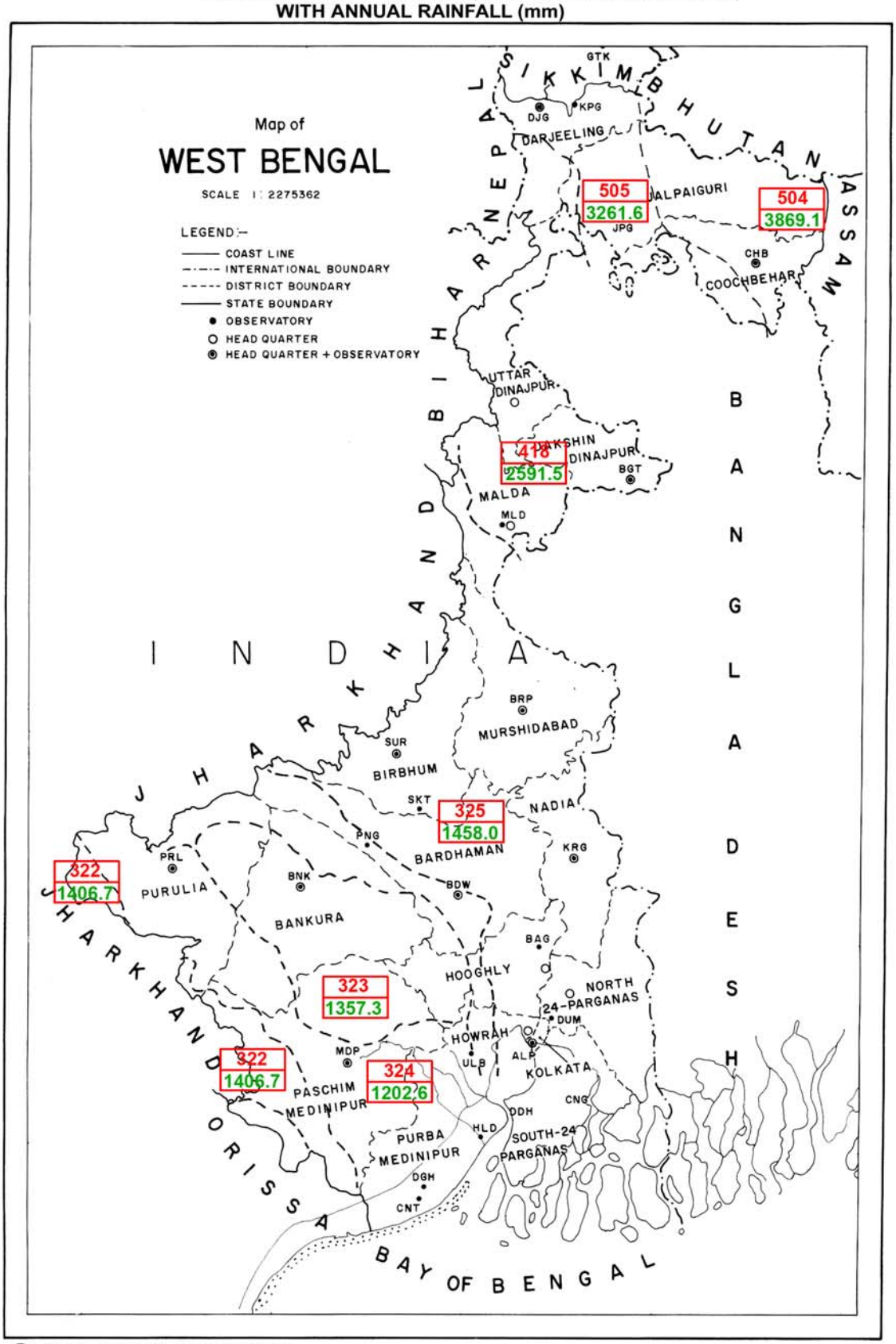

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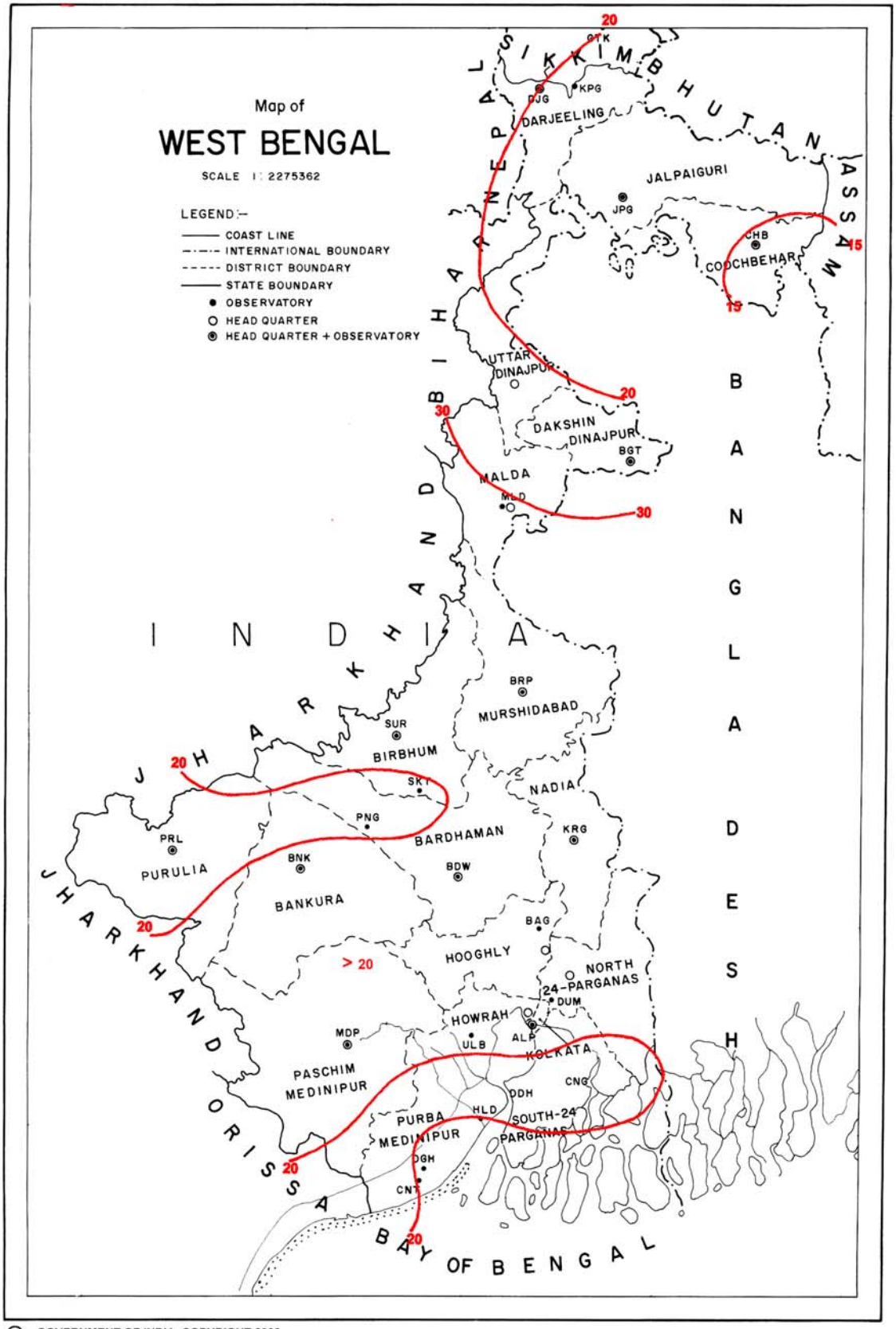

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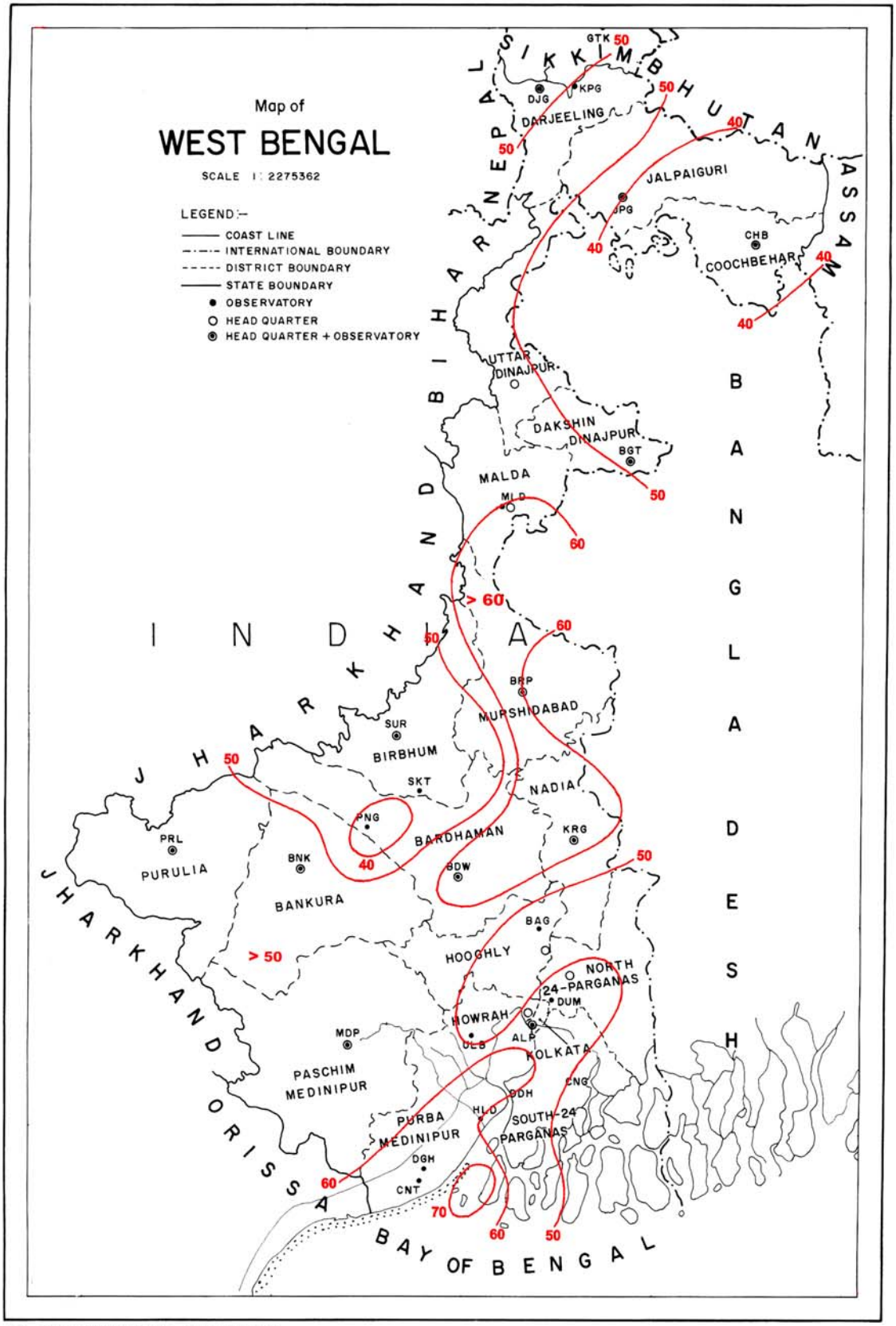

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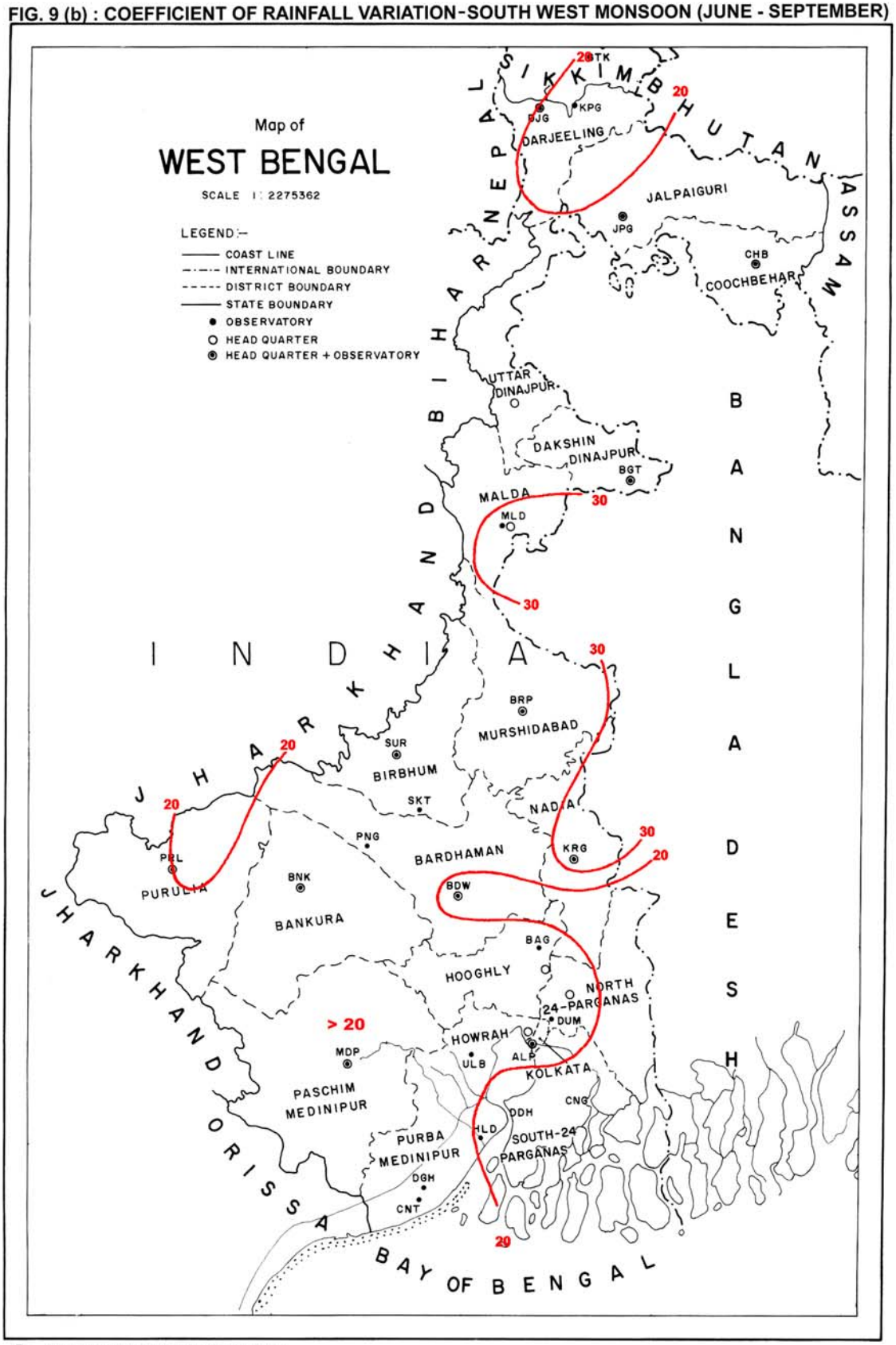

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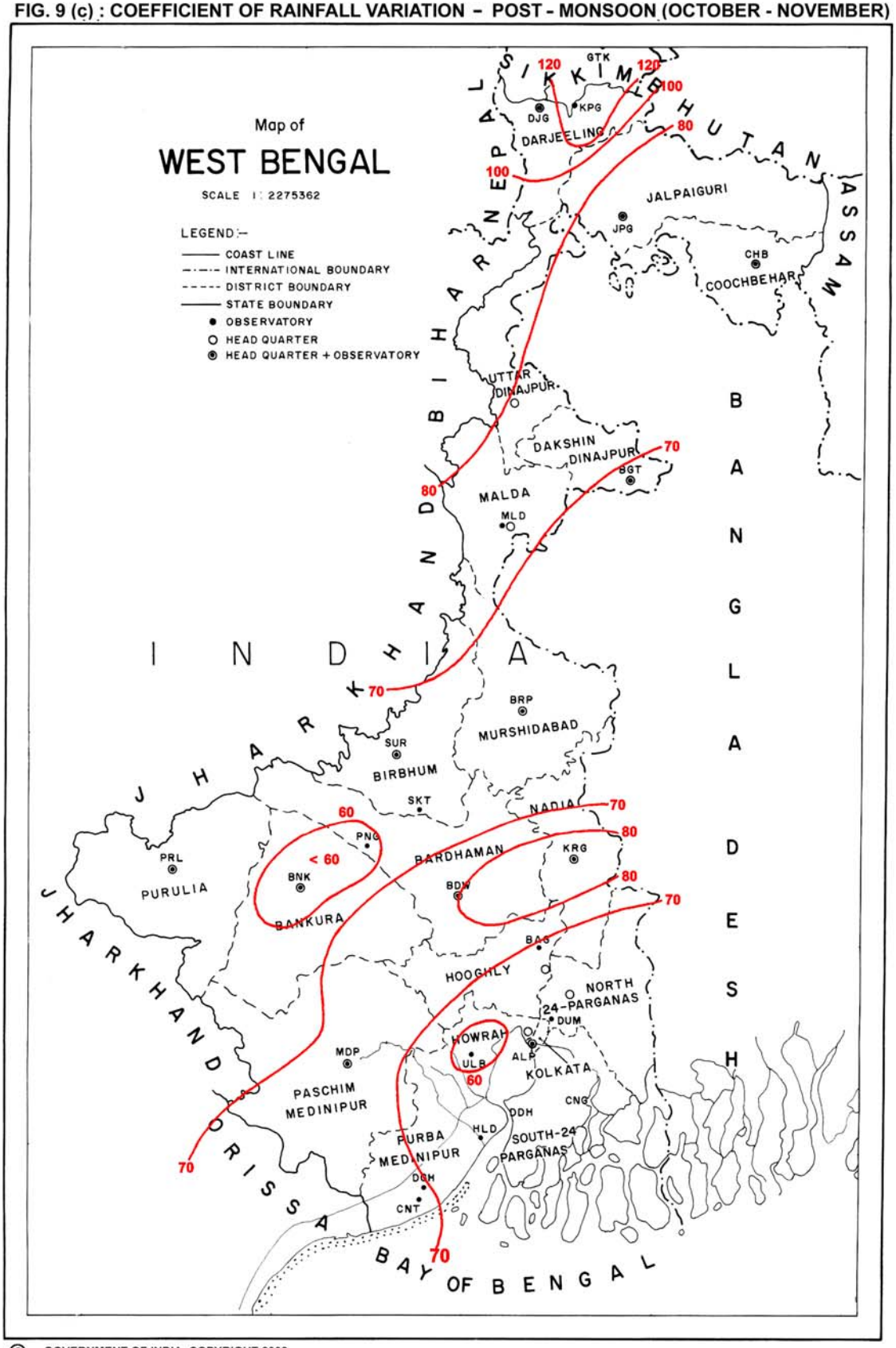

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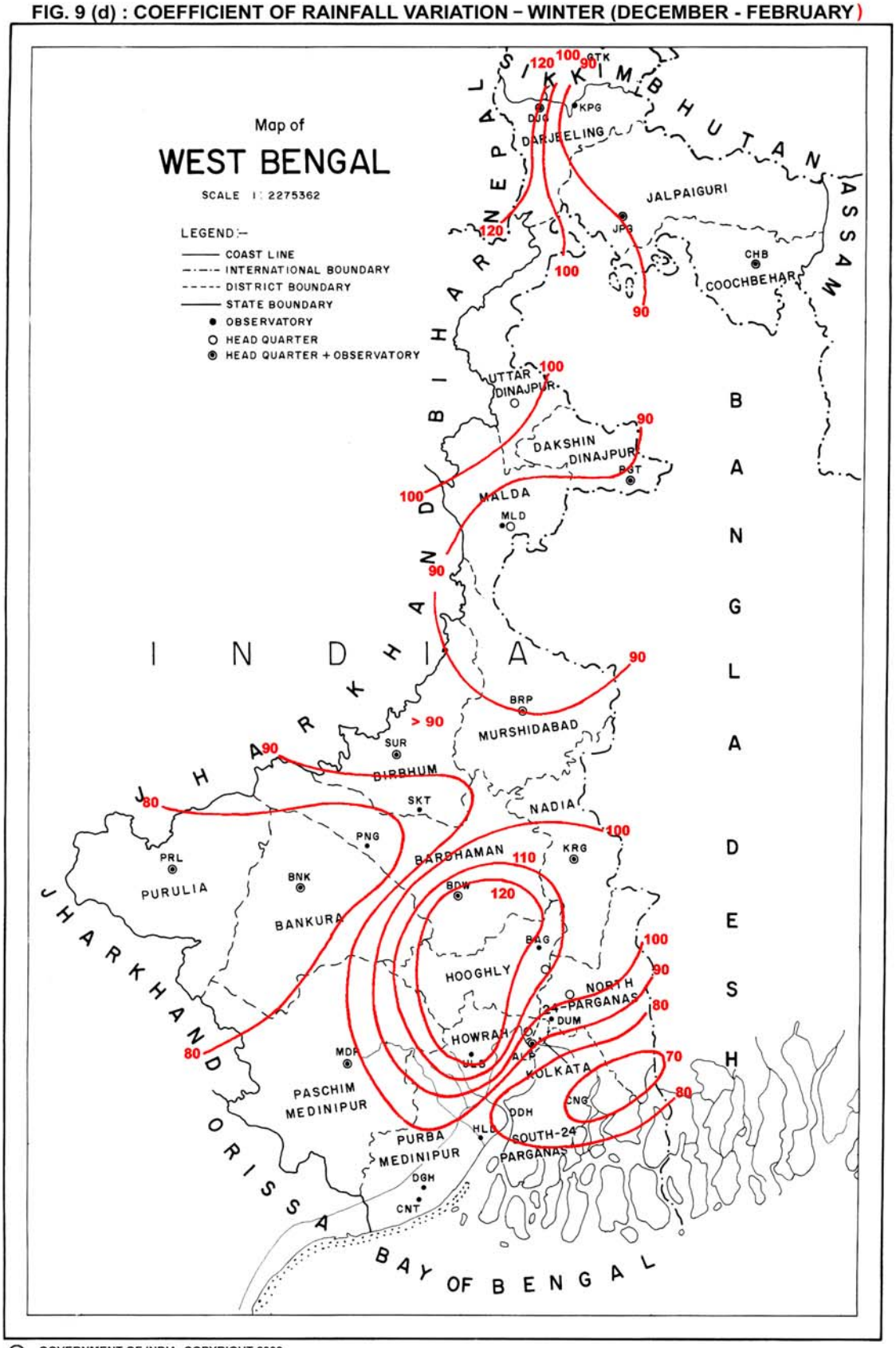

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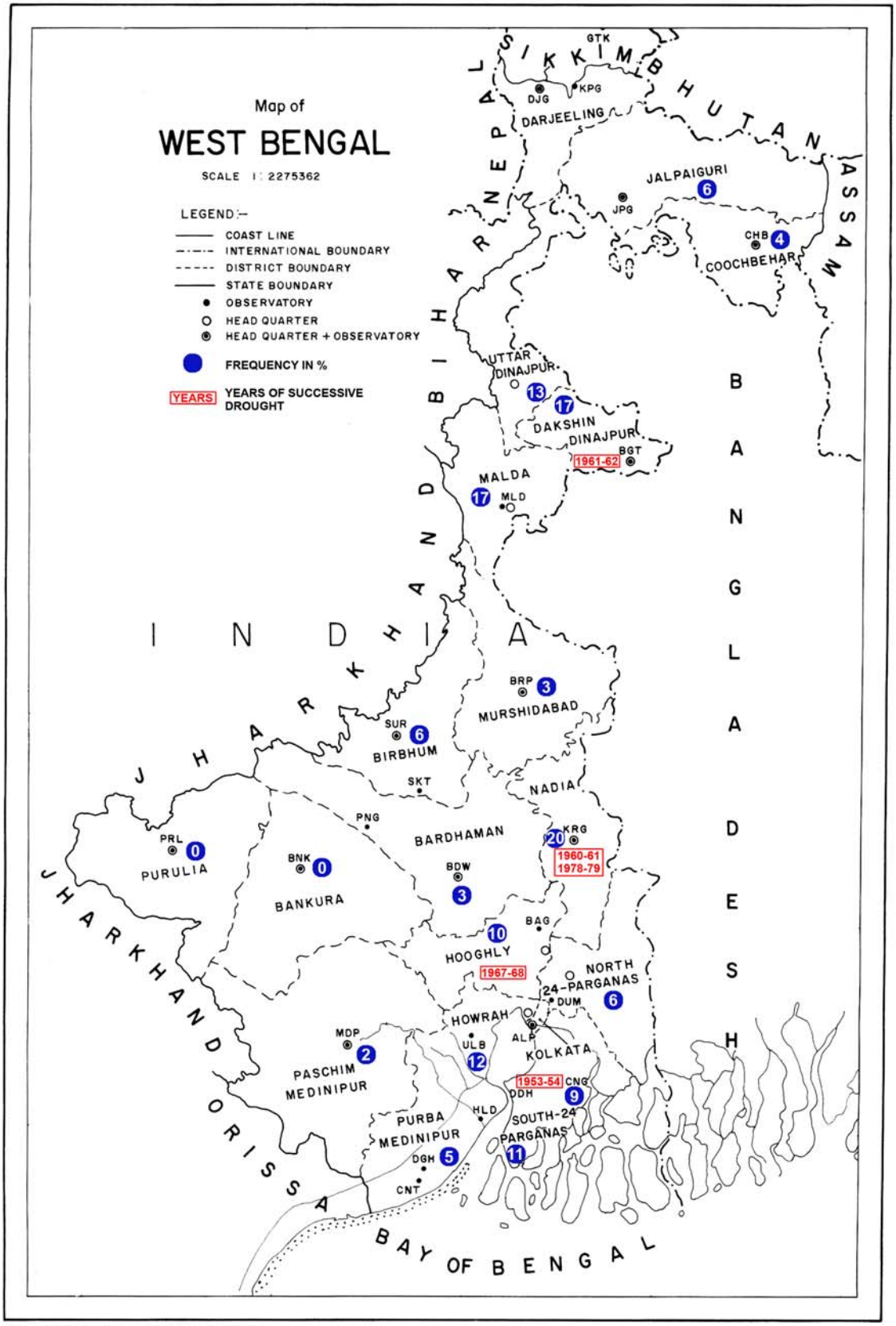

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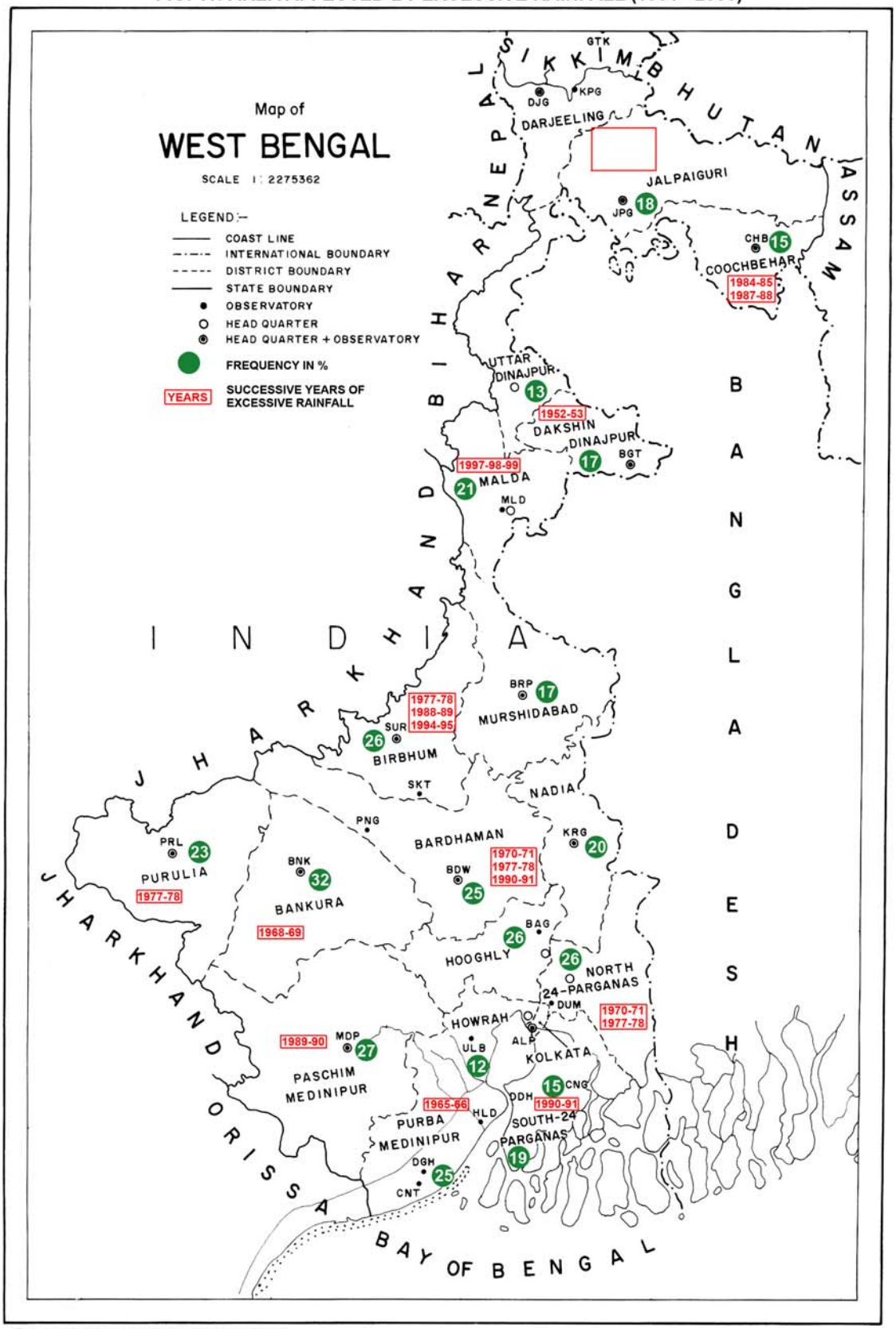

STATE SUMMARY

The Climate of West Bengal State

Introduction

The state of West Bengal extending from the Bay of Bengal on the south to the sub-Himalayan region to the north and from hills and Gangetic plains of Jharkhand and Bihar on the West to riverine Bangladesh with innumerable deltas of the Ganges and the Brahmaputra, has climate of varied nature in view of its geographical location. It lies roughly between 21°30'N and 27°11'N latitude and 85°49'30"E and 89°54'E longitude. Front piece gives the orographic features of the state. The state is bounded on the north by Sikkim, Bhutan and by the mighty chain of Himalayas; on the west by Nepal and the districts of Santhal Parganas viz., Deoghar, Godda, Sahebganj, Dumka, Singbhum East and Singbhum West, Dhanbad, Hazaribagh, Ranchi, Singbhum in Jharkhand, Purnea in Bihar and the districts of Mayurbhanj and Balasore in Orissa, on the south by the Bay of Bengal; and on the east by the districts of Kamrup, Garo hills in Assam and Bangladesh. Fig.1 depicts the physical features of the state. The inset Fig. 1(a) indicates its position in the country.

West Bengal contains tracts of very different physical features like alluvial plains of the Ganges together with its deltas and a small portion of the sub-Himalayan region which form the main part of Darjeeling district. The part of West Bengal, west of Bhagirathi lies outside the true delta. The eastern portion of this tract is low and of alluvial formation; but farther west laterite begins to predominate and the surface rises and becomes more and more undulating and rocky, until at last it merges in the uplands of Chhota Nagpur. The part of West Bengal east of Bhagirathi and south of the Padma is formed out of the Ganges

delta. North Bengal lies north of the Padma and is wholly alluvial with the exception of the sub-Himalayan region in the district Darjeeling.

Rivers

The network of river Ganges provides the state with the most striking feature. The river Ganges flows due east as far as Rajmahal hills with Sinusoidal track and enters Malda district of West Bengal. From this point it follows a southerly course as Bhagirathi. As Bhagirathi silted up gradually, the main stream of Ganges was forced to give rise to tributaries: the Ichamati, the Jalangi and the Matabhanga which in turn became the main stream. The Ganges is known as Padma from south of the point where the Bhagirathi leaves it. Along the northern part of Bengal numerous rivers move out of the Himalayas. At present the chief Himalayan tributary of the Ganges in this state is the Mahananda while the Tista is an affluent of the Brahmaputra. On its right bank, the Ganges receives the Bhagirathi, which in the latter part of its course is called the Hooghly. The Ganges is fed by waters of the Damodar and Rupnarayan coming from the same direction. Further south several rivers which drain Chhota Nagpur plateau run through the districts East and West Medinipur before reaching the Bay of Bengal. The Kasai, the Haldi and Subarnarekha are some of them.

The process of land formation which is active along the shores of the Bay of Bengal gives rise to new islands. These islands are gradually joined with the mainland as the channels separating them from the mainland silt up. Sagar Island, off the mouth of the Hooghly, is an important island for centuries.

Although major portion of the state lies beyond the tropical zone, its climate during 8 months of a year, i.e. from the middle of March to the end of October is tropical in nature. During this period the state except for sub-Himalayan region experiences both high temperature and humidity as well as a dry and a wet season. During the rest period the temperature is much lower, humidity is moderate and rainfall is less. The climate of the state is characterized by hot and moist summer, cold and dry winter except in the sub-Himalayan region. The sub-Himalayan regions are very pleasant in the hottest months.

Meteorological sub-divisions

For meteorological purposes, the state has been divided into two sub-divisions namely:

(a) Gangetic West Bengal consisting of the districts: (1) Bardhaman (2) Bankura (3) Birbhum (4) East Medinipur (5) Hooghly (6) Howrah (7) Kolkata (8) Murshidabad (9) Nadia (10) North 24 Parganas (11) Purulia (12) South 24 Parganas and (13) West Medinipur.

(b) Sub-Himalayan West Bengal consisting of the districts: (1) Cooch Behar (2) Darjeeling (3) Jalpaiguri (4) Malda (5) North Dinajpur and (6) South Dinajpur.

Climate

Areas in the state under each climatic pattern based on Koppen's classification are shown in Fig. 2. The climate of the state comes under two distinct types. The major parts of sub-Himalayan West Bengal belongs to the type: sub-tropical monsoon, mild winter; dry winter, hot summer (Cwa) and Gangetic West Bengal and adjoining southern parts of Sub-Himalayan West Bengal belongs to the type: Tropical Savanna Hot; seasonally dry (usually winter) (Aw). However, northern most part viz., Darjeeling district has a climatic type: Tropical upland, mild winter; dry winter; short warm summer (Cwb).

The year may be divided into four seasons. The winter season from December to February is followed by the premonsoon season (hot weather season) from March to May. The period from June to the middle of September constitutes the southwest monsoon and the period from the latter half of September to November is the post monsoon period.

The period from December to February is generally very unpleasant due to low temperatures over the sea except in the coastal belt. In the hot weather season from March to May, weather is dry and uncomfortable in the interior. Due to lower temperatures, the hilly regions are however, comparatively less uncomfortable. Weather tends to be oppressive during June due to high humidity and temperature. The rest period of the monsoon is fairly comfortable due to reduced day temperatures, although humidity continues to be high.

Sea Level Pressure and Winds

The seasonal variation of atmospheric pressure over the state takes place in a systematic manner with a maximum in the winter and a minimum in the monsoon season (June and July). The pressure gradient over the state generally remains weak except during the late summer and monsoon season. During winter the higher pressure is to the north. In April, the pressure increases from northwest to the northeast. Accordingly the winds, which are light and mainly from a northerly direction in January turn gradually anticlockwise and

are replaced by light winds from a southerly direction in April. With the advance of the summer the pressure gradient increases and correspondingly the winds from south to southwest also strengthen reaching their maximum strength in May. In the monsoon season a trough over the Head Bay extends northwestwards through Gangetic West Bengal and accordingly, winds are from a westerly direction on the southern side of the trough and from a easterly direction on the northern side of the trough. Oscillation of the monsoon trough plays an important role in determining the flow of air over the state. When this trough shifts southwards, easterly winds become prominent in the state and when the trough shift northwards westerly winds become prominent. October is the month of transition with weakest pressure gradient. From October onwards, the change over of the pressure and wind pattern to the winter pattern commences. Table 1 gives the monthly mean wind speed in kilometer per hour, for the observatory stations in the state. In addition, predominant wind directions in the morning and evening have been included. For each sub-division, the mean monthly wind speed is given at the bottom of the respective sub-divisional table.

Temperature

Table 2 gives the mean daily maximum and minimum temperatures at the observatory stations in the state. Fig. 2(a, b, c, d) and 3(a, b, c, d) show the distribution of mean maximum and mean minimum temperatures respectively for the selected months. Fig. 4 and 5 give the extremes of temperature ever recorded in respect of observatory stations. These values were obtained based on data available upto 2001, the oldest observatory being Sagar Island, which has started functioning in 1865.

Day temperatures are more or less uniform over the plains during the monsoon and post monsoon seasons (increases westwards in premonsoon and southwards in winter).

In the state, the night minimum temperatures are lower in higher latitudes. Both day and night temperatures are lower at high level stations than over the plains.

May and April are the hottest months with the mean maximum temperatures of 35.6°C and 33.8°C in the Gangetic and sub-Himalayan West Bengal respectively.

The highest maximum temperature ever recorded at an individual station in the plains is 48.3°C at Berhampore observatory in Murshidabad district on 23rd May 1981, which is about 13°C higher than the normal of the warmest month. January is the coldest month in the state when the mean minimum temperature for the Gangetic West Bengal and the sub-Himalayan West Bengal are 13.3°C and 10.5°C respectively. The lowest minimum

temperature recorded at an individual station in the plain was 0.9°C at Krishnanagar observatory in Nadia district on 2nd January 1986 which was 12°C below the normal for the coldest month. The lowest minimum temperature ever recorded at an individual station in the sub-Himalayan West Bengal is -7.2°C on 30th January 1971 at Darjeeling observatory.

Both the maximum and minimum temperatures rise rapidly from February onwards till April in sub-Himalayan West Bengal and till May in the Gangetic West Bengal. The increase in maximum temperature in the period from January to April/May ranges from about 8°C to 12°C at individual stations in sub-Himalayan West Bengal depending upon the altitude of the stations above mean sea level and from about 6°C to 13°C at individual stations in Gangetic West Bengal depending upon the distance of the stations from the Bay of Bengal. In Gangetic West Bengal from the beginning of June to the end of July the maximum temperature falls only by about 1°C to 3°C whereas the minimum temperature falls only by about 0.1°C to 1.4°C from June to September. In the northern portions of West Bengal close to the foot hills of Himalayas from beginning of June to the end of September, the maximum temperature decreases very slowly whereas the minimum temperature rises or remain almost constant from June to August, contrary to minimum temperature trend in Gangetic West Bengal where, minimum temperature decreases or remain constant. In September, a slight rise in the maximum temperature is experienced in Gangetic West Bengal due to increased insolation. The night temperatures start falling rapidly after September while the day temperature follows this trend after October and both attain lowest values by January. The fall in minimum temperature and maximum temperature is about 6°C to 11°C and 3°C to 5°C respectively during these periods in Gangetic West Bengal and the same is about 3°C to 7°C and 6°C to 13°C respectively during the above period in sub-Himalayan West Bengal.

July and August have the smallest diurnal range of temperature (about 6°C to 7°C. The diurnal range increases rapidly after the withdrawal of the monsoon. During the period from November to May, the diurnal range is of the order of 10°C to 15°C, being greatest in March for sub-Himalayan West Bengal and in December for Gangetic West Bengal. This range is minimum in coastal areas.

Humidity

Table 3 gives the mean relative humidity at 0830 and 1730 hours IST for the individual stations in the state. The relative humidity is generally high during the period from July to September. It is about 80% in June rising to about 83%-85% in July, August and September in the morning. The diurnal variation of relative humidity is least during monsoon season. The relative humidity is lowest during the summer afternoons when it becomes

about 38 to 50% at the plain inland stations. The diurnal variation is highest during the period January to May in plain and inland stations.

Cloudiness

The period from December to March, is cloudless or lightly clouded. Afternoons are however, comparatively more clouded than forenoons, particularly in summer. During monsoon season (June to September) skies are heavily clouded particularly during July and August, when about 6 oktas of the sky are covered with clouds. On an average in each of these two months, the sky remains overcast for 8 to 9 days per month and does not remain clear on a single day in Gangetic West Bengal and 9 to 13 days per month in Sub-Himalayan West Bengal in the afternoon. During October, clouding decreases to a great extent over the entire state.

Tables 4 and 4(a) give the number of days of clear and overcast skies and mean monthly total cloud amount at 0830 and 1730 hours IST respectively.

The mean hours of bright sunshine for different months for some observatory stations in the state are indicated in Table 4(b), maximum and minimum number of bright sunshine hours are in February to April and July respectively. Average bright sunshine in a year is more than 6 hours per day.

Rainfall

Table 5 gives district wise and sub-divisional normals for monthly and annual rainfall and the number of rainy days based on rainfall data for the period 1951-2000. Figures 6 and 6(a) to 6(d) show the annual and seasonal distribution of rainfall.

The total annual rainfall in the plains of the state increases from142 cm over the southern parts to 371 cm over the northern parts while it decreases to 116 cm over the northwestern parts of Gangetic West Bengal. The foothills of Himalayas receive maximum amount of annual rainfall varying from 205 cm to 450 cm. The southwest monsoon is the principal rainy season when the plains of the state receive almost 74% to 83% of annual rainfall amount whereas the hills of West Bengal receive 73% to 87%. Rainfall in the winter season (December to February) is about 3% of the annual total in Gangetic West Bengal and 1% of the annual total in the plains of the northern parts whereas it is varying from 1% to 5% in the hills of West Bengal. In the hot weather season (March to May), rainfall is about 11% of the annual total in Gangetic West Bengal and 14% in northern parts (plains) respectively and is varying from 10% to 18% in the hills of West Bengal.

Jalpaiguri, a district in the north Bengal receives the maximum amount of rainfall in a year whereas Bankura, a district in the northwest recorded minimum amount in the state. The mean annual district rainfall varies from 116 cm in Bankura district to 371 cm in Jalpaiguri, the same for the state as a whole being 189 cm.

The southwest monsoon sets in over the state by about the first week of June and extends over the entire state by the second week of June. July is the rainiest month in sub-Himalayan West Bengal as well as in Gangetic West Bengal, each of the rainiest months individually accounting to about 25% and 22% of the annual rainfall of the respective sub-division. In June, August and September, rainfall varies from 16% to 20% of the annual rainfall in Gangetic West Bengal and 16 to 19% in Sub-Himalayan West Bengal. In the southwest monsoon months, there are 11 to 18 rainy days (with daily rainfall of atleast 2.5 mm) over the state.

The withdrawal of the southwest monsoon begins from the northern parts of the state towards the end of the 1st week of October and by 2nd week, the monsoon withdraws from the entire state.

The features of rainfall described above are also evident from Fig. 7(a) and 7(b), which show the annual and seasonal rainfall for the individual districts and for the subdivisions Gangetic West Bengal and Sub Himalayan West Bengal respectively.

During winter (December to February) the state receives about 3.5 cm of rainfall which although small in amount is of great significance for Agriculture. This rainfall occurs during the passage of western disturbances moving from West to East across the northern parts of the country.

Table 6 gives the monthly and annual rainfall for various river catchments (322, 323, 324, 325, 418, 504, 505) in the state and are depicted in Fig. 8. It shows that the river catchments of sub-Himalayan West Bengal receive rainfall much higher than that of catchment areas in Gangetic West Bengal. The catchment of River Brahmaputra upto Bangladesh border, including River Dihang, River Lohit, streams between River Subansari and Manas and between Manas and Tista, excluding Tista and its tributaries is fed by maximum amount of annual rainfall which is about 387 cm. The catchment of River Tista upto Bangladesh border receives annual rainfall amount of 326 cm. In other catchments of West Bengal, annual rainfall varies from 120 cm to 259 cm.

Rainfall Variability

The spatial distribution of coefficient of variation of annual rainfall over West Bengal is shown in Fig. 9.

Coefficient of annual rainfall is expressed in percentage as:

$$\frac{\text{Standard deviation } (\sigma)}{\text{Normal } (N)} \times 100$$

Where σ = Standard Deviation

N = Normal of the annual rainfall

This is generally less than 30% over the sub-Himalayan West Bengal, partly eastern districts of Gangetic West Bengal mainly Nadia, Hooghly etc., and north western parts of Gangetic West Bengal i.e. Bankura district whereas, over the coastal district South 24 Parganas coefficient of rainfall variation is about 35%.

Fig. 9(a) to 9(d) show coefficient of rainfall variation for premonsoon, southwest monsoon, post monsoon and winter season.

In the monsoon season, exteme northern parts of West Bengal have coefficient of rainfall variation less than 25% whereas the rest of the state has 20% to 35%. It is generally between 55% and 90% over the state in the post monsoon season. In winter, it is extremely high, ranging between 80% and 130%. In the hot weather season, it is more than 60% over coastal belts, less than 40% in sub-Himalayan West Bengal and the rest of the state has 50% to 80%.

Droughts and Excessive Rainfall

A. Droughts

Meteorologically drought over an area or place may be defined as a situation when annual rainfall over the area or place is less than 75% of the normal. It is classified as ‘moderate drought’ if rainfall deficit is between 25 to 50% and ‘severe drought’ when it is more than 50%. Areas where frequency of drought as defined above is 20% of the years examined are classified as ‘drought areas’ and areas having drought condition for more than 40% of the years under consideration represent “chronically drought affected areas”.

There is not a single district in the state during 1951-2000, which satisfied the criteria for ‘chronically drought affected area’, and one district i.e. Nadia which satisfied the criteria for ‘drought area’.

All districts of the state except Bankura and Purulia were affected by drought during some year or other during the period 1951-2000. During the fifty year period 1951-2000, drought conditions as prevailed over the state are as described below: The figures within the brackets against each district indicate the number of occasions during the fifty year period when these districts were affected by drought. Bardhaman (1), Birbhum (3), Cooch Behar (2), East Medinipur (2), Hooghly (3), Howrah (2), Jalpaiguri (3), Kolkata (4), Malda (7), Murshidabad (1), Nadia (7), North Dinajpur (1), North 24 Parganas (3), South Dinajpur (4), South 24 Parganas (5), West Medinipur (1).

The details of yearwise occurrence of drought over each district are given in Table (i).

Table (i)

District	Years of Drought	Lowest amount of rainfall (expressed as % of annual normal) with year
Bardhaman	1966	89.0 cm in 1966 (72%)
Birbhum	1954, 1965, 1982	83.3 cm in 1982 (65%)
Cooch Behar	1978, 1994	198.5 cm in 1994 (61%)
Darjeeling	1980, 1994	65.9 cm in 1980 (20%)
East Medinipur	1957, 1964	111.0 cm in 1964 (71%)
Hooghly	1967, 1968, 1982	59.6 cm in 1982 (42%)
Howrah	1954, 1982	89.2 cm in 1982 (57%)
Jalpaiguri	1972, 1992, 1994	241.4 cm in 1994 (65%)
Kolkata	1953, 1954, 1966, 1982	113.1 cm in 1982 (66%)
Malda	1951, 1957, 1966, 1972, 1979, 1986, 1994	62.1 cm in 1979 (44%)
Murshidabad	1962	99.3 cm in 1962 (72%)
Nadia	1960, 1961, 1972, 1978, 1979, 1981, 1998	53.4 cm in 1979 (39%)
North Dinajpur	1974	89.0 cm in 1975 (52%)
North 24 Parganas	1966, 1979, 1982	108.9 cm in 1966 (72%)
South Dinajpur	1961, 1962, 1966, 1972	94.0 cm in 1966 (56%)
South 24 Parganas	1951, 1954, 1957, 1964,1979	107.7 cm in 1979 (61%)
West Medinipur	1954	89.5 cm in 1954 (63%)

Occurrence of drought conditions in successive years is not frequent in the state. However, individual districts have successive years of drought. Severity of drought not only depends upon the order or rainfall deficiency in a single year, but also on the continued occurrence of deficient rain in successive years, even though the deficiency in each successive years, may not be as high as in a single year. The following Table (ii) depicts district wise years of successive drought during the fifty year period 1951-2000.

Table (ii)

Years of Successive Drought	Names of the district Affected
1967-1968	Hooghly
1953-1954	Kolkata
1960-1961, 1978-1979	Nadia
1961-1962	South Dinajpur

Fig. 10 shows percentage frequency of drought and years of successive drought in the districts during the period 1951-2000.

The following table (iii) shows the years of severe drought for various districts, with the actual rainfall expressed as percentage of normal rainfall, given in brackets, against each district.

Table (iii)

Years of Severe Drought	Affected Districts
1980	Darjeeling (20%)
1982	Hooghly (42%)
1972, 1979	Malda (44%)
1979	Nadia (39%)

Incidence of widespread drought over the state in any particular year was not common. In the years 1954, 1966, 1972, 1979, 1982 and 1994 three – four districts in the state were affected by drought.

There was no drought anywhere in the state in the following 27 years:

1952, 1955, 1956, 1958, 1959, 1963, 1969, 1970, 1971, 1973, 1974, 1976, 1977, 1983, 1984, 1985, 1987, 1988, 1989, 1990, 1991, 1993, 1995, 1996, 1997, 1999 and 2000. The districts Malda and Nadia experienced the maximum number (7 years) of drought conditions during the fifty years under consideration.

B. Excessive rainfall

Rainfall sufficiently in excess of the normal, is a predominant factor for occurrence of floods, particulary in high rainfall regions. Even with a coefficient of variation of rainfall of 20% or less, regions are prone to frequent floods. Since the coefficient of variation of annual rainfall is less than 25% in the state, the state is prone to floods. For the purpose of the present description annual rainfall of 125% or more of the normal is considered as excessive rain.

Fig. 11 shows the percentage frequency of excessive rainfall and successive years of excessive rainfall during the period 1951-2000.

The following Table (iv) gives the district wise excessive rainfall and highest annual rainfall (expressed as percentage of normal) with the year of occurrence.

Table (iv)

District	Years of Excessive Rainfall	Highest amount of rainfall (expressed as % of annual normal) with year
Bankura	1959, 1964, 1968, 1969, 1971, 1978, 1985, 1987, 1995, 1997, 1999	201.0cm in 1971 (174%)
Bardhaman	1956, 1959, 1970, 1971, 1974, 1977, 1978, 1984, 1990,1991	205.2 cm in 1971 (166%)
Birbhum	1956, 1959, 1971, 1977, 1978, 1980, 1988, 1989, 1994, 1995, 1997, 1999	206.4 cm in 1978 (161%)
Cooch Behar	1958, 1974, 1984, 1985, 1987, 1988, 1990	748.6 cm in 1990 (230%)
Darjeeling	1962, 1977, 1989, 1990, 1991, 1995, 1998	540.4 cm in 1998 (164%)
East Medinipur	1956, 1965, 1966, 1971, 1973, 1986, 1990, 1993, 1995, 1999	257.9 cm in 1965 (165%)
Hooghly	1951, 1956, 1959, 1971, 1974, 1977, 1986, 1993	275.2 cm in 1951 (194%)
Howrah	1952, 1971	237.8 cm in 1971 (152%)
Jalpaiguri	1952, 1954, 1955, 1966, 1967, 1968, 1983, 1984, 1998	676.0 cm in 1984 (182%)
Kolkata	1971, 1978, 1984, 1986, 1990, 1993, 1999	260.5 cm in 1999 (152%)`
Malda	1953, 1981, 1987, 1991, 1993, 1995, 1997, 1998, 1999	235.8 cm in 1995 (167%)
Murshidabad	1959, 1971, 1988, 1993, 1995, 1998	233.0 cm in 1971 (169%)
Nadia	1952, 1971	237.8 cm in 1971 (152%)
North Dinajpur	1998	248.1 cm in 1998 (145%)
North 24 Parganas	1959, 1968, 1970, 1971, 1977, 1978, 1981, 1984, 1986, 1990, 1995, 1999	252.7 cm in 1971 (167%)
Purulia	1953, 1959, 1977, 1978, 1984, 1987, 1990, 1993, 1995	214.3 cm in 1978 (176%)
South Dinajpur	1952, 1953, 1956, 1987	322.3 cm in 1953 (192%)
South 24 Parganas	1956, 1971, 1977,, 1981, 1986, 1988, 1990, 1991, 1995	646.4 cm in 1995 (366%)
West Medinipur	1956, 1968, 1971, 1973, 1978, 1986, 1989, 1990, 1993, 1997, 1999	270.0 cm in 1971 (190%)

From the above table, it is seen that during the fifty year period 1951-2000, there were 38 years in which some districts or other in the state recorded excessive rainfall, the maximum amount being 748.6 cm, 230 % of the annual normal rainfall in the year 1990 for the district Cooch Behar. The district Birbhum has experienced maximum number of years (12) of such rainfall. In the year 1971, a large number of districts (12) of the state experienced excessive rainfall.

The successive years of excessive rainfall against each district are listed below:

Table (v)

Successive years of Excessive Rainfall (Districtwise)

Successive Years of Excessive Rainfall	Districts
1968-1969	Bankura
1970-1971, 1977-1978, 1990-1991	Bardhaman
1977-1978, 1988-1989, 1994-1995	Birbhum
1984-1985, 1987-1988	Cooch Behar
1989-1990-1991	Darjeeling
1965-1966	East Medinipur
1954-1955, 1966-1967-1968, 1983-1984	Jalpaiguri
1997-1998-1999	Malda
1970-1971	Nadia
1970-1971, 1977-1978	North 24 Parganas
1977-1978	Purulia
1952-1953	South Dinajpur
1990-1991	South 24 Parganas
1989-1990	West Medinipur

The heaviest one day rainfall on record at any station in the state is 884.5 mm at Sagar Island observatory of South 24 Parganas district on 22nd July 1991.

Cyclonic Storms and Depressions

Cyclonic storms and depressions in the Bay of Bengal which affect the weather of West Bengal give rise to storm surges and gale winds in the coastal belts. The height of the storm surges and wind force along the coast increases as the systems approach the area. These storm surges and gale winds especially associated with storms cause heavy loss of lives and damage to houses, other properties and standing crops in the low lying agricultural land. As the storms/depressions approach the coast more and more damage to life and property occur. The devastating effect reaches its peak when the storms cross the coast.

Table VII gives the total number of storms/depressions which affected the state during the period 1891-1990.

The cyclonic storms and depressions which affect West Bengal originate and intensify over the Bay of Bengal, mostly during May to November. They usually travel west-northwest and cross the coast. In general, storms and depressions weaken on entering the land. Hence, the state, being situated on the east coast of India, experiences very frequently the full fury of the severe storms and depressions of the Bay. Maximum number of storms affect the state in July/August. During their course of movement the systems sometimes turn or recurve towards north or northeast. This point of turning progressively shifts westwards till September. For example, the systems in May recurve while still out in the Bay of Bengal. As such, exceptionally few of them which cross the coast and travel inland affect the weather of the state in May.

During the period 1891-1990, there was no Bay storm during January-April which affected the weather of West Bengal whereas 55 and 26 storms/depressions affected the weather of the state in October and in November respectively. During the period from June to September the systems form over the Head Bay of Bengal and while traveling westwards pass across Orissa-West Bengal, Bihar and Madhya Pradesh. Sometimes they move west or northwestwards as far as Rajasthan and recurve north, northeastwards under the influence of slow moving deep westerly system across Pakistan and northwest India. During the period 1891-1990, 530 storms/depressions influenced the weather of West Bengal state.

The track of the Bay cyclones is more in southerly latitudes in October and November and 55 such storms and depressions of October/November influenced the weather of West Bengal.

Other Weather Phenomena

Thunderstorms and Duststorms

Convective activity is essential for the occurrence of thunderstorms and dust storms. With the advance of the summer, thunder activity becomes pronounced due to ground heating. When the moisture is insufficient in the atmosphere, dry thunderstorms or dust storms occur. Maximum number of thunderstorms occur with the approach of the monsoon current, while dust storms are mainly confined to the summer months of April-June. Hail occur in the state during the period from March-September.

Squalls occasionally occur mainly during the premonsoon and monsoon period. The average number of days of thunderstorms during monsoon varies from 5 to 50, in the plains. Thunderstorm activity attains its maximum in June and September. Even in the winter months, the state may experience thunderstorms resulting from low pressure areas induced due to eastward moving upper air disturbances known as 'Western Disturbances'. Thunder activity is generally minimum in the month of December.

Norwesters

Premonsoon thunderstorm activity of West Bengal, plays an important role in Indian Climatology. These thunderstorms are generally associated with squalls and torrential rain in the premonsoon months March, April and May and are known as 'Norwesters', also locally known as 'Kalbaisakhi'. Majority of these thunderstorms originate in the afternoon over Chhota Nagpur hills in Jharkhand where a heat low develops. They move southeast towards the Head Bay of Bengal and are sometimes associated with hail. There is a type which originates from the hills flanking northern and eastern border of northeast India in the night or early morning. From the hilly region of sub-Himalayan West Bengal they move south towards the mouth of Meghna River in Bangladesh. Very rarely these thunderstorms originate over Khasi hills in the forenoon and travel from northeasterly or easterly direction.

Tornado

These occur in the form of a narrow funnel below the base of the thunderstorm cloud and on the water surface it is known as water spout. It is a vortex with high angular velocity and large pressure defect inside and has an almost vertical axis. It can do a lot of damage by virtue of its churning motion when it reaches the ground surface. Records of tornado occurrence though rare in India show that maximum number of tornadoes were reported from West Bengal. It is worth mentioning that on 9th April 1993, a severe tornado hit Murshidabad and adjoining areas with a speed of 250 kmph.

Fog

Hill fog is frequent during the rainy months of July and September, when air is almost saturated and is easily cooled below the dew point while rising over high elevations. Condition like light to calm wind, clear skies etc., which favour the occurrence of radiation fog exist after the withdrawal of the monsoon till February. But due to lack of sufficient moisture, fog occurs only occasionally, the maximum frequency of occurrence being only about 5 to 20 in January in southern parts of West Bengal.

TABLE – I
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Alipore	a	3.3	4.4	6.0	8.7	9.7	7.8	6.8	6.0	5.4	4.0	3.6	3.0	5.7
	m	C/NW/N	C/N	SW/C	S/SW	S	S	S	SE	C/S	C/NE	C/N	C/NW/N	
	e	C/NW/N	C/NW	S/C	S	S	S	S	S/SE	C/S	C/NW	C/NW	C/NW	
Bagati	a	2.1	2.5	3.7	6.5	7.3	5.1	5.3	4.0	4.3	2.8	1.5	1.7	3.9
	m	N	N	SW	SW	SW	SW/S	S	S	SW/S	N/SW	N	N	
	e	N	N	S	S	S	S	S	S	S	S	N	N	
Bankura	a	1.9	1.8	2.2	2.1	2.5	2.7	2.9	2.4	2.5	2.1	1.8	1.6	2.2
	m	C/W	C/W	C/W	C/W	C/S	C/S	C/SW	C/NE	C/S	C/NE	C/N	C/W	
	e	C	C	C	C/Var	C/Var	C/Var	C/SW	C/Var	C/Var	C	C	C	
Bardhaman	a	3.1	3.7	5.8	7.3	10.1	9.0	8.7	7.5	6.8	4.8	3.5	2.9	6.1
	m	NW	NW	NW/SW	SW/S	SE/SW	SE/SW	SE/SW	SE	SE	NW	NW	NW	
	e	NW	NW	NW/C	SE/S	SE	SE	SE	SE	SE	C/N	C/NW	NW	
Berhampore	a	0.8	1.3	2.3	3.7	5.4	4.7	3.9	3.3	2.6	1.3	0.7	0.6	2.6
	m	C	C	C/Var	C/S	C/S/E	C/S	C/Var	C/W	C/Var	C/Var	C/Var	C	
	e	C	C	C	C/Var	C/E/S	C/Var	C/Var	C/Var	C	C	C	C	
Canning	a	-	-	-	-	-	-	-	-	-	-	-	-	-
	m	N/NE	N/NE	SW	SW	SW/S	SW	SW/S	SW	S	NE/N	N/NE	N/NE	
	e	C	C/S	S	S	S	S	S/SW	S	S	C/S	C	C	
Contai	a	3.8	5.7	9.7	14.4	16.8	12.6	10.6	9.2	7.7	4.4	2.9	2.9	8.4
	m	N	N	SW/N	SW	SW	SW	SW	SW/SE	SW	N	N	N	
	e	C/S	S	S	S	S	S	S	S	S/SE	C/S	C/Var	C/S	
Diamond Harbour	a	-	-	-	-	-	-	-	-	-	-	-	-	-
	m	C/NE/N	C/NE	C/SW	C/S/SW	C/S/SW	C/S/SW	C/SW/S	C/SW	C/SW	C/Var	C/N/NE	C/NE/N	
	e	C	C/Var	C/SW/S	S/SW	S	C/S	C/S/SW	C/SW	C/S	C	C	C	
Digha	a	1.7	3.0	5.7	9.1	9.3	8.2	7.3	5.8	4.7	2.4	1.5	1.5	5.0
	m	C/N	C/N	C/S/SW	S/SW	S	SW/S	SW	C/SW	C/S/SW	C/N	C/N	N/C	
	e	C/SE	C/S/SE	S	S	S	S	S/SW	S	S/C	C/S	C	C	
Dum Dum	a	3.5	4.5	7.3	11.9	13.9	11.1	10.3	8.8	7.4	4.9	3.5	3.0	7.5
	m	N/C	N	S	S	S	S	S	S	S/SE	N	N	N	
	e	C/N	C/N	S/C	S	S	S	S	S	S	C/S	C/N	C/N	
Haldia	a	3.7	5.4	9.8	13.7	12.4	11.9	11.2	9.4	7.6	4.6	3.9	3.7	8.1
	m	C/NW	C/NW	C/SW	SW	S	SW/S	SW	S/SW/C	C/SE	C/NW	N	C/N	
	e	C/N/NW	C/S/NW	S/SW	S	SW	S/SW	S/SW	SE/SW	S/SE	C/SE/S	C/NW	C/NW	

TABLE – I Contd….
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Krishnanagar	a	1.7	2.8	5.2	8.0	10.2	8.2	6.5	5.1	4.0	2.9	1.8	1.4	4.8
	m	C	C	C	C	C	C	C	C	C	C	C	C	
	e	C	C	C	C	C/S	C	C	C	C	C	C	C	
Medinipur	a	3.3	3.9	5.5	7.5	9.0	6.8	5.7	5.0	4.1	3.2	3.1	3.2	5.0
	m	C/N/NE	NE	C/NE	C/SW/S	S/SW	S/SW	SW/S	C/S	C/S/SW	C/NE/N	C/N/NE	N	
	e	C/N	C/N/S	C/S	S	S	S	S	S	C/S	C/S	C/N	C	
Panagarh(A)	a	2.2	3.0	4.3	6.6	7.7	7.1	5.9	5.8	4.8	2.6	2.0	2.0	4.5
	m	C/NW	C/NW	C/W/NW	S	S	S/SE	S	E/S	S	C/NE	C/N	C/NW	
	e	C	C/NW	C/NW	C/SE	SE/E	SE	S/SE	C/SE	C/SE	C	C	C	
Purulia	a	3.1	3.9	4.5	5.6	6.7	6.7	6.0	5.4	4.9	3.5	2.9	2.8	4.7
	m	NW	NW	NW/C	C/NW	C/SE	SE	SW	SE/C	C/SE	C/NW	NW	NW	
	e	C	C/NW	C/NW	NW/C	NE/SE	SE	C/SE	SE/C	C/SE	C	C	C	
Sagar Island	a	10.5	12.6	18.4	25.6	28.4	24.8	24.2	20.7	16.9	11.5	10.5	10.5	17.8
	m	N	N/NE	SW	SW	SW/S	SW	SW	SW/S	SW/S	NE/N	N/NE	NE/N	
	e	N	S	S	S	S	S/SW	SW/S	S/SW	S/SW	SW	N/NE	N/NE	
Sand Heads	a	-	-	-	-	-	-	-	-	-	-	-	-	-
	m	N/NE	SW	SW	SW	SW	SW	SW	SW	SW	NE	N	N	
	e	N	SW	SW	SW	SW	SW	SW	SW	SW	N	N	N	
Shantiniketan	a	5.0	5.6	6.8	8.8	10.2	9.0	8.4	7.0	6.2	4.0	4.4	4.8	6.7
	m	NW	NW/C	W/NW	SW	S	S/SE	S/SW	SE	SE	C/NE	NW/NE	NW	
	e	C/NE	C/NW	C/W/NW	SE	SE/S	SE/S	S/SE	SE/S	C/SE/S	C/NE	C/NE	C/NE/NW	
Suri	a	4.5	5.7	6.8	8.5	9.3	8.2	7.2	6.2	5.5	4.2	4.0	4.4	6.2
	m	NW/N	W/NW	W	S	S/SE	S/SE	S	S/SE	S	N	N	NW/N	
	e	-	-	-	-	-	-	-	-	-	-	-	-	
Uluberia	a	3.0	4.8	5.2	8.6	9.4	7.0	6.8	5.4	5.0	4.0	3.7	3.1	5.5
	m	C/NE	NE/C	SW	SW	SW/SE	SE/SW	SW/SE	SE/SW	SW	NE	NE/NW	C/NE/NW	
	e	C/NE	C/NE	SE/C	SE	SE	SE	SE/SW	SE	SE/C	C/NE	C/NE	C/Var	
Sub.Div.Means.	a	3.6	4.7	6.8	9.8	11.1	9.4	8.6	7.3	6.3	4.2	3.4	3.3	6.5

TABLE – I Contd…..
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
SUB-HIMALAYAN WEST BENGAL														
Balurghat	a	2.5	3.0	4.6	6.3	7.1	7.4	6.5	6.2	5.0	3.2	2.4	2.4	4.7
	m	C/N	C/W	W/C	SE/C	SE/E	SE	SE	SE/C	C/SE/E	C/E	C/NE	C/N	
	e	C	C	C/W	C/Var	C/E/SE	C/SE/E	C/SE	C/SE/E	C/SE	C	C	C	
Coochbehar	a	2.3	3.2	4.7	6.9	6.5	5.-0	4.2	3.7	3.5	3.6	2.3	1.8	4.0
	m	C/E	E/C	E	E	E	E	E/C	E/C	E/C	E	E	E/C	
	e	C	C	C/W	C/E	C/E	C/E	C/E	C/S	C/E	C	C	C	
Jalpaiguri	a	3.6	4.8	6.4	8.6	9.0	7.6	6.7	5.9	5.5	4.4	3.6	3.3	5.8
	m	C/N	C/N	E	E	E	E	E	E	E/C	C/N/E	C/N	E/C	
	e	C/N	C/SW	C/SW	E	E	E/C	E/C	C/E	C/E	C/N	C	C	
Malda	a	3.5	4.0	4.8	6.2	6.9	6.4	6.0	5.7	5.1	3.5	2.9	3.3	4.9
	m	C/NW	C/NW	C/W	S/C	E	SE/E/S	C/S	E/SE/S	C/E	C/Var	C/N/NW	NW/N	
	e	C/NW	C/NW/W	C/W/NW	C/E	E	SE/C	C/SE	C/E	C/SE	C/Var	C/NW	C/NW	
Sub.Div.Means.	a	3.0	3.7	5.1	7.0	7.4	6.6	5.8	5.4	4.8	3.7	2.8	2.7	4.8

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
HILL STATIONS														
Darjeeling	a	2.2	2.9	3.8	4.6	3.9	3.1	2.8	2.7	2.4	2.0	1.8	1.8	2.8
	m	C	C	C	C	C	C	C	C	C	C	C	C	
	e	C	C	C/SW	C/SW	C	C	C	C	C	C	C	C	
Kalimpong	a	5.5	5.1	6.7	6.8	6.6	5.8	5.2	5.6	5.4	5.2	5.2	5.4	5.7
	m	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	
	e	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	

a Mean wind speed in kms per hour
m Predominant wind direction in the morning
e Predominant wind direction in the evening
Var Variable
C Calm

TABLE - II

MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE (^{0}C)

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Bagati	Max.	26.6	29.3	33.5	36.6	36.7	35.0	33.1	33.0	33.0	32.9	30.7	27.5	32.3
	Min.	12.1	14.8	19.5	23.3	24.3	25.1	25.1	25.3	25.1	22.9	17.9	12.9	20.7
Bankura	Max.	26.1	28.6	33.9	37.9	38.8	36.9	33.7	33.2	33.4	32.4	29.8	26.3	32.6
	Min.	11.9	15.1	19.4	23.9	25.6	26.0	25.4	25.2	24.9	22.6	18.1	12.7	20.9
Berhampore	Max.	25.4	28.7	34.1	37.0	35.9	34.9	32.8	33.6	33.1	32.6	30.5	26.8	32.1
	Min.	12.3	14.7	19.3	23.4	24.6	25.8	25.8	25.8	25.6	23.7	19.0	13.9	21.2
Bardhaman	Max.	26.9	29.4	33.8	37.2	37.4	35.7	33.3	32.6	33.1	32.4	30.5	27.4	32.5
	Min.	12.0	14.2	18.5	23.0	23.7	24.9	24.0	24.3	24.3	22.1	16.6	12.0	20.0
Canning	Max.	25.9	29.2	33.6	35.6	35.3	33.9	32.4	32.1	32.2	32.1	30.0	27.3	31.6
	Min.	13.5	17.1	21.7	24.9	26.2	26.5	26.3	26.3	25.9	24.2	19.6	14.7	22.2
Contai	Max.	25.8	28.5	31.8	33.2	33.3	32.8	31.3	31.0	31.3	31.2	29.3	26.5	30.5
	Min.	14.0	17.4	21.4	24.8	25.6	26.0	25.4	25.3	25.2	23.5	18.5	14.6	21.8
Diamond	Max.	25.4	28.3	31.8	33.2	33.4	32.8	31.6	31.5	31.7	32.0	29.7	26.7	30.7
Harbour	Min.	14.0	17.8	22.5	25.6	26.6	27.1	26.8	26.7	26.4	24.6	19.9	15.5	22.8
Digha	Max.	25.6	27.8	30.6	31.8	32.4	32.4	31.3	31.0	31.4	31.3	29.6	27.0	30.2
	Min.	14.0	17.9	22.4	25.1	26.4	26.6	26.2	26.0	25.7	23.5	18.6	14.2	22.2
Haldia	Max.	25.6	28.4	31.8	33.1	33.4	33.0	31.8	31.6	31.8	31.8	29.8	27.0	30.8
	Min.	14.7	18.4	22.8	25.7	26.6	27.2	26.8	26.8	26.4	24.6	20.1	15.7	23.0
Kolkata	Max.	26.1	29.1	33.5	35.4	35.3	34.0	32.4	32.0	32.3	32.3	30.2	26.9	31.6
(Alipore)	Min.	13.9	17.2	21.9	25.1	26.1	26.6	26.2	26.2	25.9	24.0	19.6	14.7	22.3
Kolkagta	Max.	25.8	28.8	33.2	35.5	35.4	34.0	32.5	32.2	32.4	32.1	29.8	26.7	31.5
(Dum Dum)	Min.	12.9	16.2	20.9	24.6	25.6	26.3	26.0	26.0	25.7	23.8	19.1	13.8	21.7
Krishnanagar	Max.	28.2	30.4	34.8	38.0	37.8	36.0	33.7	33.3	33.8	33.9	32.4	29.3	33.5
	Min.	10.7	13.0	17.7	22.0	223.0	23.7	23.5	23.7	23.6	22.1	17.3	12.1	19.4
Medinipur	Max.	25.9	29.1	34.1	37.4	37.2	34.9	32.4	31.9	32.1	31.7	29.4	26.2	31.9
	Min.	13.4	16.5	20.7	24.2	25.5	26.0	25.5	25.5	25.1	23.0	18.4	13.7	21.5
Panagarh (A)	Max.	25.5	28.7	34.0	37.9	37.5	35.3	32.9	32.5	32.6	31.8	29.4	26.1	32.0
	Min.	10.3	13.2	18.5	23.2	24.9	25.8	25.5	25.4	24.6	21.6	16.0	10.9	20.0
Purulia	Max.	25.4	28.2	33.7	38.2	38.7	25.6	32.3	31.7	32.0	31.6	29.1	25.9	31.9
	Min.	11.6	14.1	18.8	23.4	24.9	25.1	24.3	24.2	23.7	20.9	16.5	12.3	20.0
Sagar Island	Max.	24.9	27.0	29.8	31.2	32.0	31.9	30.6	30.6	30.8	30.7	28.6	25.6	29.5
	Min.	16.3	19.5	23.9	26.4	27.2	27.4	26.9	26.8	26.8	25.4	21.6	17.3	23.8
Sandheads	Max.	25.4	27.1	29.3	30.5	31.7	31.5	30.5	30.5	30.9	31.2	29.2	26.4	29.5
	Min.	20.8	22.5	25.1	26.6	27.4	27.3	26.6	26.4	26.8	26.7	24.8	22.1	25.3
Shantiniketan	Max.	24.8	28.2	33.6	37.1	36.9	34.9	32.7	32.2	32.3	31.7	29.4	26.0	31.7
	Min.	11.9	14.5	19.3	23.4	25.0	25.9	25.8	25.8	25.3	22.6	17.5	12.9	20.8

TABLE - II (contd.)

MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE (^{0}C)

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Suri	Max.	25.2	28.5	34.1	38.0	37.5	35.1	32.8	32.2	32.4	31.9	29.6	26.1	32.0
	Min.	11.6	14.1	18.6	22.9	24.1	25.1	24.6	24.6	24.0	21.9	17.1	12.5	20.1
Uluberia	Max.	26.0	28.7	33.2	35.1	35.1	34.0	32.3	31.9	32.2	31.9	29.6	26.6	31.4
	Min.	12.7	15.9	20.7	24.5	25.5	26.3	26.0	26.1	25.9	24.0	18.9	13.7	21.7
Sub.Div.Means	Max.	25.8	28.6	32.9	35.5	35.6	34.2	32.3	32.0	32.2	32.0	29.8	26.7	31.5
	Min.	13.3	16.2	20.7	24.3	25.4	26.0	25.6	25.6	25.3	23.4	18.8	14.1	21.6
SUB-HIMALAYAN WEST BENGAL														
Balurghat	Max.	25.0	27.4	32.3	35.1	34.1	33.7	32.9	33.2	32.7	31.7	29.5	26.5	31.2
	Min.	10.6	12.9	17.3	21.0	22.7	24.5	25.2	25.6	25.2	23.2	17.8	12.2	19.9
Cooch Behar	Max.	23.5	25.7	30.0	31.5	20.9	31.4	31.1	31.9	31.0	20.5	28.5	25.2	29.3
(A)	Min.	9.2	11.3	15.5	19.9	21.9	23.9	24.5	24.8	23.8	20.8	15.2	10.6	18.5
Jalpaiguri	Max.	24.3	26.4	30.5	32.0	31.8	32.1	31.5	32.2	31.5	31.6	29.3	26.3	30.0
	Min.	9.9	11.7	15.3	19.9	21.9	23.7	24.2	24.5	23.6	21.3	16.4	12.2	18.7
Malda	Max.	24.8	28.1	33.4	36.8	35.8	34.6	32.6	32.8	32.8	32.1	29.9	26.5	31.7
	Min.	12.2	14.6	18.6	22.4	24.1	25.8	25.9	26.1	25.6	23.4	18.5	13.8	20.9
Sub.Div.Means.	Max.	24.4	26.9	31.6	33.8	33.2	33.0	32.0	32.5	32.0	31.5	29.3	26.1	30.5
	Min.	10.5	12.6	16.7	20.8	22.6	24.5	25.0	25.3	24.5	22.2	17.0	12.2	19.5
HILL STATIONS														
Darjeeling	Max.	9.9	11.7	15.5	18.1	18.8	20.1	20.0	20.5	20.2	19.9	16.9	13.1	17.1
	Min.	1.2	2.5	6.0	8.9	10.5	13.0	13.4	13.1	11.9	9.9	6.0	3.4	8.3
Kalimpong	Max.	21.2	20.9	22.1	23.8	24.8	25.6	26.2	26.0	26.3	25.5	24.6	22.8	24.1
	Min.	8.7	9.6	10.9	12.2	12.9	13.5	14.5	14.7	15.7	14.7	12.4	9.7	12.5

Hill stations not considered for sub-divisional means

TABLE - III

MEAN RELATIVE HUMIDITY (%)

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Bagati	M	78	74	74	78	79	83	86	87	85	82	77	78	80
	E	60	60	63	65	70	77	84	84	82	78	69	62	71
Bankura	M	66	63	63	63	67	78	82	83	83	77	69	68	72
	E	55	53	57	57	62	75	82	83	84	75	66	59	67
Berhampore	M	75	67	64	71	80	84	89	88	87	82	76	76	78
	E	61	56	52	52	67	78	84	84	84	78	68	65	69
Bardhaman	M	63	61	63	70	71	76	82	84	81	74	67	63	71
	E	49	46	42	49	60	67	79	80	78	70	60	53	61
Canning	M	75	74	72	72	75	81	85	86	85	80	75	73	78
	E	63	57	56	68	73	79	82	84	86	82	75	68	73
Contai	M	67	67	69	71	74	78	84	84	83	76	71	67	74
	E	66	69	75	80	80	82	85	85	85	79	71	66	77
Diamond	M	76	77	76	78	80	84	87	88	87	80	76	75	80
Harbour	E	65	65	66	75	78	83	85	86	85	78	71	68	75
Digha	M	76	75	75	75	77	80	82	84	83	80	76	73	78
	E	67	69	74	78	79	80	81	72	80	75	70	66	75
Haldia	M	76	74	73	74	82	83	85	86	85	76	75	70	78
	E	57	59	61	75	78	83	82	85	82	75	69	61	72
Kolkata	M	74	68	68	71	73	78	83	84	82	75	69	72	75
(Alipore)	E	58	52	49	60	67	75	82	82	81	73	66	63	68
Kolkata	M	73	69	68	72	75	80	84	84	82	76	70	71	75
(Dum Dum)	E	58	52	49	61	67	77	82	83	82	74	67	63	68
Krishnanagar	M	71	65	64	69	71	75	77	79	78	75	69	70	72
	E	49	47	45	46	55	68	73	75	73	66	60	53	59
Medinipur	M	62	57	57	62	67	75	82	83	82	74	66	61	69
	E	49	43	40	51	58	71	81	82	81	72	61	55	62
Panagarh (A)	M	71	61	53	60	68	77	84	85	83	78	72	72	72
	E	59	49	36	38	52	70	81	82	82	77	71	67	64
Purulia	M	70	63	55	54	62	74	83	85	83	76	69	70	71
	E	55	46	40	37	46	66	78	79	77	66	60	59	59
Sagar Island	M	77	75	78	81	82	84	86	86	85	79	75	75	80
	E	68	70	77	83	83	83	85	85	84	78	72	69	78
Sandheads	M	70	74	79	82	81	82	85	85	81	75	68	66	77
	E	66	69	78	83	83	83	85	84	81	74	65	63	76

TABLE - III (contd…)

MEAN RELATIVE HUMIDITY (%)

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Shantiniketan	M	73	65	57	63	72	79	86	87	85	80	74	73	74
	E	56	46	38	41	55	71	82	83	84	79	69	62	64
Suri	M	55	47	45	54	67	73	80	81	80	73	60	57	64
	E	-	-	-	-	-	-	-	-	-	-	-	-	
Uluberia	M	83	78	79	79	79	83	88	88	87	83	81	83	83
	E	61	56	56	69	73	78	83	84	83	77	70	65	71
Sub.Div.Means.	M	72	68	67	70	74	79	84	85	83	78	72	71	75
	E	56	53	53	58	64	72	78	79	78	71	64	59	65
SUB HIMALAYAN WEST BENGAL														
Balurghat	M	74	67	63	68	76	80	82	82	83	82	75	75	76
	E	68	59	54	61	71	76	80	80	82	82	75	72	72
Cooch Behar (A)	M	85	77	65	70	81	86	89	86	87	80	74	80	80
	E	68	58	50	60	72	79	82	80	83	78	73	71	71
Jalpaiguri	M	87	79	66	71	78	85	88	86	86	81	77	83	81
	E	67	58	52	63	72	79	81	80	81	76	71	70	71
Malda	M	72	66	58	60	66	73	78	78	77	73	69	70	70
	E	60	52	44	47	56	67	74	73	74	69	63	62	62
Sub.Div.Means.	M	80	72	63	67	75	81	84	83	83	79	74	77	77
	E	66	57	50	58	68	75	79	78	80	76	71	69	69
HILL STATIONS														
Darjeeling	M	81	80	70	77	87	92	95	91	91	83	72	73	83
	E	84	82	72	79	89	92	95	92	92	87	79	78	85
Kalimpong	M	77	78	79	76	79	78	77	76	77	79	81	80	78
	E	78	77	79	76	78	77	77	77	80	81	81	80	78

Hill stations not considered for sub divisional means.

M : Morning

E : Evening

T A B L E - IV

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 0830 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Bagati	a	26	22	22	16	11	5	2	1	5	13	22	26	171
	b	0	1	1	1	1	4	4	4	3	1	1	0	21
	c	0.7	1.2	1.4	2.3	3.5	5.0	5.7	5.9	5.0	3.0	1.3	0.6	3.0
Bankura	a	23	20	21	20	19	12	7	7	8	17	20	25	199
	b	1	1	1	0	1	3	6	7	4	2	1	1	28
	c	1.2	1.2	1.2	1.3	1.6	2.9	4.2	4.7	3.8	2.1	1.4	0.9	2.2
Berhampore	a	25	22	23	17	10	6	1	1	4	15	23	26	173
	b	1	2	2	5	8	10	15	12	10	5	2	1	73
	c	0.7	1.1	1.2	2.2	3.6	4.8	6.2	5.3	4.8	2.5	1.0	0.6	2.8
Bardhaman	a	22	20	21	16	14	10	3	4	8	16	19	24	177
	b	1	2	2	2	2	4	5	6	3	1	1	1	30
	c	1.0	1.2	1.2	1.9	2.3	3.4	4.5	4.7	3.6	1.5	0.8	0.6	2.2
Canning	a	17	14	13	6	2	0	0	0	1	7	15	20	95
	b	3	3	2	1	3	8	10	7	6	2	3	1	49
	c	1.7	2.2	2.5	3.5	4.7	5.9	6.7	6.4	5.8	3.4	2.3	1.4	3.9
Contai	a	19	14	13	6	2	0	0	0	1	7	16	19	97
	b	1	2	2	1	3	8	12	10	6	3	2	1	51
	c	1.4	2.1	2.2	3.2	4.7	6.0	6.7	6.5	5.6	3.0	2.0	1.4	3.7
Diamond	a	20	16	16	10	4	2	0	0	0	9	18	21	120
Harbour	b	2	2	1	0	2	8	8	8	6	2	2	1	42
	c	1.5	2.0	1.9	2.7	4.2	5.5	6.2	6.1	5.4	3.0	1.9	1.2	3.5
Digha	a	17	14	10	4	2	0	0	0	1	8	15	19	92
	b	2	2	1	1	2	6	8	7	6	2	2	1	40
	c	2.0	2.3	2.7	3.7	4.7	6.0	6.4	6.0	5.7	3.5	2.3	1.5	3.9
Haldia	a	18	18	19	10	6	4	0	4	5	9	16	17	126
	b	2	1	0	0	2	6	10	11	5	2	2	1	42
	c	1.7	1.5	1.4	2.5	3.5	4.8	6.1	5.4	4.3	3.2	1.9	1.6	3.1
Kolkata	a	20	15	14	7	3	0	0	0	1	8	15	20	103
(Alipore)	b	1	1	1	1	2	6	8	7	5	2	1	1	36
	c	1.4	1.9	2.2	3.2	4.3	6.0	6.6	6.5	5.7	3.4	2.1	1.2	3.7
Kolkata	a	20	16	15	7	3	0	0	0	0	8	15	20	104
(Dum Dum)	b	1	2	1	1	2	7	10	9	6	2	2	1	44
	c	1.6	2.1	2.3	3.4	4.6	6.3	6.9	6.8	6.0	3.6	2.2	1.4	3.9

T A B L E - IV (contd….)

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 0830 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Krishnanagar	a	24	22	23	21	18	11	8	7	9	21	25	28	217
	b	0	0	0	0	0	0	0	0	0	0	0	0	0
	c	0.2	0.3	0.3	0.7	1.1	1.9	2.3	2.4	2.0	0.9	0.4	0.1	1.1
Medinipur	a	21	17	19	14	11	2	0	0	2	12	17	22	137
	b	4	4	4	5	7	15	19	18	14	7	5	3	105
	c	1.8	2.2	2.1	2.8	3.7	6.1	6.9	6.7	6.1	3.6	2.4	1.5	3.8
Panagarh	a	19	15	17	11	7	2	0	0	2	11	15	19	118
	b	1	1	2	1	3	6	9	7	4	3	2	1	40
	c	1.6	2.0	2.1	2.9	3.8	5.8	6.8	6.8	5.9	3.2	2.2	1.5	3.7
Purulia	a	20	17	18	16	13	4	0	0	3	14	18	20	143
	b	2	2	2	2	2	8	14	14	8	4	2	2	62
	c	1.5	1.7	1.6	1.7	2.3	4.7	6.5	6.4	4.9	2.5	1.6	1.3	3.0
Sagar Island	a	20	14	10	4	2	0	0	0	1	6	14	19	90
	b	0	0	0	0	1	3	3	3	2	1	1	0	14
	c	1.4	2.1	2.9	4.1	5.0	6.1	6.3	6.2	5.5	9.7	2.3	1.6	3.9
Sandheads	a	19	14	12	5	3	1	0	0	1	5	10	17	87
	b	0	1	0	1	3	9	9	10	5	3	2	1	44
	c	1.1	1.5	1.8	2.9	3.8	5.7	6.2	6.1	5.0	3.3	2.7	1.5	3.5
Shantiniketan	a	21	16	17	12	7	2	0	0	2	12	16	21	126
	b	1	1	1	1	3	5	8	6	4	3	2	1	36
	c	1.4	1.6	1.9	2.5	3.5	5.1	6.3	6.1	5.1	2.7	1.9	1.1	3.3
Suri	a	25	22	23	19	15	9	4	1	3	12	21	26	180
	b	2	2	2	4	7	11	16	14	12	6	3	2	81
	c	1.0	1.1	1.2	2.0	3.2	4.7	6.0	5.7	5.6	3.4	1.5	0.5	3.0
Uluberia	a	13	10	9	4	3	0	0	0	0	3	7	11	60
	b	2	3	2	1	2	5	8	8	5	2	1	2	41
	c	2.9	3.3	3.6	4.3	5.1	6.3	6.8	6.8	6.3	4.9	3.8	3.2	4.7
Sub Div.	a	20	17	17	11	08	03	01	01	03	11	17	22	131
Means	b	1	2	1	1	3	7	9	8	6	3	2	1	44
	c	1.4	1.7	1.9	2.7	3.7	5.1	6.0	5.4	5.1	3.0	1.9	1.2	3.3

T A B L E - IV (contd…)

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 0830 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
SUB HIMALAYAN WEST BENGAL														
Balurghat	a	23	19	20	11	6	2	0	1	3	12	20	25	142
	b	0	0	0	1	2	1	3	3	3	1	0	0	14
	c	0.8	1.0	1.5	2.6	3.6	4.6	5.3	4.8	4.5	2.7	1.2	0.7	2.8
Cooch Behar	a	18	16	16	6	2	0	0	0	1	7	15	18	99
	b	2	1	2	4	8	13	15	10	9	4	1	1	70
	c	1.7	1.8	2.3	4.1	5.4	6.5	6.9	6.4	6.0	3.5	1.6	1.2	4.0
Jalpaiguri	a	16	15	16	8	4	2	0	1	2	9	16	17	106
	b	3	2	3	6	9	15	20	14	13	5	1	1	92
	c	1.5	1.3	1.5	3.5	4.4	6.3	7.2	6.5	6.1	3.2	1.3	1.0	3.6
Malda	a	22	18	19	12	7	2	0	0	2	13	20	23	138
	b	2	2	2	4	7	9	12	10	8	3	2	1	60
	c	1.3	1.6	1.7	3.0	4.3	5.7	6.5	6.2	5.5	2.7	1.3	1.0	3.4
Sub Div.	a	20	17	18	9	5	1	0	1	2	10	18	21	122
Means	b	2	1	2	4	7	9	13	9	8	3	1	1	61
	c	1.3	1.4	1.7	3.3	4.4	6.0	6.5	6.0	5.5	3.0	1.3	1.0	3.5
HILL STATIONS														
Darjeeling	a	8	7	15	9	4	4	2	4	4	10	13	14	94
	b	6	6	3	7	10	11	11	13	11	6	4	3	91
	c	4.1	4.2	2.3	3.6	4.9	5.0	4.0	4.9	4.5	3.6	2.5	2.3	3.8
Kalimpong	a	7	5	6	4	3	2	2	1	2	4	6	7	49
	b	3	2	2	3	6	6	9	8	5	2	1	1	48
	c	2.8	2.8	2.8	3.3	3.8	4.5	4.6	4.5	4.0	3.1	2.7	2.8	3.5

a: Days with clear sky

b: Days with sky overcast

c: Mean cloud amount

** Okta = Unit, equal to area of one eighth of the sky used in specifying cloud amount. For example: 1 Okta means 1/8th of the sky covered.

* Hill station not considered for sub divisional mean.

T A B L E - IV (a)

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 1730 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Bagati	a	28	24	26	20	17	10	5	3	6	15	25	28	207
	b	0	0	0	1	1	3	4	4	3	1	0	0	18
	c	0.4	0.6	0.6	1.5	2.2	3.6	4.7	4.9	4.2	2.2	0.7	0.4	2.2
Bankura	a	24	22	22	20	19	12	7	8	9	17	22	26	207
	b	1	1	1	1	2	5	7	8	6	3	1	1	37
	c	0.9	1.0	1.1	1.5	1.9	3.3	4.3	4.5	3.9	2.1	1.2	0.8	2.2
Berhampore	a	26	23	25	18	13	6	1	2	3	15	22	26	180
	b	1	1	2	4	7	9	13	10	9	5	2	1	64
	c	0.7	0.9	0.8	2.0	3.1	4.5	5.6	5.0	4.9	2.5	1.2	0.5	2.6
Bardhaman	a	22	19	20	16	12	13	4	4	8	14	17	21	171
	b	0	1	1	1	2	3	4	4	3	1	1	1	22
	c	0.8	1.1	1.2	1.8	1.9	2.3	3.8	4.8	3.7	1.5	0.8	0.6	2.0
Canning	a	17	13	11	5	3	0	0	0	0	4	10	16	78
	b	2	1	2	3	4	8	10	9	8	4	3	1	54
	c	1.7	2.1	2.4	3.7	4.4	5.8	6.3	6.7	6.3	4.3	2.7	1.5	4.0
Contai	a	19	13	12	4	2	0	0	0	0	5	12	17	85
	b	1	1	2	3	4	7	8	7	5	3	1	1	43
	c	1.3	2.0	2.5	4.0	4.9	6.1	6.4	6.3	5.6	3.2	2.2	1.5	3.8
Diamond	a	20	17	14	7	4	1	0	0	0	6	14	19	102
Harbour	b	1	1	1	2	3	8	10	7	7	3	2	1	45
	c	1.3	1.6	2.1	3.4	4.2	5.9	6.4	6.3	5.9	3.8	2.2	1.3	3.7
Digha	a	17	13	12	4	3	0	0	0	0	4	12	16	81
	b	1	1	1	3	3	7	8	6	4	4	2	1	40
	c	1.6	2.1	2.6	4.3	4.4	6.0	6.4	6.4	5.8	4.1	2.5	1.8	4.0
Haldia	a	18	17	16	5	4	0	5	0	0	4	12	21	101
	b	1	1	1	4	3	8	8	10	6	4	2	1	49
	c	1.6	1.7	2.0	3.9	3.9	6.0	5.2	6.6	6.0	4.4	2.3	1.1	3.7
Kolkata	a	17	13	12	6	3	1	0	0	0	2	9	15	79
(Alipore)	b	1	1	1	2	3	7	8	7	6	3	2	1	42
	c	1.5	1.9	2.3	3.4	4.2	6.0	6.7	6.6	6.3	4.3	2.5	1.6	3.9
Kolkata	a	17	13	13	6	3	0	0	0	0	3	10	16	82
(Dum Dum)	b	1	1	2	3	4	9	11	9	8	4	2	1	54
	c	1.6	2.0	2.5	3.7	4.5	6.4	6.9	6.8	6.5	4.5	2.7	1.7	4.2

T A B L E - IV (a)

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 1730 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Krishnanagar	a	25	21	22	14	11	7	7	6	7	15	20	26	181
	b	0	0	0	0	0	0	0	0	0	0	0	0	0
	c	0.6	0.8	0.9	2.1	2.5	3.5	3.3	3.7	3.2	1.9	1.0	0.4	2.0
Medinipur	a	21	17	16	10	7	2	0	0	1	10	17	22	122
	b	2	2	4	5	7	13	18	17	14	7	4	2	95
	c	1.4	1.8	2.3	3.2	4.1	6.1	6.8	6.8	6.2	3.7	2.2	1.2	3.8
Panagarh	a	18	13	14	8	5	0	0	0	0	5	11	16	91
	b	1	1	2	2	4	9	12	9	9	3	2	1	55
	c	1.7	2.2	2.3	3.5	4.4	6.6	7.1	7.0	6.6	4.0	2.7	1.8	4.2
Purulia	a	17	14	14	9	6	1	0	0	1	7	14	17	100
	b	2	2	3	4	6	15	19	17	15	6	3	2	94
	c	1.8	2.0	2.3	2.9	3.8	6.2	7.0	6.8	6.2	3.3	2.0	1.6	3.8
Sagar Island	a	20	15	12	4	3	0	0	0	0	6	11	14	87
	b	0	0	0	0	1	3	3	2	2	1	1	0	14
	c	1.3	2.0	2.7	4.2	4.4	5.9	6.3	6.2	5.6	3.8	2.6	1.8	3.9
Sandheads	a	20	15	14	6	5	1	0	0	1	6	12	18	99
	b	0	1	1	1	2	7	9	7	4	3	2	1	38
	c	0.8	1.3	1.8	3.0	3.4	5.4	5.9	5.9	5.1	3.1	2.2	1.2	3.3
Shantiniketan	a	19	15	15	9	5	1	0	0	0	7	13	18	103
	b	1	1	1	2	4	8	11	7	7	3	1	1	47
	c	1.4	1.7	2.0	2.9	3.8	5.8	6.6	6.3	5.8	3.1	2.0	1.3	3.6
Suri	a	Data not available												
	b													
	c													
Uluberia	a	12	8	9	3	3	0	0	0	0	1	3	7	47
	b	2	2	1	2	3	6	7	8	6	2	1	2	43
	c	2.8	3.2	3.4	4.4	4.8	6.2	6.8	6.8	6.5	5.1	4.1	3.4	4.8
Sub Div.	a	2	16	16	9	7	3	1	1	2	8	14	19	116
Means	b	01	01	01	02	03	07	09	08	06	03	02	01	44
	c	1.3	1.7	2.0	3.1	3.7	5.3	5.9	6.0	5.5	3.4	2.1	1.3	3.4

T A B L E - IV (a)

MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AND MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AT 1730 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
SUB HIMALAYAN WEST BENGAL														
Balurghat	a	23	19	21	15	8	3	1	1	2	13	20	23	149
	b	0	0	0	1	2	2	3	2	3	1	0	0	16
	c	0.8	0.8	1.0	1.9	3.1	4.3	4.9	4.6	4.4	2.4	1.0	0.7	2.5
Cooch Behar	a	16	12	13	6	2	0	0	0	0	5	12	15	82
	b	1	1	1	2	3	5	5	4	4	2	1	1	30
	c	1.5	1.9	2.2	3.4	4.2	5.7	6.2	5.9	5.5	3.1	1.6	1.4	3.6
Jalpaiguri	a	15	11	15	11	6	2	1	1	2	9	17	17	107
	b	1	1	1	3	3	8	8	7	6	3	1	1	43
	c	1.0	1.0	1.0	2.4	2.7	4.8	5.2	4.5	4.5	2.4	0.9	0.7	2.6
Malda	a	20	18	18	14	9	2	0	0	1	10	18	21	131
	b	2	1	1	2	4	7	9	7	8	4	1	1	48
	c	1.3	1.4	1.6	2.1	3.2	5.4	6.1	5.9	5.5	2.9	1.3	1.1	3.3
Sub Div.	a	19	15	17	11	6	2	1	1	1	9	17	19	118
Means	b	1	1	1	2	3	5	6	5	5	3	1	1	34
	c	1.1	1.3	1.5	2.5	3.3	5.1	5.6	5.2	5.0	2.7	1.2	1.0	3.0
HILL STATIONS														
Darjeeling	a	4	5	8	5	4	3	3	4	4	6	8	8	62
	b	10	8	7	10	11	12	9	12	11	7	6	7	110
	c	5.3	4.9	4.0	4.7	5.6	5.2	3.7	5.0	4.8	4.3	4.0	3.6	4.6
Kalimpong	a	7	5	6	4	3	2	2	2	3	4	5	6	49
	b	3	2	2	3	6	6	8	8	5	2	1	2	49
	c	3.3	3.0	3.1	3.6	4.0	4.6	4.7	4.7	4.3	3.6	3.2	3.1	3.8

a: Days with clear sky

b: Days with sky overcast

c: Mean cloud amount

** Okta = Unit, equal to area of one eighth of the sky used in specifying cloud amount.
For example: 1 Okta means 1/8th of the sky covered.

* Hill station not considered for sub divisional mean.

T A B L E - IV (b)

MEAN NUMBER OF HOURS OF BRIGHT SUNSHINE PER DAY

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL													
Chinsurah	8.9	9.4	9.2	9.5	8.8	5.6	4.7	5.1	5.9	7.3	9.1	9.0	7.7
Kolkata	7.9	8.6	8.2	8.6	8.2	4.4	3.8	3.9	4.5	6.3	8.3	8.2	6.7
SUB HIMALAYAN WEST BENGAL													
Nagarkata	8.3	7.6	7.9	7.1	6.4	3.7	3.3	4.1	5.3	7.5	8.9	8.4	6.5
Nagri Farm	6.6	5.4	7.1	5.8	5.0	2.8	2.4	3.2	4.3	6.4	7.5	7.0	5.3

T A B L E - V

MEAN RAINFALL (in mm) AND NUMBER OF RAINY DAYS

DISTRICTS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
GANGETIC WEST BENGAL														
Bankura	a	10.7	16.0	18.9	28.6	61.0	182.3	266.1	247.9	230.3	81.8	9.2	2.4	1155.2
	b	0.8	1.2	1.4	1.7	3.5	9.3	14.0	13.6	11.1	4.4	0.5	0.2	61.7
Birbhum	a	14.3	14.1	18.2	29.3	74.3	210.0	291.1	277.8	235.0	101.8	12.2	3.9	1282.0
	b	1.0	1.1	.15	1.9	4.6	10.1	14.5	14.4	10.8	5.0	0.7	0.3	65.9
Bardhaman	a	10.8	16.2	19.0	32.9	75.1	211.9	276.0	257.2	232.0	92.4	8.0	4.5	1236.0
	b	0.8	1.2	1.5	2.1	4.4	9.9	14.0	13.6	10.9	4.7	0.6	0.3	64.0
Howrah	a	10.6	21.5	31.9	51.9	123.4	255.7	315.6	315.3	299.9	107.4	23.6	7.9	1564.7
	b	0.9	1.4	2.0	3.0	5.8	11.7	14.2	16.0	12.7	5.9	1.1	0.5	75.2
Hooghly	a	13.1	20.4	23.2	48.6	108.0	233.4	291.9	272.3	278.9	112.9	12.0	3.8	1418.5
	b	0.7	1.4	1.8	2.6	5.4	10.7	14.5	14.4	12.0	6.0	0.7	0.2	70.4
East Medinipur	a	14.8	23.3	25.8	43.4	110.8	237.3	291.1	294.6	340.8	154.4	22.8	4.0	1563.1
	b	0.9	1.5	1.6	2.6	4.8	10.4	13.3	14.0	13.2	6.6	1.0	0.2	70.1
West Medinipur	a	14.5	20.2	26.8	45.0	98.8	216.2	295.9	297.2	287.8	102.4	13.2	3.1	1421.1
	b	0.8	1.4	1.8	3.0	5.1	10.0	14.0	14.0	12.0	5.3	0.8	0.2	68.4
Murshidabad	a	20.1	13.8	18.5	34.0	80.0	254.1	338.4	245.4	231.6	129.9	11.6	1.5	1378.9
	b	1.2	0.9	1.3	1.9	4.5	10.2	14.6	12.9	10.6	5.1	0.6	0.1	63.9
Nadia	a	10.9	13.2	22.5	49.7	98.4	252.9	293.9	250.0	244.9	115.9	12.8	4.3	1369.4
	b	0.8	1.1	1.6	2.6	5.9	11.6	14.7	14.4	11.3	5.5	0.8	0.3	70.6
North 24 Parganas	a	14.3	16.9	25.7	49.5	104.3	266.1	315.8	194.1	276.2	132.5	14.4	3.1	1512.9
	b	0.9	1.5	1.8	2.8	5.5	11.5	14.9	15.2	12.3	6.2	0.8	0.2	73.6
South 24 Parganas	a	14.3	21.0	32.7	43.8	107.6	289.4	380.8	348.2	325.1	154.9	41.2	7.0	1766.0
	b	0.9	1.5	1.8	2.5	5.1	11.6	14.8	15.4	13.0	6.4	1.5	0.3	74.8
Kolkata	a	14.7	23.8	34.9	52.3	110.5	278.4	363.2	336.1	309.3	156.1	25.2	9.0	1713.5
	b	1.0	1.7	2.3	3.2	6.1	12.5	17.1	17.0	13.9	7.1	1.2	0.5	83.6
Purulia	a	12.1	16.9	16.8	19.3	36.2	173.9	291.2	271.0	277.4	89.6	10.7	2.6	1217.7
	b	1.0	1.3	1.5	1.4	2.9	9.4	14.8	14.4	12.1	4.6	0.6	0.3	64.3
Sub.Div.Means.	a	13.5	18.3	24.2	40.6	91.4	235.5	308.5	285.2	274.6	117.8	16.7	4.4	1430.7
	b	0.9	1.3	1.7	2.4	4.9	10.7	14.6	14.6	12.0	5.6	0.8	0.3	69.7

T A B L E - V (contd…)

MEAN RAINFALL (in mm) AND NUMBER OF RAINY DAYS

DISTRICTS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
SUB HIMALAYAN WEST BENGAL														
Cooch Behar	a	9.6	14.4	34.3	121.1	358.3	655.6	828.2	621.0	447.8	146.3	12.8	5.2	3254.6
	b	0.8	1.1	2.5	6.4	13.7	17.5	19.7	15.7	12.6	5.4	0.7	0.5	96.6
Jalpaiguri	a	12.4	24.4	46.4	142.9	363.1	733.3	962.7	702.7	529.3	168.7	19.4	8.8	3714.1
	b	0.9	1.6	2.7	7.3	13.8	18.9	22.3	18.4	15.3	6.2	1.2	0.7	109.3
Malda	a	14.1	10.1	14.0	32.6	104.6	209.6	339.6	287.7	277.6	102.3	12.9	6.7	1411.8
	b	1.0	1.2	1.1	2.5	5.5	10.2	15.6	14.0	11.6	4.6	0.7	0.6	68.6
North Dinajpur	a	11.6	13.1	22.2	56.1	150.3	212.3	434.4	367.9	314.0	114.7	9.2	5.1	1710.9
	b	0.8	0.9	1.3	3.5	7.5	10.0	16.5	14.3	11.0	4.8	0.9	0.4	71.9
South Dinajpur	a	19.1	9.2	23.3	47.4	143.5	333.0	394.2	294.7	289.1	115.5	7.9	1.8	1678.7
	b	1.0	0.6	1.5	2.3	6.1	12.2	14.7	12.3	11.1	4.5	0.5	0.2	67.0
Sub-Div.	a	13.4	14.2	28.0	80.0	224.0	428.8	591.8	454.8	371.6	129.5	12.4	5.5	2354.0
Means	b	0.9	1.1	1.8	4.4	9.3	13.8	17.8	14.9	12.3	5.1	0.8	0.5	82.7
	a:	Normal Rainfall (mm)												
	b:	Average number of rainy days (i.e.days with rainfall of 2.5 mm or more)												

T A B L E - V(a)

MEAN RAINFALL (in mm) AND NUMBER OF RAINY DAYS

HILL STATIONS

STATIONS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Bijanbari	a	5.2	14.0	26.3	85.8	148.2	367.8	517.6	428.3	316.4	120.8	104.4	4.0	2044.8
(Hydro)	b	0.5	1.2	1.9	6.5	10.4	15.7	22.5	20.2	14.4	4.2	0.8	0.5	98.8
Darjeeling	a	24.2	14.1	44.4	78.0	166.0	492.5	784.5	533.3	413.3	94.7	14.2	3.0	2662.2
(Obsy)	b	1.5	1.6	3.7	6.7	12.0	19.9	25.5	22.9	16.3	5.0	1.2	0.4	116.7
Kalimpong	a	17.8	15.7	33.2	75.7	136.5	381.7	663.9	472.0	374.4	105.1	6.8	3.8	2286.6
(Obsy)	b	1.2	1.3	2.6	4.9	9.4	15.6	21.0	17.6	12.0	3.2	0.6	0.4	89.8
Mongpoo	a	23.8	10.8	67.4	116.3	233.8	640.5	861.1	606.7	428.4	130.8	12.5	2.9	3135.0
	b	1.5	1.0	4.1	7.4	13.8	21.2	24.4	21.7	14.8	4.3	1.0	0.4	115.6
Pedong	a	21.3	26.1	56.1	88.2	214.4	397.1	629.4	520.7	356.0	118.1	21.7	2.0	2451.1
	b	2.0	2.6	5.3	7.2	14.8	21.2	25.8	26.5	16.8	4.9	1.8	0.2	129.1
Phalut	a	103.6	74.1	97.4	233.3	477.9	735.6	867.5	934.-	725.7	161.5	30.3	24.6	4465.4
(Hydro)	b	3.1	3.3	5.1	10.8	19.3	25.0	26.7	24.5	21.3	8.8	2.5	1.3	151.7
Sandakphu	a	68.4	45.5	89.0	220.0	344.5	638.8	926.7	785.8	544.9	116.1	23.9	9.5	3813.1
(Hydro)	b	2.3	2.1	4.4	9.0	15.8	23.0	27.4	25.9	19.5	5.4	1.8	0.7	1373.3
Tanglu	a	40.8	33.7	84.9	165.3	408.7	646.3	969.1	909.6	536.6	123.5	15.9	7.5	3941.9
(Hydro)	b	2.3	2.6	4.9	9.7	19.3	23.0	27.5	27.0	20.0	6.2	1.4	0.7	144.6
Jhepi	a	6.4	22.9	24.4	111.2	179.3	451.3	849.2	466.7	450.6	195.9	6.3	14.1	2778.3
(Hydro)	b	0.8	1.5	1.8	8.4	14.8	21.0	17.1	22.9	18.0	6.9	0.8	0.9	124.7
Kurseong	a	17.0	18.7	79.4	88.2	224.0	742.7	1138.4	966.2	707.6	109.3	12.4	1.5	4105.4
	b	1.6	1.6	3.2	4.6	11.1	20.9	26.3	25.4	20.1	5.8	0.8	0.2	121.6
	a:	Normal Rainfall (mm)												
	b:	Average number of rainy days (i.e.days with rainfall of 2.5 mm or more)												

T A B L E - VI

MEAN RAINFALL (mm) OVER DIFFERENT CATCHMENTS OF WEST BENGAL

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL

1. River Subernarekha and streams between River Baitarni and River Subarnarekha: (Catchment No: 322)

Districts/Parts of districts within this catchment:-

Gangetic West Bengal : West Medinipur, Purulia

6.4	17.7	24.6	31.7	84.5	197.4	325.6	307.6	291.6	104.2	12.7	2.7	1406.7

2. Streams between river Subarnarekha and Damodar (excluding River Damodar): (Catchment No: 323)

Districts/Parts of districts within this catchment:-

Gangetic West Bengal : West Medinipur, Purulia, East Medinipur, Bankura, Hooghly

14.4	20.1	23.5	38.2	83.9	209.0	278.6	276.7	285.0	109.5	15.1	3.3	1357.3

3. RiverDamodar (Catchment No.: 324)

Districts/Parts of districts within this catchment:-

Gangetic West Bengal : Purulia, Bankura, Bardhaman

9.9	15.0	17.6	29.5	64.2	193.3	281.0	254.0	231.4	95.5	8.1	3.1	1202.6

4. River Hooghly and River Mor: (Catchment No.: 325)

Districts/Parts of districts within this catchment:-

Gangetic West Bengal : Bardhaman, Hooghly, Howrah, Nadia, Murshidabad, Birbhum, South 24 Parganas, North 24 Parganas, Kolkata

14.3	17.3	23.6	41.9	96.3	250.7	317.1	284.0	269.5	121.5	17.5	4.3	1458.0

T A B L E - VI (contd…)

MEAN RAINFALL (mm) OVER DIFFERENT CATCHMENTS OF WEST BENGAL

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL

5. River Ganga from its confluences with River Kosi to Bangladesh: (Catchment No. 418)

Districts/Parts of districts within this catchment:-

Sub Himalayan West Bengal : South Dinajpur, North Dinajpur, Darjeeling, Malda

23.2	17.7	41.6	87.7	208.0	451.4	668.1	535.9	415.5	126.2	11.1	5.1	2591.5

6. River Brahmaputra upto Bangladesh border including River Dihang, River Lohit, streams between River Subansari and Manas and between Manas and Tista, excluding Tista and its tributaries: (Catchment No. 504)

Districts/Parts of districts within this catchment:-

Sub Himalayan West Bengal : Jalpaiguri, Cooch Behar

14.2	19.6	47.2	148.5	409.5	786.1	999.0	729.5	528.3	164.1	16.8	6.3	3869.1

7. River Tista upto Bangladesh border : (Catchment No. 505)

Districts/Parts of districts within this catchment:-

Sub Himalayan West Bengal : Darjeeling, Jalpaiguri, Cooch Behar

17.7	23.8	44.3	121.4	289.1	620.3	837.3	637.2	484.9	157.9	18.8	8.9	3261.6

TABLE – VII

STORMS/DEPRESSIONS AFFECTING WEST BENGAL STATE DURING 1891-1990

MONTH	***NO. OF DAYS OF STORMS/DEPRESSIONS***	
	GANGETIC WEST BENGAL	***SUB HIMALAYAN WEST BENGAL***
January	0	0
February	0	0
March	0	0
April	0	0
May	15	8
June	63	17
July	112	16
August	121	19
September	79	20
October	42	13
November	13	13
December	3	0
TOTAL	**448**	**82**

BARDHAMAN DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidity nearly all the year round and well distributed rainfall during the monsoon season. The winter season starts by about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season is from June to September. October and first half of November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 8 stations for the period ranging from 12 to 99 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1236.0 mm. About 79% of the annual rainfall is received during the southwest monsoon months i.e June to September. The variation in the rainfall from year to year is not large. Considering the district as a whole, during fifty years period from 1951 to 2000, the highest annual rainfall in the district amounting to 166% of the normal occurred in 1971, while 1966 was the year with the lowest annual rainfall, which was 72% of the normal. There are three years in which the annual rainfall was less than 80% of the normal, and none of them were consecutive. It is seen from Table 2 that in 25 years out of 40, the annual rainfall was between 1001 and 1500 mm.

On an average there are 64 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 47 at Mangalkote to 75 at Panagarh Aero (Obsy).

The heaviest rainfall in 24 hours recorded at any station in the district was 391.2 mm at Mangalkote on 26th September, 1956.

Temperature

The district has two meteorological observatories, one at Bardhaman and other at Panagarh (Aerodrome). The western part of the district comprising the Panagarh subdivision is slightly different from the rest of the district in its climatic features. The temperature and other data of Panagarh (Aerodrome) may be taken to represent the condition in this part and data of Bardhaman observatory represents the rest of the district. Temperatures in summer are higher at Panagarh (Aerodrome) than at Bardhaman, while those in the cold season are slightly lower than Bardhaman. Temperatures begin to rise rapidly from the beginning of March. The day temperatures reach a maximum in April and May. The night temperatures increase further upto June and remains steady till September. The heat in summer is oppressive due to high moisture contents in the air. The maximum temperature sometimes rise upto 47^0C. There is welcome relief from the heat though only temporarily when thundershowers occur on some days in this season. The mean daily maximum temperature in the month of May is 37.4^0C, while the mean daily minimum temperature is about 23.7^0C at Bardhaman (Obsy). The mean daily maximum temperature is 37.9^0C and mean daily minimum temperature is 23.2^0C at Panagarh Aero (Obsy). With the onset of the southwest monsoon season by about the first week of June, the day temperatures drop appreciably but night temperatures remain high. With the increased humidity in the air and the continuing high night temperatures, even during the monsoon season weather is often uncomfortable. The southwest monsoon withdraws early in October and the temperature begins to drop. The drop in night temperatures is particularly more rapid from about the middle of November. January is the coldest month with the mean daily maximum temperature at about 26.0^0C to 27.0^0C and the mean daily minimum temperature at about 10.0^0C to 11.0^0C. In association with the passage of western disturbances, spells of cold wave are experienced in the winter season and on individual days minimum temperature may drop down upto 3 to 4^0C.

The highest maximum temperature ever recorded at Bardhaman was 46.8^0C on 22nd May 1980 and the lowest minimum temperature ever recorded was 4.4^0C on 17th January 1962, 3rd February 1905 and 24th December 1961. Whereas, the highest maximum

temperature ever recorded at Panagarh (Aerodrome) was 47.4^{0}C on 19th May 1972 and the lowest minimum temperature ever recorded was 2.8^{0}C on 14th January 1989.

Humidity

The values of relative humidity are generally high throughout the year. But in summer months values of relative humidity are comparatively less being about 60-70% in the morning and 35 to 40% in the afternoons.

Cloudiness

In winter and early part of summer skies are clear or lightly clouded. Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October.

Winds

Winds are generally light with a slight increase in force in summer and southwest monsoon months. In winter months and March winds blow mainly from northwest and north. In April southerlies appear and south easterlies are predominant till September. Winds blow mostly from northerly and northwesterly directions in post monsoon months.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and post monsoon often reach the district and its neighbourhood and cause widespread heavy rain with high winds. Depressions in the monsoon season also affect the district and heavy rains occur. Thunderstorms are common, mostly in the afternoons, in the hot season in association with them heavy rain, occasional hail and severe squalls occur. These thunderstorms are called 'Norwesters' due to the fact that the squalls associated with them usually come from the northwest and are locally known as 'Kalbaisakhi'. A sharp drop in temperatures is experienced during these storms which are often violent. Rain during the monsoon season is also often associated with thunder. Occasional fog occurs during the cold season.

Tables 3, 4, 5 and Tables 3(a), 4(a), 5(a) give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Bardhaman and Panagarh (Aero) observatories in the district.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Asansol	38	a	13.1	19.0	20.1	28.3	62.7	232.1	327.5	317.1	267.0	105.1	12.2	3.5	1407.7	209	67	272.0	23 Sep 1916
		b	1.1	1.4	1.7	2.0	4.1	10.8	16.8	16.0	12.3	5.0	0.9	0.4	72.5	(1999)	(1966)		
Bardhaman (Obsy)	36	a	10.3	18.4	26.5	44.7	81.0	196.0	310.4	312.3	227.9	113.2	11.1	4.6	1356.4	151	65	304.8	26 Sep 1956
		b	0.6	1.3	2.0	2.6	4.8	9.4	14.1	14.2	10.3	5.1	0.7	0.2	65.3	(1971)	(1962)		
Durgapur (Hydro)	15	a	14.4	17.5	12.7	27.5	54.5	259.9	290.2	292.6	246.3	121.4	1.9	0.3	1339.2	177	63	387.7	27 Sep 1978
		b	1.1	1.4	1.1	1.9	3.1	10.6	14.6	14.8	12.4	5.7	0.3	0.0	67.0	(1957)	(1966)		
Kalna	13	a	12.5	17.7	10.1	41.0	107.9	182.4	230.1	181.2	269.8	50.0	10.0	0.2	1112.9	145	71	331.5	26 Sep 1956
		b	0.7	0.7	0.9	2.2	5.4	10.1	12.4	11.1	10.5	4.0	0.5	0.0	58.5	(1956)	(1958)		
Katwa	13	a	13.0	14.5	26.8	36.9	63.7	270.1	308.9	241.8	223.9	79.1	6.8	4.6	1290.1	127	85	266.7	25 Sep 1956
		b	0.9	1.2	1.9	2.0	4.5	10.8	14.8	14.3	10.6	5.0	0.6	0.2	66.8	(1953)	(1960)		
Luuchipur (Hydro)	12	a	9.9	4.9	19.9	24.5	60.4	187.4	195.5	202.4	135.7	91.8	6.2	1.3	939.9	121	73	193.0	28 Sep 1978
		b	0.7	0.7	1.0	2.0	3.0	9.7	12.5	14.1	9.8	4.3	0.9	0.3	59.0	(1963)	(1966)		
Mangalkote	13	a	4.7	15.4	3.9	15.8	58.6	144.9	221.5	234.4	217.9	73.0	5.1	2.3	997.5	146	56	391.2	26 Sep 1956
		b	0.4	0.9	0.4	1.3	3.6	7.0	10.8	9.4	8.9	3.7	0.1	0.3	46.8	(1959)	(1952)		
Panagarh Aero Obsy	19	a	8.2	21.8	31.7	44.2	112.1	222.2	324.1	275.7	267.5	105.7	10.3	19.5	1443.0	152	68	325.3	27 Sep 1978
		b	1.1	1.7	2.8	3.1	6.5	11.1	15.6	14.5	12.2	4.6	1.1	0.8	75.1	(1978)	(1988)		
Bardhaman (District)		a	10.8	16.2	19.0	32.9	75.1	211.9	276.0	257.2	232.0	92.4	8.0	4.5	1236.0	166	72		
		b	0.8	1.2	1.5	2.1	4.4	9.9	14.0	13.6	10.9	4.7	0.6	0.3	64.0	(1971)	(1966)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000.

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 -2000)
(BARDHAMAN)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	1	1501 – 1600	3
901 – 1000	2	1601 – 1700	4
1001 – 1100	7	1701 – 1800	2
1101 – 1200	6	1801 – 1900	1
1201 – 1300	3	1901 – 2000	1
1301 – 1400	5	2001 – 2100	1
1401 – 1500	4		

(Data available for 40 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(BARDHAMAN)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	26.9	12.0	36.7	1951 Jan 16	4.4	1962 Jan 17	63	49
February	29.4	14.2	38.8	1974 Feb 25	4.4	1905 Feb 03	61	46
March	33.8	18.5	41.7	1941 Mar 28	10.0	1928 Mar 09	63	42
April	37.2	23.0	46.0	1965 Apr 25	14.6	1981 Apr 19	70	49
May	37.4	23.7	46.8	1980 May 22	15.4	1982 May 01	71	60
June	35.7	24.9	45.6	1926 Jun 15	18.6	1981 Jun 01	76	67
July	33.3	24.0	39.8	1982 Jul 04	19.4	1981 Jul 18	82	79
August	32.6	24.3	38.3	1981 Aug 02	19.7	1981 Aug 24	84	80
September	33.1	24.3	38.0	1968 Sep 23	18.9	1981 Sep 30 1982 Sep 29	81	78
October	32.4	22.1	36.7	1951 Oct 21	15.4	1980 Oct 29	74	70
November	30.5	16.6	35.6	1896 Nov 02	9.8	1981 Nov 27	67	60
December	27.4	12.0	31.7	1951 Dec 07	4.4	1961 Dec 24	63	53
Annual	32.5	20.0					71	61

TABLE – 4

Mean Wind Speed in km/hr.
(BARDHAMAN)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.1	3.7	5.8	7.3	10.1	9.0	8.7	7.5	6.8	4.8	3.5	2.9	6.1

TABLE – 5

Special Weather Phenomena
(BARDHAMAN)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0,0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Squall	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.7	1.7

TABLE – 3(a)

Normals of Temperature and Relative Humidity
(PANAGARH (A))

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.5	10.3	32.8	1990 Jan 30	2.8	1989 Jan 14	71	59
February	28.7	13.2	36.7	1985 Feb 26	5.4	1974 Feb 11	61	49
March	34.0	18.5	41.4	1973 Mar 31	9.6	1972 Mar 02	53	36
April	37.9	23.2	46.4	1975 Apr 02	16.2	1977 Apr 03	60	38
May	37.5	24.9	47.4	1972 May 19	14.6	1988 May 16	68	52
June	35.3	25.8	46.2	1972 Jun 02	21.0	1974 Jun 23	77	70
July	32.9	25.5	40.3	1982 Jul 04	18.1	1976 Jul 27	84	81
August	32.5	25.4	40.1	1974 Aug 02	21.6	1987 Aug 03	85	82
September	32.6	24.6	37.6	1968 Sep 08	14.5	1981 Sep 16	83	82
October	31.8	21.6	38.6	1974 Oct 11	12.9	1983 Oct 29	78	77
November	29.4	16.0	35.4	1977 Nov 07	6.6	1982 Nov 30	72	71
December	26.1	10.9	31.7	1975 Dec 05	3.1	1988 Dec 29	72	67
Annual	32.0	20.0					72	64

TABLE – 4(a)

Mean Wind Speed in km/hr.
(PANAGARH (A))

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.2	3.0	4.3	6.6	7.7	7.1	5.9	5.8	4.8	2.6	2.0	2.0	4.5

TABLE – 5(a)

Special Weather Phenomena
(PANAGARH (A))

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.7	2.1	3.9	6.1	8.6	11.7	13.4	13.0	12.6	4.0	0.2	0.1	76.4
Hail	0.0	0.0	0.2	0.3	0.4	0.7	0.9	0.7	0.9	0.1	0.0	0.0	4.2
Dust storm	0.0	0,0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3
Squall	0.0	0.0	0.1	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Fog	2.9	1.4	1.0	0.9	0.2	0.2	0.0	0.1	0.5	1.4	1.4	2.7	12.7

BANKURA DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidity nearly all the year round and well distributed rainfall during the monsoon season. The cold weather starts by about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season is from June to September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 17 raingauge stations well distributed over the district for period ranging from 24 to 135 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall of the district is 1155.2 mm. Bankura observatory gets on an average 1408.0 mm of rain in a year, which is the highest for the district, while Barjora gets an average 857.0 mm of rain in a year, which is the lowest for the district. The southwest monsoon arrives over the district by about the first week of June and withdraws by about the first week of October. About 80% of the annual rainfall is received during southwest monsoon months i.e. June to September, July being the rainiest month. The year to year variation of the annual rainfall in the district is not large. Considering the district as a whole, during the fifty year period from 1951-2000, the highest annual rainfall in the district amounting to 174% of the normal occurred in 1971, while 1976 was the year with the lowest annual rainfall which was 76% of the normal. There are three years in which annual rainfall was less than 80% of the normal. However, no two

consecutive years experienced such a low rainfall during this period. It is seen from Table 2 that in 25 years out of 34, the annual rainfall was between 901 and 1500 mm.

On an average there are 62 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 52 at Indpur and Barjora to 73 at Bankura (observatory).

The heaviest rainfall in 24 hours ever recorded at any station in the district is 599.2 mm at Taldangra on 10th August 1950.

Temperature

There is a meteorological observatory in the district at Bankura. The description of the climate which follows is based on the records of meteorological parameters for Bankura, which may be taken as representative of the conditions in the district as a whole. The hot season commences by about the beginning of March, when temperatures begin to rise rapidly. May is the hottest month when the mean daily maximum temperature is at about 38.8^{0}C whereas mean daily minimum temperature is 25.6^{0}C at Bankura. During May and early part of June, on individual days, the maximum temperature may sometimes rise upto about 47^{0}C. The heat in the summer is oppressive due to high moisture content in the air. There is welcome relief from heat, although only temporarily when thundershowers occur on some days in the season. With the onset of the southwest monsoon by about the first week of June day temperatures drop appreciably but the night temperature remains high. With the increased humidity in the air and the continuing high night temperatures, even during the southwest monsoon season, weather is often uncomfortable. The southwest monsoon withdraws early in October and the temperatures begin to drop. The drop, particularly in the night temperatures is more rapid from about the middle of November. The cold season is bracing. January is the coldest month with the mean daily maximum temperature being 26.1^{0}C and the mean daily minimum temperature being 11.9^{0}C at Bankura. In association with passing of western disturbances spells of cold weather are experienced in the winter season, and the minimum temperature may sometimes go down to about 5 to 6^{0}C.

The highest maximum temperature ever recorded at Bankura was 47.4^{0}C on 20th May 1972. The lowest minimum temperature ever recorded was 5.1^{0}C on 31st January 1967 and 2nd February 1967.

Humidity

The values of relative humidity are high generally throughout the year. But in the summer months, the afternoon humidity is comparatively less.

Cloudiness

Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and the skies are clear or lightly clouded in the rest of the year.

Winds

Winds are generally light to moderate with a slight increase in force in the summer and monsoon season. Winds blow mostly from directions between southeast and southwest in May and the southwest in the monsoon season. In October they are light and variable and sometimes northeast in the morning. In November and December, winds are mainly from directions between north to west. From January to April they are mostly calm and sometimes from west.

Special Weather Phenomena

Storms and depressions originate from the Bay of Bengal in May and in the post monsoon season often reach the district and its neighbourhood causing widespread heavy rain with high winds. Depressions in the monsoon season also affect the district and heavy rains occur. Thunderstorms are common mostly in the afternoons in the hot season. In association with them occasional hail and severe squalls occur. These thunderstorms are called Norwesters due to the fact that the squalls often violent associated with them usually come from northwest and locally known as ‘Kalbaisakhi’. A sharp drop in temperature is experienced during these storms. Rain during the southwest monsoon season is also often associated with thunder. Occasional fog occurs during the cold season.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Bankura observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bankura	49	a	15.2	18.9	29.4	36.8	71.4	214.1	316.4	314.9	256.4	101.6	14.8	18.1	1408.0	194	62	317.0	18 Jun 1898
(Obsy)		b	1.2	1.6	2.0	2.7	4.7	10.6	15.8	16.2	12.0	5.2	0.8	0.6	73.4	(1991)	(1976)		
Barjora	13	a	8.3	18.0	8.6	23.1	55.4	156.0	210.0	152.9	154.1	61.3	7.2	2.1	857.0	129	47	177.8	26 Aug 1944
		b	0.8	1.1	0.8	1.4	2.8	8.2	12.2	11.6	8.3	4.0	0.5	0.2	51.9	(1961)	(1954)		
Chatna	12	a	12.8	20.2	14.7	11.7	42.2	150.8	285.1	283.6	210.3	71.3	3.8	1.7	1108.2	136	63	294.6	22 Jun 1922
		b	1.1	1.3	1.5	0.7	2.4	9.5	14.7	15.6	11.3	3.5	0.4	0.2	62.2	(1959)	(1955)		
Gangajalghati	10	a	2.4	12.4	21.4	35.6	43.3	141.8	273.2	229.1	214.6	109.5	10.1	0.0	1093.4	135	62	275.8	30 Jul 1937
		b	0.3	0.9	2.3	1.7	2.4	6.9	12.8	12.4	9.6	4.9	0.6	0.0	54.8	(1952)	(1954)		
Indas	16	a	20.2	20.0	25.3	26.7	61.5	196.1	258.2	219.5	266.4	63.2	15.5	0.9	1173.5	123	77	330.2	25 Sep 1956
		b	1.2	1.4	1.6	1.7	3.9	10.3	13.5	13.8	12.7	5.0	0.6	0.1	65.8	(1959)	(1957)		
Indpur	13	a	10.6	7.1	21.7	16.3	31.2	183.0	210.1	216.6	209.8	90.5	8.3	0.0	1005.2	142	72	307.6	03 Aug 1922
		b	0.7	0.6	1.0	1.2	2.1	7.6	11.4	11.6	10.6	4.4	0.4	0.0	51.6	(1956)	(1952)		
Joypur	11	a	11.5	18.3	16.0	31.5	52.5	177.6	220.5	205.9	240.8	68.3	10.0	1.3	1054.2	154	62	190.5	30 Sep 1959
		b	0.6	1.4	1.5	1.3	4.0	9.1	13.0	13.9	10.7	5.2	0.7	0.1	61.5	(1959)	(1961)		
Khatra	13	a	12.3	23.7	21.9	25.5	77.8	202.1	256.4	229.2	272.7	67.7	5.2	3.6	1198.1	146	91	306.8	23 Jun 1893
		b	1.0	1.8	1.5	2.1	4.6	10.6	14.9	11.8	13.0	4.3	0.2	0.3	66.1	(1959)	(1961)		
Palasdanga	12	a	13.9	22.3	12.8	24.9	66.3	212.0	284.4	269.8	236.5	69.3	0.4	3.3	1215.9	132	68	276.9	17 Sep 1946
		b	1.3	1.3	0.9	1.4	3.3	10.0	14.4	13.5	12.0	3.7	0.1	0.3	62.2	(1956)	(1954)		

Contd 2…..

TABLE - I (Contd)….
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Patrasayar	11	a	13.9	11.3	20.7	10.9	54.6	186.5	231.7	216.9	253.5	96.2	20.1	3.8	1120.1	150	76	233.7	10 Aug 1950
		b	1.0	0.7	1.1	0.9	3.3	8.3	12.6	12.5	11.4	4.4	0.9	0.2	57.3	(1953)	(1954)		
Ranibandh	18	a	9.8	16.8	20.3	38.1	70.4	185.8	283.7	321.0	228.7	87.3	8.7	0.3	1270.9	169	59	175.0	01 Aug 1968
		b	0.7	1.2	1.8	2.2	3.7	10.3	13.9	14.0	10.3	4.3	0.4	0.1	62.9	(1971)	(1962)		
Salbundh	13	a	9.7	25.7	24.5	52.4	75.3	205.8	308.3	249.5	212.1	87.4	8.2	0.4	1259.3	127	73	201.7	30 Jun 1936
		b	0.8	1.6	1.2	2.4	3.6	10.5	17.0	15.3	13.0	5.7	0.6	0.1	71.8	(1964)	(1966)		
Saltora	15	a	5.7	11.1	18.5	17.0	33.6	166.4	261.3	236.2	184.8	90.7	13.1	0.2	1038.6	145	62	266.7	08 Jul 1928
		b	0.7	0.7	1.1	0.9	2.3	8.5	13.7	13.0	9.6	4.0	0.7	0.1	55.3	(1959)	(1957)		
Simlapal	16	a	7.8	8.0	25.0	29.4	82.5	182.2	283.8	307.9	271.4	68.2	8.2	1.9	1276.3	183	54	403.1	07 Aug 1969
		b	1.1	1.2	1.9	1.6	3.8	10.3	13.4	13.9	12.3	3.4	0.5	0.2	63.6	(1968)	(1962)		
Sonamukhi	14	a	0.0	1.0	0.0	30.9	81.9	185.3	340.9	222.9	250.7	95.9	0.0	0.0	1209.5	109	62	225.0	28 Sep 1978
		b	0.0	0.3	0.0	2.4	3.8	8.6	14.6	13.8	10.2	4.0	0.0	0.0	57.7	(1978)	(1962)		
Taldangra	20	a	7.3	15.2	17.8	43.2	74.8	192.8	234.5	281.2	227.0	93.5	8.6	1.3	1197.2	157	56	599.2	10 Aug 1950
		b	0.7	1.4	1.4	2.6	4.2	9.8	14.3	13.8	10.6	4.2	0.6	0.1	63.7	(1971)	(1957)		
Vishnupur	13	a	20.7	21.7	22.6	31.5	61.7	160.1	265.7	256.9	225.3	68.8	13.9	2.2	1151.1	119	76	344.2	30 Aug 1909
		b	1.0	1.3	1.8	1.8	3.9	9.5	15.0	14.1	11.2	4.0	0.6	0.2	64.4	(1951)	(1962)		
Bankura		a	10.7	16.0	18.9	28.6	61.0	182.3	266.1	247.9	230.3	81.8	9.2	2.4	1155.2	174	76		
(District)		b	0.8	1.2	1.4	1.7	3.5	9.3	14.0	13.6	11.1	4.4	0.5	0.2	61.7	(1971)	(1976)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data up to 2000.

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(BANKURA)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	2	1501 – 1600	2
901 - 1000	4	1601 – 1700	1
1001 – 1100	6	1701 – 1800	0
1101 – 1200	4	1801 – 1900	1
1201 – 1300	2	1901 – 2000	2
1301 – 1400	4	2001 – 2100	1
1401 – 1500	5		

(Data available for 34 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(BANKURA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest inimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	26.1	11.9	34.0	1973 Jan 22	5.1	1967 Jan 31	66	55
February	28.6	15.1	38.3	1967 Feb 22	5.1	1967 Feb 02	63	53
March	33.9	19.4	42.5	1966 Mar 28	10.8	1967 Mar 01	63	57
April	37.9	23.9	45.2	1973 Apr 15	16.0	1990 Apr 01	63	57
May	38.8	25.6	47.4	1972 May 20	17.0	1977 May 08	67	62
June	36.9	26.0	47.0	1966 Jun 10	19.4	1967 Jun 10	78	75
July	33.7	25.4	41.2	1982 Jul 04	21.4	1979 Jul 29 1976 Jul 08	82	82
August	33.2	25.2	39.8	1988 Aug 20	20.0	1987 Aug 27	83	83
September	33.4	24.9	39.0	1988 Sep 28	19.8	1978 Sep 29	83	84
October	32.4	22.6	39.0	1988 Oct 05	16.2	1995 Oct 25	77	75
November	29.8	18.1	37.0	1977 Nov 07	10.5	1970 Nov 30	69	66
December	26.3	12.7	33.0	1979 Dec 01	7.2	1966 Dec 24	68	59
Annual	32.6	20.9					72	67

TABLE – 4

Mean Wind Speed in km/hr.
(BANKURA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1.9	1.8	2.2	2.1	2.5	2.7	2.9	2.4	2.5	2.1	1.8	1.6	2.2

TABLE – 5

Special Weather Phenomena
(BANKURA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.2	0.0	0.3	0.4	1.0	0.5	0.7	0.4	0.1	0.0	0.0	3.6
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.8

BIRBHUM DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidity and well distributed rainfall during the monsoon season. The winter season commences by about the middle of November to the end of February. This is followed by the summer season from March to May. June to September is the southwest monsoon season. October and first half of November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 6 raingauge stations for the period ranging from 20 to 112 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1282.0 mm. The monsoon arrives over the district by about the first week of June and withdraws in the first week of October. About 79% of the annual rainfall is received during the monsoon months June to September, July being the rainiest month. The variation in the rainfall from year to year is not large. Considering the district as a whole, during fifty years period from 1951 to 2000, the highest annual rainfall in the district amounting to 161% of the normal occurred in 1978, while 1982 was the year with the lowest annual rainfall which was 65% of the normal . There are four years in which the annual rainfall was less than 80% of the normal. However, no two consecutive years experienced such a low rainfall during this period. It is seen from Table 2 that in 29 years out of 47 , the annual rainfall was between 1101 and 1600 mm.

On an average there are 66 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 51 at Labpur to 75 at Shantiniketan (Obsy).

The heaviest rainfall in 24 hours ever recorded at any station in the district was 673.1 mm at Suri on 1st July 1866.

Temperature

The district has two meteorological observatories, one at Suri and other at Shantiniketan. The description of the climate that follows is based on the available records at these observatories. Temperatures begin to rise rapidly from about the beginning of March. May is the hottest month with the mean daily maximum temperature at about 37.2^{0}C and the mean daily minimum temperature at about 24.5^{0}C. The heat in the summer is oppressive. The maximum temperature during the summer may sometimes rise upto about 47^{0}C - 48^{0}C. There is welcome relief from the heat though only temporarily when thundershowers occur on some days in this season. With the advance of the southwest monsoon season early in June, the day temperatures drop appreciably but night temperatures remain as high as in the summer months. Due to the continuous high temperatures, with increased moisture content in the air, the weather during the monsoon season is often uncomfortable in between the rains. With the withdrawal of the monsoon by about the first week of October the temperatures begin to drop. The drop particularly in the night temperatures is more rapid. January is the coldest month with the mean daily maximum temperature at about 25^{0}C and the mean daily minimum temperature at about 12^{0}C. In association with the passing of western disturbances, spells of cold weather are experienced in the winter season. The minimum temperature may then occasionally go down to about 5 to 6^{0}C.

The highest maximum temperature ever recorded at Suri was 47.8^{0}C on 20th May 1972 and 10th June 1966 and at Shantiniketan it was 47.0^{0}C on 10th June 1966. The lowest minimum temperature ever recorded at Suri was 5.6^{0}C on 16th December 1964 and at Shantiniketan it was 5.2^{0}C on 17th January 1962.

Humidity

The air is highly humid throughout the southwest monsoon season. Thereafter the values of relative humidity decrease progressively. The driest part of the year is the summer season with average relative humidity at about 45% in the afternoons and 59% in the mornings.

Cloudiness

Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and the skies are clear or lightly clouded in the rest of the year.

Winds

From April onwards southerly wind appears. From May to September south or southeast wind predominates. In October and November winds blow mainly from North or Northeast directions. From December to February northwesterly wind prevails in the morning while northeasterly prevails in the evening. From February to March westerly winds also appear.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and post monsoon often reach the district and its neigbourhood and cause widespread heavy rain with high winds. Depressions in the monsoon season also affect the district and heavy rains occur. During the hot season thunderstorms occur commonly, mostly in the afternoons. Associated with them heavy rains, occasional hail and severe squalls occur. These thunderstorms called 'Norwesters' are locally known as 'Kal Baisakhi' and the squalls associated with them usually come from northwest. A sharp drop in temperatures is experienced during these storms. Rain during the monsoon season is also often associated with thunder. Fog occurs occasionally during the winter season.

Tables 3, 4, 5 and Tables 3(a), 4(a), 5(a) give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Suri and Shantiniketan observatories in the district.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bolpur	16	a	9.1	10.9	15.5	12.4	57.6	177.6	252.5	218.4	180.7	100.1	8.0	1.9	1044.7	141 (1956)	63 (1954)	243.8	29 Aug 1951
		b	0.7	0.7	1.1	0.9	3.9	8.2	12.6	12.6	8.9	4.6	0.6	0.1	54.9				
Labpur	18	a	10.9	11.1	14.7	24.9	67.2	186.9	271.5	253.3	213.6	78.6	11.6	2.9	1147.2	174 (1956)	44 (1967)	360.4	25 Sep 1956
		b	0.7	0.7	1.3	1.7	3.4	7.7	11.2	11.4	9.3	3.3	0.5	0.1	51.3				
Rampurhat	14	a	18.2	11.4	7.9	30.2	76.4	230.3	323.3	301.8	234.9	103.4	4.1	0.1	1342.0	161 (1971)	59 (1952)	250.9	15 Aug 1888
		b	1.1	1.0	1.0	1.9	4.8	11.5	16.2	15.2	10.8	5.6	0.4	0.0	69.5				
Shantiniketan (Obsy)	39	a	11.7	23.8	28.8	48.5	103.7	243.8	321.8	294.4	250.4	96.8	17.6	8.2	1449.5	143 (1971)	57 (1982)	341.8	27 Sep 1978
		b	1.2	1.8	2.1	3.1	5.9	11.1	15.8	15.7	11.4	5.0	0.9	0.5	74.5				
Suri	16	a	21.6	14.0	22.4	26.9	63.3	209.1	285.2	291.1	243.9	115.8	16.0	4.0	1313.3	133 (1956)	75 (1965)	673.1	01 Jul 1866
		b	1.1	1.3	1.7	1.7	4.5	11.3	15.5	15.6	12.0	5.5	1.1	0.4	71.1				
Suri (Obsy)	33	a	14.5	13.5	19.7	32.9	77.4	212.4	292.3	307.8	286.6	116.1	15.7	6.2	1395.1	154 (1959)	70 (1958)	400.0	27 Sep 1978
		b	1.1	1.2	2.0	2.3	5.1	10.5	15.9	15.9	12.3	5.9	0.9	0.4	73.5				
Birbhum (District)		a	14.3	14.1	18.2	29.3	74.3	210.0	291.1	277.8	235.0	101.8	12.2	3.9	1282.0	161 (1978)	65 (1982)		
		b	1.0	1.1	1.5	1.9	4.6	10.1	14.5	14.4	10.8	5.0	0.7	0.3	65.9				

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 -2000)
(BIRBHUM)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	2	1501 – 1600	8
901 – 1000	1	1601 – 1700	2
1001 – 1100	4	1701 – 1800	3
1101 – 1200	7	1801 – 1900	3
1201 – 1300	8	1901 – 2000	1
1301 – 1400	1	2001 – 2100	2
1401 – 1500	5		

(Data available for 47 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(SURI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest ever Maximum recorded		Lowest ever Minimum recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.2	11.6	31.1	1955 Jan 12 1986 Jan 30	5.7	1977 Jan 30	55	Data Not Available
February	28.5	14.1	36.0	1974 Feb 25	6.5	1974 Feb 07	47	
March	34.1	18.6	42.6	1986 Mar 30	11.5	1979 Mar 11	45	
April	38.0	22.9	45.2	1980 Apr 24	16.0	1965 Apr 02	54	
May	37.5	24.1	47.8	1972 May 20	16.0	1977 May 07	67	
June	35.1	25.1	47.8	1966 Jun 10	19.4	1967 Jun 08	73	
July	32.8	24.6	40.0	1989 Jul 13	17.0	1976 Jul 20	80	
August	32.2	24.6	38.0	1972 Aug 18	20.3	1964 Aug 25	81	
September	32.4	24.0	36.6	1988 Sep 29 1968 Sep 03	19.5	1979 Sep 15	80	
October	31.9	21.9	39.0	1973 Oct 07	15.0	1974 Oct 30	73	
November	29.6	17.1	36.6	1991 Nov 14	10.4	1988 Nov 26	60	
December	26.1	12.5	30.5	1976 Dec 05	5.6	1964 Dec 16	57	
Annual	32.0	20.1					64	

TABLE – 4

Mean Wind Speed in km/hr.
(SURI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.5	5.7	6.8	8.5	9.3	8.2	7.2	6.2	5.5	4.2	4.0	4.4	6.2

TABLE – 5

Special Weather Phenomena
(SURI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	0.5	1.5	2.4	2.5	2.9	1.6	2.6	0.5	0.0	0.0	14.8
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	2.9	1.9	1.7	0.2	0.2	0.0	0.0	0.0	0.0	1.3	5.2	3.2	16.6

TABLE – 3(a)

Normals of Temperature and Relative Humidity
(SHANTINIKETAN)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest ever Maximum recorded		Lowest ever Minimum recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	24.8	11.9	33.0	1990 Jan 30	5.2	1962 Jan 17	73	56
February	28.3	14.5	36.9	1964 Feb 23	6.0	1974 Feb 10	65	46
March	33.6	19.3	42.0	1986 Mar 31	12.0	1979 Mar 11	57	38
April	37.1	23.4	44.5	1966 Apr 30	14.6	1990 Apr 05	63	41
May	36.9	25.0	46.6	1970 May 14	18.1	1987 May 03	72	55
June	34.9	25.9	47.0	1966 Jun 10	18.7	1968 Jun 10	79	71
July	32.7	25.8	41.6	1982 Jul 04	20.0	1971 Jul 17	86	82
August	32.2	25.8	36.0	1987 Aug 20	22.4	1985 Aug 04	87	83
September	32.3	25.3	37.1	1986 Sep 04	21.5	1986 Sep 26	85	84
October	31.7	22.6	37.1	1973 Oct 07	15.6	1983 Oct 29	80	79
November	29.4	17.5	33.8	1977 Nov 04	9.7	1985 Nov 29	74	69
December	26.0	12.9	30.3	1976 Dec 05	6.1	1961 Dec 24	73	62
Annual	31.7	20.8					74	64

TABLE – 4(a)

Mean Wind Speed in km/hr.
(SHANTINIKETAN)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.0	5.6	6.8	8.8	10.2	9.0	8.4	7.0	6.2	4.0	4.4	4.8	6.7

TABLE – 5(a)

Special Weather Phenomena
(SHANTINIKETAN)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.4	1.7	2.7	4.7	7.3	9.8	11.7	11.0	10.0	3.1	0.3	0.2	62.9
Hail	0.0	0.0	0.1	0.2	0.2	0.3	0.6	0.3	0.5	0.1	0.0	0.0	2.3
Dust storm	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Fog	0.4	0.3	0.5	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.4	2.4

DISTRICT SUMMARY
EAST MEDINIPUR

EAST MEDINIPUR DISTRICT

The climate of this district is characterised by an oppressive hot summer, high relative humidity nearly all the year round and generally an unfailing and well distributed seasonal rainfall. The year can be divided into four seasons. The period from about the middle of November to February constitutes the winter season. The hot season is from March to May. The southwest monsoon season which follows thereafter continues upto the end of September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 12 raingauge stations for the period ranging from 18 to 76 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall of the district is 1563.1 mm. The southwest monsoon arrives over the district by about the first week of June and withdraws by about the end of September. About 74% of the annual rainfall is received during southwest monsoon months i.e. June to September. Considerable amount of rain is received in October and latter part of summer. September is the rainiest month. The year to year variation of the annual rainfall is not large. Considering the district as a whole, during the 50 years period from 1951-2000, the highest annual rainfall in the district amounting to 165% of the normal occurred in 1965, while 1964 was the year with lowest annual rainfall which was 71% of the normal. There are six years in which annual rainfall was less than 80% of the

normal. However, none of them were consecutive years. It is seen from Table 2 that in 29 years out of 40 years, the annual rainfall was between 1101 and 1800 mm.

On an average there are 70 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 56 at Ramnagar to 85 at Haldia observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 480.2 mm at Tamluk on 9th July, 1964.

Temperature

There are three meteorological observatories in the district viz. Digha, Contai and Haldia. The records of these observatories may be taken as representative for the meteorological conditions prevalent in the district. The temperatures begin to rise rapidly from about the middle to February. The day temperatures reach maximum in May and the mean daily maximum temperature is about 32 to 33^{0}C. While nights are more warm in June than in May and the mean daily minimum temperature in June is about 26-27^{0}C. The heat in summer is oppressive mainly due to high moisture content in the air. The maximum temperature sometimes goes upto 43^{0}C. Thundershowers that occur on some afternoons in this season give temporarily relief. In the coastal part of the district sea breezes during the afternoon bring welcome relief. With the onset of the southwest monsoon by about the first week of June the day temperatures decrease slightly but nights continue to be as warm as summer season. With the increased humidity in the air and continuing high temperature, weather is often uncomfortable in between rains. With the withdrawal of the southwest monsoon in early October, both day and night temperatures decrease, the drop particularly in night temperature is more rapid from about the middle of November. January is the coldest month with the mean daily maximum temperature at about 25.6^{0}C and the mean daily minimum temperature at about 14.2^{0}C. In association with the passing of western disturbances, spells of cold weather are sometimes experienced in the winter season, when the night temperatures sometimes drop down by 4 to 5^{0}C

The highest maximum temperature ever recorded at Digha, Contai and Haldia were 42.5^{0}C on 7th May 1992, 43.8^{0}C on 29th April 1959 and 40.9^{0}C on 14th May 1981 respectively, while the lowest minimum temperature ever recorded at Digha, Contai and Haldia were 7.6^{0}C on 5th January 1990, 8.0^{0}C on 25th February 1986 and 9.3^{0}C on 4th January 1992.

Humidity

The values of relative humidity are generally high throughout the year. Its afternoon values are comparatively low during December to February.

Cloudiness

Skies are clear or lightly clouded in the winter season. Cloudiness increases in March/April and skies are moderately clouded in the summer season. Skies are heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and skies are lightly clouded in the post monsoon season.

Winds

During October to February winds are light. From March onwards winds become stronger till June. From July to September winds are generally moderate. Wind blows from north or northwest directions in the winter season. Southerlies or south westerlies are predominant in the premonsoon and southwest monsoon season. Northerly or northwesterly wind prevails in the post monsoon season.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal during the period May to October often reach the district or its neighbourhood and cause widespread heavy rain and gusty winds. A large proportion of the rainfall especially during the southwest monsoon and post monsoon seasons is due to these depressions and storms. Thunderstorms occur commonly during hot season and southwest monsoon season, their frequency being large during September.

Tables 3, 4, 5, 3(a), 4(a) 5(a) and 3(b), 4(b), 5(b) give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Digha, Contai and Haldia observatories.

TABLE - I

Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bhagwanpur	17	a	19.4	25.7	26.9	41.5	105.1	213.5	283.6	231.4	318.5	141.6	17.9	3.7	1428.8	131	70	296.9	22 Oct 1945
		b	1.2	1.6	1.6	2.4	4.6	10.0	12.4	13.4	12.4	6.3	0.5	0.3	66.7	(1956)	(1957)		
Contai (Obsy)	46	a	14.1	19.2	31.0	32.6	103.8	246.0	295.6	342.8	340.6	191.6	29.0	8.7	1655.0	172	60	447.1	03 Sep 1967
		b	0.9	1.4	1.8	2.3	5.4	11.0	13.9	14.9	12.4	7.0	1.2	0.3	72.5	(1956)	(1987)		
Digha (Obsy)	18	a	11.2	28.9	34.5	45.6	146.1	292.0	271.3	312.2	317.9	153.8	61.1	3.7	1678.3	162	61	400.0	18 Jun 1996
		b	1.2	2.1	2.1	3.3	6.2	10.6	12.4	14.5	12.3	6.4	2.0	0.3	73.4	(1993)	(1983)		
Etamogra	18	a	14.2	22.1	15.0	36.9	79.1	229.9	274.2	298.0	309.7	147.2	14.0	3.0	1443.3	150	67	242.6	01 Aug 1951
		b	0.8	1.4	1.3	2.7	4.8	11.5	14.7	14.6	13.6	7.0	0.9	0.2	73.5	(1971)	(1958)		
Haldia (Obsy)	19	a	12.1	35.6	37.4	66.7	106.7	298.5	376.7	371.8	358.1	131.8	62.8	1.8	1860.0	130	71	294.6	05 Jun 1984
		b	1.1	2.1	2.2	3.5	6.5	12.3	16.8	17.3	14.9	5.9	2.0	0.4	85.0	(1999)	(1989)		
Henria	12	a	8.6	20.8	25.6	20.8	143.4	206.5	288.4	210.9	413.9	178.1	2.4	12.1	1531.5	123	89	316.7	13 Sep 1958
		b	0.5	1.5	1.6	1.6	4.1	9.3	12.3	11.9	14.3	7.0	0.3	0.4	64.8	(1959)	(1954)		
Kolaghat	19	a	14.1	17.1	25.7	60.3	102.4	210.8	302.7	289.2	329.4	127.9	10.8	1.2	1491.6	155	72	241.1	25 Aug 1968
		b	0.9	1.4	1.6	3.4	5.1	10.9	14.1	15.2	14.5	6.3	0.8	0.1	74.3	(1971)	(1954)		
Kukrahati	16	a	13.4	18.5	24.1	39.1	86.2	200.7	254.1	273.7	312.0	130.0	13.6	3.7	1369.1	133	72	292.9	30 Sep 1959
		b	0.8	0.9	1.2	2.0	3.9	7.9	11.5	13.2	13.0	6.0	0.4	0.1	60.9	(1959)	(1951)		
Nandigarh	10	a	8.7	20.9	10.7	19.4	137.6	211.3	251.9	248.7	332.9	157.9	18.5	0.0	1418.5	130	83	207.0	27 May 1960
		b	0.7	1.4	0.9	1.7	4.0	9.9	13.6	11.3	13.0	8.7	2.0	0.0	67.2	(1960)	(1962)		

TABLE - I (Contd)

Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Panskura	17	a	21.4	20.5	32.7	57.2	108.1	230.2	302.3	262.0	304.8	136.7	9.9	1.8	1487.6	166	68	250.2	30 Sep 1971
		b	1.1	1.8	1.9	3.6	5.2	11.6	15.4	14.8	13.5	6.1	0.8	0.1	75.9	(1971)	(1954)		
Ramnagar	15	a	16.1	18.2	12.1	24.3	98.1	203.7	194.7	336.0	368.5	189.7	17.9	5.3	1484.6	195	51	279.4	09 Jul 1942
		b	0.9	1.0	0.9	1.5	3.5	8.6	9.1	12.0	11.7	6.4	0.6	0.2	56.4	(1956)	(1964)		
Tamluk	21	a	24.2	32.1	34.4	76.8	112.8	304.8	397.1	359.1	383.2	166.1	15.5	3.2	1909.3	247	59	480.2	09 Jul 1964
		b	1.0	1.3	2.0	3.5	4.4	11.3	13.8	14.8	12.3	6.6	0.9	0.2	72.1	(1965)	(1954)		
East Medinipur (District)		a	14.8	23.3	25.8	43.4	110.8	237.3	291.1	294.6	340.8	154.4	22.8	4.0	1563.1	165	71		
		b	0.9	1.5	1.6	2.6	4.8	10.4	13.3	14.0	13.2	6.6	1.0	0.2	70.1	(1965)	(1964)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000.

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(EAST MEDINIPUR)

Range in mm	No. of years	Range in mm	No. of years
1101 – 1200	4	1901 – 2000	2
1201 – 1300	2	2001 – 2100	2
1301 – 1400	4	2101 – 2200	2
1401 – 1500	3	2201 – 2300	3
1501 – 1600	8	2301 – 2400	0
1601 – 1700	4	2401 – 2500	1
1701 – 1800	4	2501 – 2600	1
1801 – 1900	0		

(Data available for 40 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(DIGHA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.6	14.0	32.9	1990 Jan 20	7.6	1990 Jan 05	76	67
February	27.8	17.9	33.7	1991 Feb 24	8.8	1984 Feb 26	75	69
March	30.6	22.4	38.0	1987 Mar 25	12.6	1984 Mar 01	75	74
April	31.8	25.1	40.2	1992 Apr 12	17.9	1997 Apr 11	75	78
May	32.4	26.4	42.5	1992 May 07	18.3	1985 May 08	77	79
June	32.4	26.6	39.0	1991 Jun 28	20.8	1985 Jun 11	80	80
July	31.3	26.2	37.3	1983 Jul 07	20.4	1995 Jul 27	82	81
August	31.0	26.0	34.9	1997 Aug 26	21.4	1985 Aug 05	84	82
September	31.4	25.7	36.2	1991 Sep 24	21.0	1985 Sep 16	83	80
October	31.3	23.5	38.2	1983 Oct 28	15.8	1985 Oct 30	80	75
November	29.6	18.6	34.5	1989 Nov 07	9.8	1985 Nov 30	76	70
December	27.0	14.2	32.5	1984 Dec 12	8.8	1983 Dec 28	73	66
Annual	30.2	22.2					78	75

TABLE – 4

Mean Wind Speed in km/hr.
(DIGHA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1.7	3.0	5.7	9.1	9.3	8.2	7.3	5.8	4.7	2.4	1.5	1.5	5.0

TABLE – 5

Special Weather Phenomena
(DIGHA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	2.4	4.2	8.4	7.3	8.2	7.2	7.3	8.8	5.8	0.6	0.1	60.6
Hail	0.0	0.0	0.2	0.4	0.7	0.6	0.8	0.3	0.2	0.3	0.1	0.0	3.6
Dust storm	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Squall	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Fog	5.2	3.6	1.7	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.2	1.8	12.9

TABLE – 3(a)

Normals of Temperature and Relative Humidity
(CONTAI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.8	14.0	31.7	1958 Jan 17	8.4	1990 Jan 04	67	66
February	28.5	17.4	37.2	1951 Feb 28	8.0	1986 Feb 25	67	69
March	31.8	21.4	40.1	1958 Mar 28	14.6	1984 Mar 01	69	75
April	33.2	24.8	43.8	1959 Apr 29	16.4	1971 Apr 19	71	80
May	33.3	25.6	42.2	1968 May 11	17.2	1951 May 03	74	80
June	32.8	26.0	43.6	1965 Jun 06	13.8	1961 Jun 12	78	82
July	31.3	25.4	38.6	1982 Jul 04	21.3	1965 Jul 03	84	85
August	31.0	25.3	36.7	1951 Aug 14	20.7	1967 Aug 11	84	85
September	31.3	25.2	36.5	1974 Sep 08	21.7	1959 Sep 11	83	85
October	31.2	23.5	35.5	1976 Oct 05	18.3	1974 Oct 31	76	79
November	29.3	18.5	33.8	1981 Nov 05	11.5	1970 Nov 28	71	71
December	26.5	14.6	32.9	1990 Dec 20	8.3	1961 Dec 25	67	66
Annual	30.5	21.8					74	77

TABLE – 4(a)

Mean Wind Speed in km/hr.
(CONTAI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.8	5.7	9.7	14.4	16.8	12.6	10.6	9.2	7.7	4.4	2.9	2.9	8.4

TABLE – 5(a)
Special Weather Phenomena
(CONTAI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	1.5	2.4	2.2	4.9	4.8	2.9	3.9	4.6	1.9	0.3	0.1	29.7
Hail	0.0	0.0	0.2	0.2	0.3	0.3	0.5	0.1	0.2	0.1	0.0	0.0	1.9
Dust storm	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	1.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.1

TABLE – 3(b)

Normals of Temperature and Relative Humidity
(HALDIA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.6	14.7	31.0	1999 Jan 25	9.3	1992 Jan 04	75	57
February	28.4	18.4	34.1	1999 Feb 27	11.9	1983 Feb 04	74	59
March	31.8	22.8	37.7	1992 Mar 30	15.7	1984 Mar 01	73	61
April	33.1	25.7	38.8	1992 Apr 12	18.3	1997 Apr 11	74	75
May	33.4	26.6	40.9	1981 May 14	19.1	1984 May 25	82	78
June	33.0	27.2	39.9	1981 Jun 13	22.0	1997 Jun 03	83	83
July	31.8	26.8	38.2	1982 Jul 04	23.1	1991 Jul 04	85	82
August	31.6	26.8	36.9	1981 Aug 02	22.9	1999 Aug 15	86	85
September	31.8	26.4	35.2	1994 Sep 09 1998 Sep 27	23.0	1984 Sep 12	85	82
October	31.8	24.6	35.6	1998 Oct 09	19.3	1995 Oct 24	76	75
November	29.8	20.1	33.9	1981 Nov 02	12.5	1993 Nov 28	75	69
December	27.0	15.7	31.0	1994 Dec 12	10.9	1982 Dec 24	70	61
Annual	30.8	23.0					78	72

TABLE – 4(b)

Mean Wind Speed in km/hr.
(HALDIA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.7	5.4	9.8	13.7	12.4	11.9	11.2	9.4	7.6	4.6	3.9	3.7	8.1

TABLE – 5(b)

Special Weather Phenomena
(HALDIA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.9	1.8	3.4	3.8	4.2	4.1	3.7	5.0	2.9	0.4	0.0	30.2
Hail	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Fog	3.7	2.4	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	1.8	9.4

HOOGHLY DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidity nearly all the year round and well distributed rainfall during the monsoon season. The cold season starts by about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season is from June to September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for eight stations, for the periods ranging from 31 to 102 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1418.5 mm. The rainfall during the southwest monsoon season, June to September constitutes about 76% of the annual rainfall. July is the rainiest month. The annual rainfall in the district varies from 1083.2 mm at Arambagh to 1950.2 mm at Serampore. The variation in the rainfall from year to year is large. During the 50 year period from 1951 to 2000, the highest annual rainfall amounting to 194% of the normal occurred in 1951 while 1982 was the year with the lowest annual rainfall which was only 42% of the normal. In the same 50 year period, rainfall less than 80% of the normal occurred in 4 years, 2 of them being consecutive. It is seen from Table 2 that the annual rainfall in the district is between 901 mm and 1500 mm in 19 years out of 31.

On an average there are 70 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 63 at Boinchee to 80 at Serampore.

The heaviest rainfall in 24 hours recorded at any station in the district was 422.9 mm at Serampore on 21st September 1900.

Temperature

There is a meterological observatory in the district at Bagati. The records of this observatory may be taken as representative of the meteorological conditions in the district as a whole. The hot season commences by about the beginning of March, when temperatures begin to rise rapidly. May is the hottest month, with the mean daily maximum temperature at 36.7°C and the mean daily minimum temperature at 24.3°C. The heat in the summer is oppressive due to high moisture content in the air. On individual days, the maximum temperature sometimes rise upto 45 to 46°C.There is welcome relief from the heat although only temporarily when thundershowers occur on some days in this season. With the onset of the southwest monsoon by about the first week of June, there is an appreciable drop in day temperatures but night temperatures increase further. With the increased humidity in the air and the continuing high night temperatures, the weather is often uncomfortable particularly when not raining. The southwest monsoon withdraws early in October and the temperatures begin to drop. The drop in night temperatures is more rapid from about the middle of November. January is the coldest month with the mean daily maximum temperature at about 26.6°C and the mean daily minimum temperature at about 12.1°C. In association with passing of western disturbances, spells of cold weather are experienced in the winter season and the minimum temperature may go down to about 5°C.

The highest maximum temperature and the lowest minimum temperature ever recorded at Bagati were 46.2°C on 3rd June 1974 and 4.8°C on 17th January 1983 respectively.

Humidity

The values of relative humidity are generally high throughout the year and particularly so in the southwest monsoon months, when it is about 80%.

Cloudiness

Skies are moderately clouded in May. In the monsoon season the skies are generally heavily clouded or overcast. Cloudiness decreases gradually from October, and in the winter and early summer seasons the skies are clear or lightly clouded.

Winds

Winds are generally light throughout the year with some strengthening in force in the latter part of the summer and early part of the southwest monsoon season. Winds blow mostly from directions between southwesterly or southerly in the summer and southwest monsoon season. Northerly winds start blowing from the months of October and predominate throughout the cold season.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and the post monsoon season often reach the district and its neighbourhood and cause widespread heavy rain and high winds. Depressions in southwest monsoon season also affect the district and heavy rains occur. Thunderstorms are common mostly in the afternoons in the hot season and in association with them heavy rain, occasional hail and severe squalls occur. These thunderstoms are called “Norwesters” due to the fact that squalls associated with them usually come from the northwest, are locally known as “Kalbaisakhi”. A sharp drop in temperature is experienced during these thunderstorms which are often violent. Rain during the southwest monsoon season is also often associated with thunder. Fog occurs during the cold season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Bagati observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Arambagh	21	a	10.4	16.8	15.2	40.5	64.2	161.2	265.1	228.3	184.7	88.2	8.3	0.3	1083.2	149	88	317.5	22 Aug 1885
		b	0.8	1.3	2.1	3.1	4.4	10.3	14.6	15.2	12.0	6.3	0.8	0.1	71.0	(1953)	(1967)		
Bagati (Obsy)	30	a	8.7	35.9	36.9	64.3	135.2	272.0	328.6	294.8	240.6	103.6	21.7	10.5	1552.8	139	38	280.2	28 Sep 1978
		b	0.8	1.8	2.0	3.6	7.0	11.3	15.5	15.9	10.5	5.1	1.0	0.5	75.0	(1971)	(1982)		
Boinchee	11	a	10.2	19.1	18.7	45.3	116.6	237.5	279.0	292.4	315.0	117.4	13.6	2.5	1467.3	131	83	293.4	25 Sep 1956
		b	0.7	0.9	1.7	1.6	5.0	10.0	11.8	13.6	11.9	5.4	0.4	0.3	63.3	(1959)	(1953)		
Chanditala	11	a	9.6	11.4	22.5	34.1	80.6	266.9	303.6	281.1	320.0	163.9	10.6	2.9	1507.2	183	66	259.8	23 Jun 1933
		b	0.5	1.0	1.8	1.6	4.6	10.3	14.1	14.6	12.3	6.7	0.7	0.2	68.4	(1951)	(1958)		
Hooghly	12	a	14.0	16.6	23.7	47.1	98.0	178.3	243.5	223.7	231.9	95.9	8.3	5.0	1186.0	154	78	246.4	21 Sep 1900
		b	1.1	1.5	2.2	2.6	5.5	11.2	15.4	14.4	12.6	5.8	0.8	0.1	73.2	(1959)	(1962)		
Khanakul	14	a	8.9	19.5	21.0	58.3	111.9	169.5	279.0	242.6	288.8	106.3	18.2	4.1	1328.1	155	64	236.2	11 May 1931
		b	0.4	1.3	1.5	2.7	4.9	9.8	13.8	13.1	12.2	6.6	0.9	0.2	67.4	(1959)	(1958)		
Serampore	13	a	18.6	23.0	21.4	57.3	167.1	355.5	382.6	369.4	400.3	147.0	8.0	0.0	1950.2	160	72	422.9	21 Sep 1900
		b	0.8	2.0	1.6	3.5	6.5	11.7	16.5	16.6	13.6	6.7	0.7	0.0	80.2	(1956)	(1957)		
Tarakeshwar	14	a	24.7	20.7	26.5	41.8	90.3	225.9	253.7	245.8	249.5	81.2	7.5	5.3	1272.9	151	47	200.7	22 Sep 1962
		b	0.8	1.1	1.6	2.4	5.0	11.2	14.0	12.0	11.2	5.5	0.6	0.1	65.5	(1959)	(1954)		
Hooghly (District)		a	13.1	20.4	23.2	48.6	108.0	233.4	291.9	272.3	278.9	112.9	12.0	3.8	1418.5	194	42		
		b	0.7	1.4	1.8	2.6	5.4	10.7	14.5	14.4	12.0	6.0	0.7	0.2	70.4	(1951)	(1982)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(HOOGHLY)

Range in mm	No. of years	Range in mm	No. of years
501 – 600	1	1701 – 1800	1
601 – 700	0	1801 – 1900	2
701 – 800	0	1901 – 2000	1
801 – 900	0	2001 – 2100	1
901 – 1000	2	2101 – 2200	1
1001 – 1100	1	2201 – 2300	1
1101 – 1200	5	2301 – 2400	0
1201 – 1300	3	2401 – 2500	0
1301 – 1400	5	2501 – 2600	0
1401 – 1500	3	2601 – 2700	0
1501 – 1600	0	2701 – 2800	1
1601 – 1700	3		

(Data available for 31 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(BAGATI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	26.6	12.1	33.3	1973 Jan 30	4.8	1983 Jan 17	78	60
February	29.3	14.8	36.3	1974 Feb 25	5.5	1974 Feb 11	74	60
March	33.5	19.5	39.8	1975 Mar 06	11.0	1979 Mar 11	74	63
April	36.6	23.3	44.5	1973 Apr 17	15.1	1968 Apr 01	78	65
May	36.7	24.3	45.5	1974 May 09	14.5	1973 May 02	79	70
June	35.0	25.1	46.2	1974 Jun 03	14.2	1971 Jun 24	83	77
July	33.1	25.1	42.3	1975 Jul 04	19.1	1971 Jul 06	86	84
August	33.0	25.3	37.3	1973 Aug 20	20.8	1984 Aug 01	87	84
September	33.0	25.1	37.1	1990 Sep 11	16.7	1971 Sep 30	85	82
October	32.9	22.9	38.4	1973 Oct 30	16.6	1971 Oct 01	82	78
November	30.7	17.9	38.5	1976 Nov 06	10.0	1982 Nov 20	77	69
December	27.5	12.9	36.5	1984 Dec 20	6.4	1968 Dec 30	78	62
Annual	32.3	20.7					80	71

TABLE – 4

Mean Wind Speed in km/hr.
(BAGATI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.1	2.5	3.7	6.5	7.3	5.1	5.3	4.0	4.3	2.8	1.5	1.7	3.9

TABLE - 5

Special Weather Phenomena
(BAGATI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.7	1.2	2.0	4.2	2.5	1.0	0.9	0.9	0.7	0.0	0.0	14.1
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Fog	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.7	1.1

HOWRAH DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidities nearly all the year round. The winter season commences by about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season is from June to September. October and first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for two stations, Amta and Uluberia for the period ranging from 89 and 31 years respectively. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1564.7 mm. The southwest monsoon arrives over the district by about the first week of June and withdraws in early October. About 76% of the annual rainfall is received during the southwest monsoon months June to September. July and August are the rainiest months. The variation in the rainfall from year to year is large. Considering the district as a whole, the highest annual rainfall in the district amounting to 152% of the normal, occurred in 1971, while 1982 was the year with the lowest annual rainfall, which was 57% of the normal. There are two years in which annual rainfall was less than 80% of the normal. It is seen from Table 2 that in 12 years out of 17, the annual rainfall was between 1301 and 1900 mm.

On an average there are 75 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 73 at Amta to 77 at Uluberia.

The heaviest rainfall in 24 hours ever recorded at any station in the district was 409.3 mm at Uluberia (Obsy) on 29th September 1978.

Temperature

There is one meteorological observatory in the district is at Uluberia . The records of this observatory may be taken as representative of the meteorological conditions in the district as a whole. Temperatures begin to rise rapidly from about the beginning of March. April and May constitute the hottest part of the year, when the mean daily maximum temperature is 35.1°C and the mean daily minimum temperature is about 25°C. The heat in the summer is oppressive due to high moisture content in the air. There is welcome relief from the heat, although only temporarily when thundershowers occur on some days in this season. On individual days in the months of May and early part of June maximum temperature may sometime go above 43°C. With the onset of the southwest monsoon by about the first week of June, day temperatures drop appreciably but night temperatures continue to be as high as in summer. With the increased humidity in the air and the continuing high night temperature, the weather when not raining is uncomfortable even in the southwest monsoon season. The southwest monsoon withdraws early in October and temperatures steadily decrease. The drop in night temperatures is more rapid from about the middle of November. January is the coldest month with the mean daily maximum temperature at about 26°C and the mean daily minimum temperature at about 12.7°C. Spells of cold weather are experienced in association with passing western disturbances which affect the district in the winter season. The minimum temperature on such occasions drop down to about 7°C.

The highest maximum temperature ever recorded at Uluberia was 43.5°C on 10th May 1975 and the lowest minimum temperature ever recorded was 6.6°C on 10th February 1974

Humidity

The values of relative humidity are generally high throughout the year, the morning relative humidity varying between 78 to 88 percent. Winter and early part of summer season is comparatively drier part of the year, when values of relative humidity in the afternoon are about 60%.

Cloudiness

During the winter season the skies are clear or lightly clouded, cloudiness increases in the summer and by May skies are moderately clouded. In the southwest monsoon season the skies are heavily clouded or overcast. After October cloudiness decreases.

Winds

Winds are generally light with some strengthening in force in the later part of the summer and southwest monsoon season. In the period from March to September, winds blow mostly from directions between southeast and southwest. In the remaining part of the year winds are light and mainly northeasterly.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and the post monsoon season affect the district and its neighbourhood and cause widespread heavy rain and high winds. Depressions in southwest monsoon season also affect the district and heavy rains occur. Thunderstorms are common mostly in the hot season. These thunderstoms often violent are called “Kalbaisakhi” or “Norwesters” as the squall associated with them usually come from the northwest. A sharp drop in temperature is experienced during these thunderstorms. Fog occurs occasionally from November to March.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Uluberia observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Amta	21	a	9.8	18.7	33.4	50.9	127.4	270.9	288.4	286.3	291.0	115.0	14.9	2.8	1509.5	153	75	304.8	02 Aug 1922
		b	0.8	1.2	2.0	2.4	5.3	11.8	13.4	15.9	13.0	6.1	0.9	0.2	73.0	(1952)	(1954)		
Uluberia (Obsy)	29	a	11.3	24.2	30.3	52.8	119.4	240.4	342.8	344.3	308.7	99.8	32.3	13.0	1619.3	147	55	409.3	29 Sep 1978
		b	0.9	1.6	2.0	3.6	6.2	11.6	14.9	16.0	12.4	5.6	1.4	0.7	76.9	(1971)	(1982)		
Howrah (District)		a	10.6	21.5	31.9	51.9	123.4	255.7	315.6	315.3	299.9	107.4	23.6	7.9	1564.7	152	57		
		b	0.9	1.4	2.0	3.0	5.8	11.7	14.2	16.0	12.7	5.9	1.1	0.5	75.2	(1971)	(1982)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(HOWRAH)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	1	1601 – 1700	3
901 - 1000	0	1701 – 1800	1
1001 – 1100	0	1801 – 1900	2
1101 – 1200	1	1901 – 2000	0
1201 – 1300	1	2001 – 2100	0
1301 – 1400	4	2101 – 2200	0
1401 – 1500	0	2201 – 2300	0
1501 – 1600	2	2301 – 2400	2

(Data available for 17 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(ULUBERIA)

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MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	26.0	12.7	33.2	1973 Jan 10	7.2	1972 Jan 10	83	61
February	28.7	15.9	38.9	1981 Feb 01	6.6	1974 Feb 10	78	56
March	33.2	20.7	40.3	1983 Mar 13	12.1	1979 Mar 11	79	56
April	35.1	24.5	41.0	1990 Apr 25	18.2	1978 Apr 19	79	69
May	35.1	25.5	43.5	1975 May 10	17.8	1990 May 18	79	73
June	34.0	26.3	43.3	1979 Jun 04	21.4	1975 Jun 01	83	78
July	32.3	26.0	38.8	1982 Jul 02	20.8	1988 Jul 20	88	83
August	31.9	26.1	35.8	1979 Aug 26	21.5	1987 Aug 24	88	84
September	32.2	25.9	39.4	1988 Sep 20	21.6	1985 Sep 17	87	83
October	31.9	24.0	37.7	1989 Oct 11	18.6	1974 Oct 30 1983 Oct 30	83	77
November	29.6	18.9	35.5	1979 Nov 27	11.3	1982 Nov 30	81	70
December	26.6	13.7	33.8	1976 Dec 16	9.3	1973 Dec 26	82	65
Annual	31.4	21.7					83	71

TABLE – 4

Mean Wind Speed in km/hr.
(ULUBERIA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.0	4.8	5.2	8.6	9.4	7.0	6.8	5.4	5.0	4.0	3.7	3.1	5.5

TABLE - 5

Special Weather Phenomena
(ULUBERIA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.5	0.5	1.3	2.0	1.1	1.0	1.0	1.5	0.6	0.0	0.0	9.5
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	2.4	1.1	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	5.2

KOLKATA DISTRICT

The climate of this district is characterised by an oppressive hot summer, high dampness in the atmosphere nearly all the year round and well distributed rainfall during the southwest monsoon season. The winter season commences by about the middle of November to the end of February which is followed by the hot season from March to May. The southwest monsoon season is from June to September. October and the first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall for Kolkata are available for one station Alipore, for a period of 106 years, which is taken as representative of whole district. The details of rainfall at this station and for the district as a whole are given in Tables 1 and 2. The average annual rainfall for Kolkata is 1713.5 mm. The rainfall during the southwest monsoon months, June to September constitutes about 75% of the annual rainfall, July being the rainiest month. During the latter half of the summer season and in October, rainfall occurs in the form of thundershowers. The period from November to March is comparatively dry with an average of 1 or 2 rainy days in each of the months. The variation of rainfall from year to year is not large. Considering the district as a whole, during the fifty year period from 1951 to 2000, the highest annual rainfall in the district amounting to 152% of the normal occurred in the year 1999, while 1982 was the year with the lowest annual rainfall which was 66% of the normal. There are six years in which annual rainfall less than 80% of the normal and there was only one occasion when such a low rainfall occurred in two consecutive years i.e. 1953 and 1954.

It is seen from Table 2 that the rainfall in the district was between 1201 mm and 2000 mm in 35 years out of 46.

On an average there are 84 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district.

The heaviest rainfall in 24 hours ever recorded at Kolkata district was 369.6 mm at Alipore observatory on 28th September 1978.

Temperature

There is only one meteorological observatory in the district is at Alipore. The records of this observatory may fairly be taken as representative of the meteorological conditions prevailing in the district. The cold season commences by about the second week of November and lasts only till about the end of February. January is the coldest month with the mean daily maximum temperature at about 26.1°C and the mean daily minimum temperature at about 13.9°C. In association with the western disturbances which move across north India the minimum temperature may sometimes drop down to about 6 to 7°C. By about the end of February days become appreciably warm but nights still continue to be cool. However, with the progress of the season both day and night temperature increase at a rapid pace till May which is the hottest month, with the mean daily maximum temperature at 35.3°C and mean daily minimum temperature at 26.1°C. Occasionally the day temperatures may go over 43°C on some individual days. With the rise in the day temperature and coupled with high moisture content in the air, the weather becomes very sultry and oppressive. Southerly sea breeze which blows from the wide estuary of Hooghly in the afternoon, sometimes brings agreeable relief. However this does not generally last beyond mid night. The Norwesters which occur during the summer afternoons, are often followed by the cooler nights. With the onset of the southwest monsoon by about the first week of June, there is an appreciable drop in day temperatures. Nights however continue to be warm. With the rise in day temperature in September and October only light winds and continuing dampness in the air, weather is very oppressive and trying.

The highest maximum temperature and the lowest minimum temperature ever recorded at Alipore were 43.9°C on 1st June 1924 and 6.7°C on 20th January 1899 respectively.

Humidity

The air is highly humid throughout the year, particularly from June to October. However, relative humidity is comparatively lower in the afternoons during the period January to April.

Cloudiness

The skies are mostly heavily clouded or overcast during the southwest monsoon season. Cloudiness decreases thereafter, mainly clear or lightly clouded skies prevail from December to March. However skies are moderately clouded, being particularly so in the afternoons during April and May. On some days during the cold season, western disturbances passing across north India affect the weather over Kolkata for a few days when cloudy skies prevail.

Winds

Winds are generally light with some strengthening during the summer season. Generally winds blow between southwest and southeasterly directions during summer and southwest monsoon season. In October winds are variable in direction. In the rest of the year winds are northerly to northwesterly.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal during the period May to October affect Kolkata causing heavy rain and strong winds. Some of the depressions move in close proximity to Kolkata. Thunderstorms occur throughout the year. They are very frequent during the period March to October, being particularly so during southwest monsoon months, September being the month with the highest frequency. During the summer season, thunderstorms are often accompanied with violent squalls and occasionally with hail. These are called “Norwesters” because squalls generally come from the northwest and are locally known as “Kalbaisakhi”. Early morning fog from September to March, being most frequent in January and February is noticed.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Alipore observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Alipore	49	a	14.7	23.8	34.9	52.3	110.5	278.4	363.2	336.1	309.3	156.1	25.2	9.0	1713.5	152	66	369.6	28 sep 1978
(Obsy)		b	1.0	1.7	2.3	3.2	6.1	12.5	17.1	17.0	13.9	7.1	1.2	0.5	83.6	(1999)	(1982)		
Kolkata		a	14.7	23.8	34.9	52.3	110.5	278.4	363.2	336.1	309.3	156.1	25.2	9.0	1713.5	152	66		
(District)		b	1.0	1.7	2.3	3.2	6.1	12.5	17.1	17.0	13.9	7.1	1.2	0.5	83.6	(1999)	(1982)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(KOLKATA)

Range in mm	No. of years	Range in mm	No. of years
1101 – 1200	1	1901 – 2000	5
1201 – 1300	4	2001 – 2100	3
1301 – 1400	3	2101 – 2200	2
1401 – 1500	4	2201 – 2300	1
1501 – 1600	8	2301 – 2400	1
1601 – 1700	6	2401 – 2500	2
1701 – 1800	2	2501 – 2600	1
1801 – 1900	3		

(Data available for 46 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(ALIPORE)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	26.1	13.9	32.8	1973 Jan 20	6.7	1899 Jan 20	74	58
February	29.1	17.2	36.7	1952 Feb 21	7.2	1950 Feb 12	68	52
March	33.5	21.9	41.1	1941 Mar 23	10.0	1898 Mar 05	68	49
April	35.4	25.1	43.3	1954 Apr 25	16.1	1905 Apr 02	71	60
May	35.3	26.1	43.7	1958 May 28	18.3	1899 May 03	73	67
June	34.0	26.6	43.9	1924 Jun 01	20.4	1968 Jun 01	78	75
July	32.4	26.2	39.9	1971 Jul 10	22.8	1965 Jul 03	83	82
August	32.0	26.2	36.1	1944 Aug 18	22.6	1968 Aug 28	84	82
September	32.3	25.9	38.9	1988 Sep 10	20.6	1996 Sep 21	82	81
October	32.3	24.0	39.0	1984 Oct 31	17.2	1954 Oct 31	75	73
November	30.2	19.6	34.5	1981 Nov 05	10.6	1883 Nov 22	69	66
December	26.9	14.7	38.5	1988 Dec 05	7.2	1966 Dec 22	72	63
Annual	31.6	22.3					75	68

TABLE - 4
Mean Wind Speed in km/hr.
(ALIPORE)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.3	4.4	6.0	8.7	9.7	7.8	6.8	6.0	5.4	4.	3.6	3.0	5.7

TABLE - 5
Special Weather Phenomena
(ALIPORE)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	1.0	2.4	3.8	6.8	9.8	11.3	12.2	11.7	14.5	6.3	0.3	0.2	80.3
Hail	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.5	1.1	2.7	3.7	1.5	0.5	0.3	0.3	0.2	0.0	0.0	10.8
Fog	7.8	4.0	1.3	0.2	0.0	0.0	0.0	0.0	0.2	0.6	1.3	5.0	20.4

MURSHIDABAD DISTRICT

The climate of this district is characterized by an oppressive hot summer, high humidity nearly all the year round and a well distributed rainfall in the southwest monsoon season. The year may be divided into four seasons. The cold season is from about the middle of November to the end of February. The period from March to May is the summer season. The southwest monsoon season commences by about the beginning of June and lasts till the end of September. October and the first half of November may be termed as the post- monsoon season.

Rainfall

Records of rainfall are available for 5 raingauge stations for period ranging from 24 to 104 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1378.9 mm. The monsoon arrives over the district by about the beginning of June and withdraws by about the first week of October. About 78% of the annual rainfall is received during the southwest monsoon season i.e. June to September, July being the rainiest month. The year to year variation of the annual rainfall in the district is not large. Considering the district as a whole, during the fifty years period from 1951 to 2000, the highest annual rainfall in the district amounting to 169% of the normal occurred in 1971, while 1962 was the year with the lowest annual rainfall which was 72% of the normal. During the fifty years period, there were two years in which annual rainfall was less than 80% of the normal. It is seen from Table 2 that in 22 years out of 36 years, the annual rainfall was between 1101 and 1500 mm.

On an average there are 64 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 54 at Azimganj to 73 at Berhampore(Observatory).

The heaviest rainfall in 24 hours ever recorded at any station in the district was 410.0 mm at Berhampore observatory on 9 June 1996.

Temperature

There is only one meteorological observatory in the district at Berhampore. Temperature and other meteorological conditions over the district are fairly uniform and the climatic data of Berhampore may be taken as quite representative for the district. The cold season commences by about the middle of November when the temperatures begin to decrease. January is the coldest month the mean daily maximum temperature at 25.4^{0}C and mean daily minimum temperature at 12.3^{0}C. In association with passing western disturbances in the cold season, the district is sometimes affected by cold waves and on such occasions the minimum temperature may go down upto about 4.0^{0}C. The hot season commences by about the beginning of March, when temperatures begin to rise rapidly. April is the hottest month with the mean daily maximum temperature at about 37.0^{0}C and the mean daily minimum temperature about 23.4^{0}C. Sultry weather is experienced in the summer season and even in the monsoon season although the temperature is less, this added discomfort due to increased moisture in the air is felt in between the rains. In the summer season, there is welcome relief from the heat although temporarily when thundershowers occur on some days. The night temperatures continue to rise during the rest of the summer season and even after the advent of the southwest monsoon season when the day temperature decrease appreciably. After the withdrawal of the southwest monsoon by about the first week of October, temperatures decrease progressively.

The highest maximum temperature ever recorded at Berhampore observatory was 48.3^{0}C on 23rd May 1981 and the lowest minimum temperature ever recorded was 3.9^{0}C on 16th January 1933.

Humidity

The values of relative humidity are high generally throughout the year. The values of afternoon relative humidity in the summer season are comparatively less, being about 52% in March and April. From May onwards humidity increases.

Cloudiness

Skies are moderately to heavily clouded in May. In the southwest monsoon season, the cloudiness increases and skies are mostly heavily clouded or overcast. From October the cloudiness decreases and in the rest of the year skies are clear or lightly clouded.

Winds

The winds are generally light with a slight increase in force in the summer and southwest monsoon seasons. Winds blow mostly from directions between south and east in latter part of summer and in the early part of the southwest monsoon season. In latter part of southwest monsoon season wind is variable and sometimes westerly in the mornings. In the post monsoon and in the cold season winds are mainly calm in the afternoons and variable in the mornings.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and the post monsoon season often reach the district or its neighbourhood, causing high winds and widespread heavy rain. Depressions in the southwest monsoon season also affect the district. Thunderstorms are common in the summer season. These are sometimes violent and are accompanied with heavy rain, occasional hail and squalls. These thunderstorms usually come from the northwest and are hence called the Norwesters, locally known as ‘Kalbaisakhi’. During these thunderstorms a sharp drop in temperature occurs. In the southwest monsoon season also the rainfall is often associated with thunder. Usually fog occurs in the cold season.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Berhampore observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Azimganj	10	a	27.9	29.7	15.8	34.3	83.6	319.4	323.6	208.4	252.4	142.0	12.1	0.5	1449.7	176	55	263.1	10 Jun 1909
		b	1.3	1.2	1.1	1.4	4.0	8.8	13.6	9.1	7.6	4.9	0.6	0.1	53.7	(1956)	(1958)		
Berhampore (Obsy)	49	a	11.7	14.3	20.5	46.3	112.7	242.8	330.2	271.5	244.5	117.7	13.1	4.8	1430.1	165	67	410.0	09 Jun 1996
		b	0.9	1.3	1.9	2.7	6.2	11.4	15.4	14.3	12.3	5.6	0.9	0.4	73.3	(1996)	(1962)		
Jognipur	20	a	23.7	8.7	17.0	29.9	84.4	236.2	337.2	221.4	203.9	86.2	16.1	0.1	1264.8	117	73	210.8	01 Aug 1876
		b	1.2	0.8	1.0	2.0	4.4	10.0	12.9	11.7	10.0	3.9	0.7	0.0	58.6	(1968)	(1967)		
Kandi	13	a	8.0	5.2	26.0	37.8	53.8	283.6	400.7	275.2	210.3	137.2	10.0	2.1	1449.9	208	65	304.8	25 Aug 1883
		b	1.0	0.8	1.7	2.1	3.6	11.8	16.5	16.7	11.9	5.4	0.6	0.2	72.3	(1959)	(1968)		
Sagardighi	12	a	29.4	11.3	13.4	21.6	65.4	188.7	300.2	250.7	246.7	166.5	6.5	0.0	1300.4	151	75	228.6	03 Oct 1959
		b	1.5	0.5	0.9	1.4	4.5	8.9	14.6	12.8	11.1	5.6	0.4	0.0	62.2	(1959)	(1962)		
Murshidabad (District)		a	20.1	13.8	18.5	34.0	80.0	254.1	338.4	245.4	231.6	129.9	11.6	1.5	1378.9	169	72		
		b	1.2	0.9	1.3	1.9	4.5	10.2	14.6	12.9	10.6	5.1	0.6	0.1	63.9	(1971)	(1962)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(MURSHIDABAD)

Range in mm	No. of years	Range in mm	No. of years
901 – 1000	1	1701 – 1800	4
1001 – 1100	1	1801 – 1900	1
1101 – 1200	9	1901 – 2000	0
1201 – 1300	4	2001 – 2100	1
1301 – 1400	5	2101 – 2200	0
1401 – 1500	4	2201 – 2300	0
1501 – 1600	2	2301 – 2400	1
1601 – 1700	3		

(Data available for 36 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(BERHAMPORE)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.4	12.3	34.9	1973 Jan 07	3.9	1933 Jan 16	75	61
February	28.7	14.7	36.7	1926 Feb 28	5.0	1950 Feb 12	67	56
March	34.1	19.3	44.5	1980 Mar 27	8.9	1898 Mar 05	64	52
April	37.0	23.4	46.4	1988 Apr 10	15.0	1990 Apr 05	71	52
May	35.9	24.6	48.3	1981 May 23	15.3	1968 May 17	80	67
June	34.9	25.8	46.9	1966 Jun 10	20.0	1978 Jun 27	84	78
July	32.8	25.8	40.4	1978 Jul 23	21.0	1988 Jul 02	89	84
August	33.6	25.8	42.4	1978 Aug 03	19.6	1969 Aug 21	88	84
September	33.1	25.6	40.3	1979 Sep 24	17.0	1990 Sep 09	87	84
October	32.6	23.7	39.5	1989 Oct 06	15.6	1980 Oct 27	82	78
November	30.5	19.0	37.8	1969 Nov 01	18.3	1934 Nov 30	76	68
December	26.8	13.9	32.2	1951 Dec 07	5.7	1961 Dec 24	76	65
Annual	32.1	21.2					78	69

TABLE – 4

Mean Wind Speed in km/hr.
(BERHAMPORE)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.8	1.3	2.3	3.7	5.4	4.7	3.9	3.3	2.6	1.3	0.7	0.6	2.6

TABLE – 5

Special Weather Phenomena
(BERHAMPORE)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.3	0.5	1.7	3.0	1.4	1.7	1.1	1.1	0.7	0.1	0.0	11.6
Hail	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0,0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Squall	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Fog	9.6	6.2	2.2	0.4	0.0	0.1	0.0	0.0	0.0	0.0	2.9	8.0	29.4

NADIA DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidity nearly all the year round and a well distributed rainfall during the southwest monsoon season. The winter season is from about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season commences by about the beginning of June and lasts till the end of September. October and the first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for four stations, for the periods ranging from 18 to 104 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1369.4 mm. Haringghata in the southern part of the district gets 1698.6 mm on an average in a year while Ranaghat further north in the middle portion of the district have an annual rainfall of 1161.0 mm. The rainfall during the southwest monsoon season, June to September constitutes about 76% of the annual rainfall, July being the rainiest month. The variation in the rainfall from year to year is large. Considering the district as a whole, in the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 162% of the normal occurred in 1953 while 1979 was the year with the lowest annual rainfall which was 39% of the normal. In the same fifty year period, rainfall less than 80% of the normal occurred in nine years, and there were two occasions when such a low rainfall occurred in two

consecutive years viz. 1960-1961 and 1978-1979. It is seen from Table 2 that the annual rainfall in the district is between 901 mm and 1600 mm in 25 years out of 35 years.

On an average there are 71 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 63 at Krishnanagar (Obsy) to 74 at Haringghata and Debagram Hydro.

The heaviest rainfall in 24 hours ever recorded at any station in the district was 293.9 mm on 20th September 1900 at Krishnanagar (Obsy).

Temperature

There is a meteorological observatory in the district at Krishnanagar. Records of this station are available for long period of years. Temperature and other meteorological conditions at this station may be taken as representative of those in the district as a whole. The cold season commences by about the middle of November when the temperature begins to decrease. January is the coldest month with the mean daily maximum temperature at 28.2°C and the mean daily minimum temperature at 10.7°C. In association with the passing of western disturbances in the cold season, the district is sometimes affected by cold waves and on such occasions the minimum temperature may go down up to about 1 to 3°C. By about the end of February the temperatures begin to rise. While the night temperatures reach a maximum only in the southwest monsoon season, day temperatures usually reach the maximum in April when the mean daily maximum temperature is 38.0°C. The heat in summer is often oppressive on account of high moisture content of the air. There is a welcome relief from heat though temporarily, when thundershowers occur on some days in this season. With the onset of the southwest monsoon by about the first week of June, day temperatures begin to drop but night temperatures continue to rise. With the increased humidity in the air and the continuing high night temperatures, even during the monsoon season the weather is often uncomfortable in between the rains. The southwest monsoon withdraws early in October and the temperatures begin to drop. The drop particularly in the night temperatures is more rapid from about the middle of November.

The highest maximum temperature and the lowest minimum temperature ever recorded at Krishnanagar (Obsy) was 46.1°C on 26th May 1958 and 0.9°C on 2 nd January 1986 respectively.

Humidity

The values of relative humidity are generally high throughout the year particularly in the mornings and are about 65% to 80%. But in the summer months, March and April the values of relative humidity are comparatively less, particularly in the afternoons being about 40 to 45%.

Cloudiness

Skies are moderately clouded in May. In the southwest monsoon season the cloudiness increases and the skies are mostly heavily clouded or overcast. From October cloudiness decreases and in the following six months skies are clear or lightly clouded.

Winds

Winds are generally light with some increase in force in the summer and southwest monsoon season. Winds are mostly southerly in the latter part of summer and early part of the southwest monsoon season. In the rest of the year winds are light and variable in directions.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and the post monsoon season often reach the district and its neighbourhood and causing widespread heavy rain and high winds. Depressions in southwest monsoon season also affect the district. Thunderstorms are common in the hot season. These are sometimes violent and are accompanied with heavy rain, occasional hail and squalls. These thunder squalls usually come from the northwest and are hence called “Norwesters” locally known as “Kalbaisakhi”. During these thunderstorms, there is a sharp drop in temperature. In the southwest monsoon season also the rainfall is often associated with thunder. Occasional fog occurs during the cold season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Krishnanagar observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Debagram	10	a	7.8	12.6	29.1	37.1	107.7	208.0	342.4	274.2	233.3	109.9	23.6	8.3	1394.0	140	73	270.0	09 Jul 1987
(Hydro)		b	0.9	1.1	2.1	2.5	6.6	11.2	16.3	16.4	10.0	4.9	1.4	0.7	74.1	(1999)	(1998)		
Haringghata	13	a	12.8	12.3	21.4	76.9	94.4	331.9	341.7	290.3	355.8	156.3	4.8	0.0	1698.6	201	55	279.4	26 Sep 1956
		b	0.9	1.2	1.5	3.0	5.8	12.6	14.1	14.8	13.4	6.3	0.5	0.0	74.1	(1953)	(1960)		
Krishnanagar	48	a	10.6	12.4	21.1	47.9	104.2	230.8	278.4	224.7	179.4	97.1	11.9	5.1	1223.6	158	43	293.9	20 Sep 1900
(Obsy)		b	0.7	1.0	1.4	2.2	5.8	10.4	13.9	12.8	9.3	4.7	0.7	0.2	63.1	(1970)	(1979)		
Ranaghat	14	a	12.4	15.6	18.6	36.8	87.1	240.9	213.2	210.8	210.9	100.1	10.7	3.9	1161.0	138	42	254.0	20 Sep 1900
		b	0.6	1.1	1.3	2.5	5.5	12.1	14.4	13.5	12.4	6.1	0.6	0.2	70.3	(1953)	(1960)		
Nadia		a	10.9	13.2	22.5	49.7	98.4	252.9	293.9	250.0	244.9	115.9	12.8	4.3	1369.4	162	39		
(District)		b	0.8	1.1	1.6	2.6	5.9	11.6	14.7	14.4	11.3	5.5	0.8	0.3	70.6	(1953)	(1979)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(NADIA)

Range in mm	No. of years	Range in mm	No. of years
501 – 600	1	1401 – 1500	3
601 – 700	0	1501 – 1600	3
701 – 800	0	1601 – 1700	1
801 – 900	1	1701 – 1800	2
901 – 1000	4	1801 – 1900	0
1001 – 1100	3	1901 – 2000	3
1101 – 1200	1	2001 – 2100	1
1201 – 1300	6	2101 – 2200	0
1301 – 1400	5	2201 – 2300	1

(Data available for 35 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(KRISHNANAGAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.2	10.7	36.8	1977 Jan 01	0.9	1986 Jan 02	71	49
February	30.4	13.0	38.8	1973 Feb 09	3.9	1866 Feb 05	65	47
March	34.8	17.7	42.2	1941 Mar 30	7.5	1976 Mar 01	64	45
April	38.0	22.0	45.0	1954 Apr 25	13.5	1968 Apr 01	69	46
May	37.8	23.0	46.1	1958 May 26	15.5	1976 May 12	71	55
June	36.0	23.7	45.2	1966 Jun 12	17.0	1984 Jun 06	75	68
July	33.7	23.5	42.8	1979 Jul 31	15.0	1985 Jul 10	77	73
August	33.3	23.7	39.0	1988 Aug 28	16.0	1976 Aug 18	79	75
September	33.8	23.6	37.3	1968 Sep 01	16.0	1976 Sep 29	78	73
October	33.9	22.1	38.1	1976 Oct 29	12.0	1976 Oct 30	75	66
November	32.4	17.3	38.0	1982 Nov 19	7.0	1976 Nov 21	69	60
December	29.3	12.1	35.0	1979 Dec 31	4.4	1968 Dec 29	70	53
Annual	33.5	19.4					72	59

TABLE – 4

Mean Wind Speed in km/hr.
(KRISHNANAGAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1.7	2.8	5.2	8.0	10.2	8.2	6.5	5.1	4.0	2.9	1.8	1.4	4.8

TABLE – 5

Special Weather Phenomena
(KRISHNANAGAR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.3	0.4	0.7	0.6	1.4	2.5	1.2	1.3	0.5	0.0	0.0	8.9
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

DISTRICT SUMMARY
NORTH 24 PARGANAS

NORTH 24 PARGANAS DISTRICT

The climate of this district is characterised by an oppressive hot summer, high humidities nearly all the year round and well distributed rainfall during the monsoon season. The cold season from about the middle of November to the end of February is followed by the summer from March to May. The southwest monsoon season is from June to September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 6 raingauge stations for the period ranging from 11 to 75 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1512.9 mm. The southwest monsoon arrives over the district by about the first week of June and withdraws in the first week of October. About 76% of the annual rainfall is received during the southwest monsoon months, viz. June to September. The district gets some rain, mostly as thundershowers in the latter part of the summer season and in October. July is generally the rainiest month. Considering the district as a whole, during the fifty years period from 1951 to 2000, the highest annual rainfall in the district amounting to 167% of the normal occurred in 1971, while 1966 was the year with the lowest annual rainfall which was 72% of the normal. There are eight years in which the annual rainfall was less than 80% of the normal and there were two occasions when such a low rainfall was experienced in two consecutive years viz. 1953-54 and 1957-58. It is seen from Table 2 that in 34 years out of 47, the annual rainfall was between 1101 and 1900 mm.

On an average there are 74 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 60 at Bongaon to 83 at Dum Dum Aerodrome observatory.

The heaviest rainfall in 24 hours ever recorded at any station in the district is 383.2 mm at Dum Dum Aero (Obsy) on 6th June, 1984.

Temperature

There is one meteorological observatory at Dum Dum (Aerodrome). Records of this observatory may be taken as representative for the district as a whole. Temperatures begin to rise steadily after February. Generally April and May are the hottest months with the mean daily maximum temperature at about 35.5^0C and the mean daily minimum temperature at about 25.0^0C. The high moisture content in the air makes the heat in summer oppressive. The maximum temperature may go above 43^0C on some days. There is welcome relief from the heat although only temporarily when thundershowers occur on some days in this season. With the onset of the southwest monsoon season by about the first week of June, the day temperatures drop appreciably, but throughout the monsoon season the night temperatures continue to be as high as during the summer season. With the increased humidity in the air and high night temperatures, the weather when not raining is generally uncomfortable. The monsoon withdraws early in October and temperatures begin to drop. The drop in the night temperatures is more rapid, particularly from about the middle of November. January is the coldest month with the mean daily minimum temperature at about 12.9^0C. In association with passing western disturbances spells of cold weather are experienced in the winter season and the minimum temperature may drop down to about 5 to 6^0C.

The highest maximum temperature ever recorded at Dum Dum Aero (Obsy) is 43.7^0C on 5th June 1979 and the lowest minimum temperature ever recorded is 5.0^0C on 15th January 1947.

Humidity

Values of relative humidity are generally high throughout the year. The values of relative humidity are generally at about 75% in the mornings and that in the afternoon are about 68%.

Cloudiness

Skies are mainly clear or lightly clouded in the winter months. Cloudiness increases from April and in May skies are heavily clouded on many days. In the southwest monsoon season skies are heavily clouded to overcast. In October cloudiness decreases and in November and December skies are mostly clear or lightly clouded.

Winds

Winds are generally moderate to strong in the summer and southwest monsoon season. Winds are light in the winter and predominantly from north. In the pre monsoon season, as season advances, wind speed increases and wind mostly blow from south. In the southwest monsoon season, winds blow from directions between southeast and southwest. Northerly wind appears in October and thereafter northerly winds strengthens in November and December.

Special Weather Phenomena

In May and the post monsoon season, storms and depressions from the Bay of Bengal often affect the district and its neigbourhood and cause widespread heavy rain with high winds. Depressions in the monsoon season also affect the district causing heavy rains and strong winds. Thunderstorms are common, particularly in the summer afternoons. In association with these thunderstorms severe squalls and occasional hail occur. These thunderstorms are called ‘Norwesters’ due to the fact that the associated squalls, often violent, usually come from the northwest and are locally known as ‘Kalbaisakhi’. A sharp drop in temperatures is experienced during these thunderstorms. Rain during the southwest monsoon season is also often associated with thunder. Occasional fog occurs in the cold season.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena for Dum Dum Aerodrome observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST ANNUAL RAINFALL AS % OF NORMAL & YEARS **	LOWEST ANNUAL RAINFALL AS % OF NORMAL & YEARS **	HEAVIEST RAINFALL in 24 HOURS * Amount (mm)	HEAVIEST RAINFALL in 24 HOURS * Date
Barrackpore	11	a	7.3	16.9	16.0	49.3	92.5	233.6	313.3	261.6	259.0	132.2	8.9	1.9	1392.5	116	76	377.7	22 Sep 1878
		b	0.6	1.8	1.1	2.2	4.6	10.1	13.5	13.3	12.3	7.4	0.5	0.1	67.5	(1955)	(1962)		
Barrackpore IAF (Obsy)	11	a	17.1	19.3	23.1	44.3	88.0	226.2	281.5	271.6	265.0	149.4	7.9	0.0	1393.4	169	85	231.1	01 Oct 1959
		b	1.4	1.8	1.5	3.0	5.3	10.8	15.4	15.8	13.5	7.7	0.3	0.0	76.5	(1959)	(1961)		
Basirhat	18	a	21.3	12.7	18.9	39.2	104.4	279.9	334.8	333.1	269.3	119.1	17.9	0.0	1550.6	148	39	327.4	20 Sep 1900
		b	0.8	0.9	1.8	2.3	4.9	12.2	15.4	16.5	11.8	5.3	1.3	0.0	73.2	(1959)	(1954)		
Bongaon	13	a	12.3	12.9	35.0	59.7	112.1	270.3	308.4	249.3	263.4	133.3	0.9	1.5	1459.1	153	92	338.3	29 Aug 1909
		b	0.6	1.3	2.0	3.1	6.3	10.5	11.6	11.4	9.0	4.0	0.1	0.1	60.0	(1959)	(1960)		
Dum Dum (Obsy)	20	a	16.8	10.5	22.5	46.5	83.9	284.1	304.3	294.7	297.8	134.0	17.9	2.4	1515.4	144	71	313.9	24 Aug 1888
		b	1.0	1.1	1.9	2.8	5.0	12.6	16.6	16.9	13.7	7.1	1.3	0.2	80.2	(1959)	(1966)		
Dum Dum Aero (Obsy)	29	a	10.8	28.8	38.9	58.1	144.6	302.2	352.6	354.4	302.6	127.2	32.8	12.8	1765.8	143	61	383.2	06 Jun 1984
		b	0.9	2.0	2.2	3.6	7.0	12.5	17.0	17.1	13.5	5.9	1.2	0.6	83.5	(1971)	(1982)		
North 24 Par ganas (District)		a	14.3	16.9	25.7	49.5	104.3	266.1	315.8	294.1	276.2	132.5	14.4	3.1	1512.9	167	72		
		b	0.9	1.5	1.8	2.8	5.5	11.5	14.9	15.2	12.3	6.2	0.8	0.2	73.6	(1971)	(1966)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000.

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 -2000)
(NORTH 24 PARGANAS)

Range in mm	No. of years	Range in mm	No. of years
1001 – 1100	2	1801 – 1900	6
1101 – 1200	6	1901 – 2000	2
1201 – 1300	2	2001 – 2100	4
1301 – 1400	0	2101 – 2200	0
1401 – 1500	5	2201 – 2300	2
1501 – 1600	8	2301 – 2400	1
1601 – 1700	4	2401 – 2500	0
1701 – 1800	3	2501 – 2600	2

(Data available for 47 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(DUM DUM (A))

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.8	12.9	32.5	1973 Jan 10	5.0	1947 Jan 15	73	58
February	28.8	16.2	36.0	1999 Feb 27	6.1	1950 Feb 12	69	52
March	33.2	20.9	40.6	1955 Mar 25	12.1	1979 Mar 11	68	49
April	35.5	24.6	42.8	1954 Apr 25	16.6	1968 Apr 01	72	61
May	35.4	25.6	43.0	1975 May 10	17.6	1987 May 30	75	67
June	34.0	26.3	43.7	1979 Jun 05	19.2	1970 Jun 21	80	77
July	32.5	26.0	39.2	1982 Jul 04	20.1	1986 Jul 12	84	82
August	32.2	26.0	37.7	1983 Aug 16	21.1	1986 Aug 15	84	83
September	32.4	25.7	36.7	1998 Sep 27	21.7	1944 Sep 01	82	82
October	32.1	23.8	36.8	1999 Oct 31	13.0	1984 Oct 18	76	74
November	29.8	19.1	35.0	1999 Nov 17	11.7	1982 Nov 30	70	67
December	26.7	13.8	33.0	1984 Dec 31	6.1	1945 Dec 26	71	63
Annual	31.5	21.7					75	68

TABLE – 4

Mean Wind Speed in km/hr.
(DUM DUM (A))

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.5	4.5	7.3	11.9	13.9	11.1	10.3	8.8	7.4	4.9	3.5	3.0	7.5

TABLE – 5

Special Weather Phenomena
(DUM DUM (A))

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	2.0	3.4	6.0	9.0	10.4	10.8	10.8	12.3	5.8	0.5	0.2	71.5
Hail	0.0	0.0	0.2	0.3	0.4	0.4	0.5	0.1	0.3	0.1	0.0	0.0	2.3
Dust storm	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Squall	0.0	0.2	0.4	1.0	1.6	0.7	0.3	0.2	0.2	0.0	0.0	0.0	4.6
Fog	7.6	4.8	3.0	0.6	0.2	0.1	0.1	0.1	0.5	1.5	1.8	3.9	24.2

PURULIA DISTRICT

The climate of this district is characterised by hot summer and well distributed seasonal rainfall. The year can be divided into four seasons. The winter season commences by about the middle of November and continues till the middle of February. This is followed by the summer season which extends upto May. The southwest monsoon which follows thereafter continues upto the end of September. October and first half of November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 8 raingauge stations for periods ranging from 27 to 83 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1217.7 mm. The rainfall generally increases from the northeast to southwest in the district. Southwest monsoon season commences over the district by the first week of June and withdraws from the district by the end of September. The rainfall during the southwest monsoon months viz. June to September constitutes about 83% of the annual rainfall, July being the rainiest month in the year. The variation in the rainfall from year to year is not large. Considering the district as a whole, in the fifty year period from 1951 to 2000 the highest annual rainfall which was 176% of the normal occurred in 1978 while the lowest annual rainfall which was 75% of the normal occurred in 1982. In the same fifty year period, there is only one year viz. 1982 in which annual rainfall was less than 80% of the normal. It is seen from Table 2 that in 26 years out of 40 , the annual rainfall was between 1001 and 1400 mm.

On an average there are 64 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 59 at Barabazar and Para to 74 at Purulia (Obsy).

The heaviest rainfall in 24 hours ever recorded at any station in the district was 438.7 mm at Purulia on 18th June, 1898 but the station is not included in Table 1 as it is closed.

Temperature

There is a meteorological observatory at Purulia in the district. The description of climate which follows is based on the records of the weather parameters of Purulia observatory. Temperatures begin to rise rapidly from about the first week of March. May is the hottest month of the year with the mean daily maximum temperature at 38.7^{0}C and the mean daily minimum temperature at 24.9^{0}C. On individual days during May and June the day temperatures sometimes go upto about 46^{0}C or more. Summer is oppressive. Thundershowers during this period bring welcome relief from heat on some days. With the onset of the southwest monsoon in the district by about the first week of June, the day temperatures decrease appreciably but the drop in the night temperature is not much. Nights are as warm as in the summer season. Due to high night temperature and high moisture content of the monsoon air, the weather is often unpleasant in between the rains. After the withdrawal of the southwest monsoon by about the first week of October, both day and night temperatures begin to decrease, the drop in night temperatures being more rapid. January is the coldest month with the mean daily maximum temperature at 25.4^{0}C and the mean daily minimum temperature at 11.6^{0}C. In association with the passage of western disturbances across north India, spells of cold weather are sometimes experienced during the cold season, when the minimum temperature goes down to about 4^{0}C.

The highest maximum temperature ever recorded at Purulia was 46.3^{0}C on 20th May 1972 while the lowest minimum temperature ever recorded was 3.8^{0}C on 13th January 1989.

Humidity

The values of relative humidity are generally high throughout the year. Relative humidities are high during the southwest monsoon season, being generally between 70 to 85%. The driest part of the year is summer season when values of relative humidity in the afternoon are between 35 and 45%.

Cloudiness

Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and the skies are mostly clear or lightly clouded in the rest of the year.

Winds

The winds are generally light with a slight increase in force in the summer and the southwest monsoon season. Winds are mostly from the southeast direction during May and in the southwest monsoon season. In October and in the cold season, winds are northwesterly in the mornings and mostly calm in the evenings. From February to April they are mostly from northwest direction.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May, southwest monsoon and post monsoon season sometimes reach the district or its neighbourhood and cause widespread heavy rain with high winds. Thunderstorms occur throughout the year, their frequency being the highest in the monsoon season and the least in winter months. Thunderstorms in summer season mostly occur in the afternoons. These thunderstorms are called ‘Norwesters’ locally known as ‘Kal Baisakhi’ due to the fact that it is associated with squally, often violent weather . Hail storm and dust storm associated with them come from northwest. A sharp drop in temperature is experienced at the time of onset of these. Occasional fog occurs in winter and later part of the southwest monsoon season.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Purulia observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bagmandi	12	a	8.9	23.5	21.1	15.2	32.6	175.1	352.2	267.4	258.0	86.0	4.3	3.1	1247.4	131	70	238.8	21 Jun 1946
		b	0.8	2.0	2.0	1.4	3.1	9.4	16.5	15.4	12.3	4.4	0.3	0.2	67.8	(1961)	(1954)		
Bandwan	14	a	15.8	11.2	6.2	18.9	43.0	230.7	290.5	265.1	258.7	86.0	7.5	0.1	1233.7	154	69	254.5	22 Aug 1953
		b	1.0	1.2	0.6	0.8	2.9	11.0	13.3	13.3	11.4	3.7	0.3	0.0	59.5	(1953)	(1954)		
Barabazar	16	a	17.3	16.2	15.1	12.4	16.7	186.0	256.2	268.3	298.9	80.4	14.8	1.1	1183.4	163	68	246.1	18 Jun 1898
		b	1.0	1.2	1.5	0.8	1.8	8.9	12.9	12.6	12.8	4.5	0.7	0.1	58.8	(1953)	(1955)		
Jhaldah (Jhalda)	11	a	3.4	11.2	21.4	7.7	13.8	127.1	342.5	281.9	350.2	109.0	3.4	0.8	1272.4	132	78	400.0	19 Oct 1899
		b	0.5	1.1	1.5	0.7	1.2	7.3	15.1	14.0	13.0	5.5	0.3	0.3	60.5	(1959)	(1955)		
Manbazar	12	a	6.5	23.2	25.8	31.4	70.6	168.2	242.2	271.3	253.1	109.1	21.1	4.8	1227.3	128	78	242.3	11 Jul 1942
		b	0.7	1.6	2.3	1.5	4.9	10.4	14.0	14.6	11.6	5.1	0.7	0.3	67.7	(1951)	(1962)		
Para	18	a	15.9	14.5	10.9	17.4	26.8	149.1	289.9	249.3	252.4	81.9	6.0	0.8	1114.9	158	79	168.4	14 Sep 1958
		b	1.4	0.9	1.1	1.5	2.2	8.7	14.9	13.5	10.4	4.4	0.4	0.1	59.5	(1959)	(1962)		
Purulia (Obsy)	48	a	12.7	19.9	22.2	36.4	57.6	221.5	299.1	309.3	267.8	82.9	16.9	8.2	1354.5	158	67	181.6	15 Sep 1958
		b	1.2	1.8	2.0	2.7	4.2	11.0	16.3	16.0	12.5	4.4	1.0	0.7	73.8	(1978)	(1982)		
Raghunathpur	19	a	16.5	15.5	12.0	15.2	28.7	133.7	257.2	255.4	279.8	81.3	11.6	1.6	1108.5	169	77	268.7	07 Sep 1954
		b	1.3	0.9	0.9	1.5	2.6	8.8	15.4	15.9	12.7	4.6	0.8	0.3	65.7	(1956)	(1960)		
Purulia (District)		a	12.1	16.9	16.8	19.3	36.2	173.9	291.2	271.0	277.4	89.6	10.7	2.6	1217.7	176	75		
		b	1.0	1.3	1.5	1.4	2.9	9.4	14.8	14.4	12.1	4.6	0.6	0.3	64.3	(1978)	(1982)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(PURULIA)

Range in mm	No. of years	Range in mm	No. of years
901 – 1000	2	1601 – 1700	3
1001 – 1100	4	1701 – 1800	1
1101 – 1200	9	1801 – 1900	0
1201 – 1300	7	1901 – 2000	0
1301 – 1400	6	2001 – 2100	0
1401 – 1500	3	2101 – 2200	1
1501 – 1600	4		

(Data available for 40 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(PURULIA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.4	11.6	33.4	1977 Jan 01	3.8	1989 Jan 13	70	55
February	28.2	14.1	37.3	1967 Feb 22	6.3	1989 Feb 20	63	46
March	33.7	18.8	41.7	1955 Mar 31	10.7	1987 Mar 04	55	40
April	38.2	23.4	44.3	1980 Apr 30	13.5	1965 Apr 02	54	37
May	38.7	24.9	46.3	1972 May 20	15.6	1987 May 03	62	46
June	35.6	25.1	46.2	1966 Jun 10	18.3	1988 Jun 12	74	66
July	32.3	24.3	40.7	1982 Jul 06	17.8	1953 Jul 14	83	78
August	31.7	24.2	37.8	1972 Aug 03	17.2	1953 Aug 27	85	79
September	32.0	23.7	39.0	1981 Sep 28	17.0	1986 Sep 27	83	77
October	31.6	20.9	39.4	1974 Oct 01	13.2	1986 Oct 22	76	66
November	29.1	16.5	35.1	1981 Nov 05	7.7	1985 Nov 29	69	60
December	25.9	12.3	35.3	1981 Dec 22	5.7	1961 Dec 26	70	59
Annual	31.9	20.0					71	59

TABLE – 4

Mean Wind Speed in km/hr.
(PURULIA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.1	3.9	4.5	5.6	6.7	6.7	6.0	5.4	4.9	3.5	2.9	2.8	4.7

TABLE – 5

Special Weather Phenomena
(PURULIA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.8	2.4	4.3	6.8	9.2	13.1	13.3	11.6	10.8	3.0	0.4	0.3	76.0
Hail	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Dust storm	0.0	0,1	0.4	0.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.7
Fog	0.3	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	1.0

DISTRICT SUMMARY
SOUTH 24 PARGANAS

SOUTH 24 PARGANAS DISTRICT

The climate of this district is characterised by an oppressive hot summer, high relative humidity nearly all the year round and well distributed seasonal rainfall during the monsoon season. The cold season from about the middle of November to the end of February is followed by summer from March to May. The southwest monsoon season is from June to September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 6 raingauge stations for the period ranging from 19 to 104 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1766.0 mm. The monsoon arrives over the district by about the first week of June and withdraws by about second week of October. About 76% of the annual rainfall is received during southwest monsoon months i.e. June to September. In the latter half of the summer season and in October, the district gets some rainfall mostly as thundershowers. July is generally the rainiest month. There is a large variation in rainfall from year to year. Considering the district as a whole during the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 366% of the normal occurred in 1995, while 1979 was the year with the lowest annual rainfall which was 61% of the normal. There are 10 years in which annual rainfall was less than 80% of the normal. There is one occasion each when such a low rainfall was experienced in two and three consecutive years viz. 1957-1958 and 1960-1961-1962. It is

seen from Table 2 that in 35 years out of 47 years, the annual rainfall was between 1201 and 2100 mm.

On an average there are 75 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 61 at Sandheads observatory to 86 at Canning observatory.

The heaviest rainfall in 24 hours ever recorded at any station in the district was 884.5 mm at Sagar Island observatory on 22 July 1991.

Temperature

The district has four meteorological observatories in the district at Diamond Harbour, Sagar Island, Sandheads and Canning. The temperature and humidity conditions in the Sundarbans region in the southern part of the district with its swamps and marshes and the wide network of tidal channels, rivers, creeks and island differs a little from those in the northern inland tracts. While the meteorological records at Canning and Diamond Harbour may be taken as representative of the climatic condition in the northern inland tracts, the records of Sagar Island can be taken as typical of the Sundarbans region. The temperatures are generally lower and values of humidity are higher in the Sundarbans than in the rest of the district. The hot season commences by about the beginning of March, when the temperatures begin to rise steadily. May is the hottest month with the mean daily maximum temperature at about 32^0C in the Sundarbans region and at about 34^0C in the northern inland region. The high moisture content of the air makes the heat in summer oppressive. On some days the maximum temperature may go upto about 39-40^0C in Sundarbans region and about 3 to 4^0C higher in the northern inland region. There is a welcome relief from the heat although only temporarily when the thundershowers occur on some days in this season. The onset of southwest monsoon by about the first week of June, the day temperatures drop appreciably but throughout the southwest monsoon season the night temperatures continue to be as high as during the summer season. With the increased humidity in the air and high night temperatures, the weather when not raining is generally uncomfortable. The monsoon withdraws in early October and the temperatures begin to drop. The drop in the night temperatures particularly is more rapid from about the middle of November. January is the coldest month with the mean daily minimum temperature at about 14^0C in the northern parts of the district, and about 16^0C in the Sundarbans. In association with the passing of western disturbances, spells of cold weather are experienced in the winter season, and minimum temperatures may drop down to about 7 to 8^0C both in the inland region and in the Sundarbans.

The highest maximum temperature ever recorded at Sagar Island, Sandheads, Canning and Diamond Harbour were 40.0^{0}C on 2 June 1929, 40.4^{0}C on 31 May 1979 and 12 May 1989, 42.5^{0}C on 17 May 1987 and 41.8^{0}C on 7 April 1987 respectively, while the lowest minimum temperature ever recorded at Sagar Island, Sandheads, Canning and Diamond Harbour were 7.2^{0}C on 12 February 1950, 10.0^{0}C on 6 January 1978 and on many days in October 1955, 7.6^{0}C on 14 January 1989 and 9.0^{0}C on 5 January 1990.

Humidity

The values of relative humidity are generally high throughout the year.

Cloudiness

Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and the skies are clear or lightly clouded in the rest of year.

Winds

Winds are generally moderate with some increase in force in the summer and southwest monsoon season whereas in Sundarbans region particularly near the coast winds are generally strong. In winter, winds are generally light and mostly blow from north or northeast direction. In the pre-monsoon season, southerly winds strengthens and wind mostly blow from directions between southeast and southwest in the premonsoon and southwest monsoon season. In the month of October, winds are variable in directions in the afternoons, thereafter northerly winds strengthens. In November and December northerlies and northeasterlies prevail in the district.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and post-monsoon season often affect the district or its neighbourhood and cause widespread heavy rain and high winds. Depressions in the southwest monsoon season also affect the district causing heavy rains and strong winds. Thunderstorms are common particularly in the summer afternoons. The frequency is more in the latter half of the summer season. In association with these thunderstorms severe squalls and occasional hail occur. Thunderstorms in the summer season are called ‘Norwesters” due to the fact that the associated squalls often violent, usually occur from the northewest, and are locally known as ‘Kalbaisakhi’. A sharp drop in

temperature is experienced during these thunderstorms. Rain during the southwest monsoon season is also often associated with thunder. Fog occurs frequently during the period November to February, its frequency is more in January and December.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Sagar Island observatory and tables 3(a), 4(a), 3(b), 4(b) and 3(c), 4(c) give temperature and relative humidity and special weather phenomena for Sandheads, Canning and Diamond Harbour observatories respectively

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Budge Budge	20	a	17.5	16.6	22.2	38.5	86.3	268.0	329.4	317.2	319.4	150.1	15.2	2.5	1582.9	130	75	311.2	20 Sep 1900
		b	1.0	1.6	2.0	2.8	5.1	12.5	16.7	17.1	14.8	7.7	1.1	0.2	82.6	(1959)	(1957)		
Canning (Obsy)	19	a	12.4	21.1	37.1	57.8	132.6	337.0	369.9	370.8	333.5	132.6	53.0	3.2	1861.0	120	61	270.9	05 Jun 1984
		b	1.0	1.9	2.1	3.0	6.7	14.1	16.6	18.2	14.3	5.9	1.8	0.5	86.1	(1990)	(1982)		
Diamond Harbour (Obsy)	19	a	10.4	33.5	39.5	59.5	118.3	288.7	341.6	310.2	307.1	96.6	30.7	19.0	1655.1	129	73	251.3	11 Dec 1981
		b	0.9	2.1	2.0	3.1	6.2	12.2	15.7	15.2	13.9	5.6	1.3	0.4	78.6	(1990)	(1987)		
Sagar Island (Obsy)	48	a	12.4	22.0	31.2	38.9	115.7	259.5	367.4	387.1	361.8	191.3	49.0	7.9	1844.2	163	58	884.5	22 Jul 1991
		b	0.9	1.4	1.8	2.2	5.3	11.3	14.8	16.1	13.4	7.6	1.7	0.3	76.8	(1991)	(1979)		
Sandheads (Obsy)	48	a	13.3	25.3	45.6	40.6	135.8	375.8	579.5	460.3	342.0	241.0	76.4	9.1	2344.7	276	31	651.0	26 Jul 1989
		b	0.7	1.1	1.4	1.7	3.7	9.2	12.9	12.4	9.7	6.4	2.0	0.3	61.5	(1995)	(1957)		
South 24 Parganas (District)		a	14.3	21.0	32.7	43.8	107.6	289.4	380.8	348.2	325.1	154.9	41.2	7.0	1766.0	366	61		
		b	0.9	1.5	1.8	2.5	5.1	11.6	14.8	15.4	13.0	6.4	1.5	0.3	74.8	(1995)	(1979)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(SOUTH 24 PARGANAS)

Range in mm	No. of years	Range in mm	No. of years
1001 – 1100	2	3801 – 3900	0
1101 – 1200	0	3901 – 4000	0
1201 – 1300	3	4001 – 4100	0
1301 – 1400	5	4101 – 4200	0
1401 – 1500	3	4201 – 4300	0
1501 – 1600	4	4301 – 4400	0
1601 – 1700	3	4401 – 4500	0
1701 – 1800	5	4501 – 4600	0
1801 – 1900	6	4601 – 4700	0
1901 – 2000	1	4701 – 4800	0
2001 – 2100	5	4801 – 4900	0
2101 – 2200	1	4901 – 5000	0
2201 – 2300	0	5001 – 5100	1
2301 – 2400	1	5101 – 5200	0
2401 – 2500	1	5201 – 5300	0
2501 – 2600	1	5301 – 5400	0
2601 – 2700	1	5401 – 5500	0
2701 – 2800	0	5501 – 5600	0
2801 – 2900	1	5601 – 5700	0
2901 – 3000	0	5701 – 5800	0
3001 – 3100	1	5801 – 5900	0
3101 – 3200	1	5901 – 6000	0
3201 – 3300	0	6001 – 6100	0
3301 – 3400	0	6101 – 6200	0
3401 – 3500	0	6201 – 6300	0
3501 – 3600	0	6301 – 6400	0
3601 – 3700	0	6401 – 6500	1
3701 – 3800	0		

(Data available for 47 years only)

TABLE – 3

Normals of Temperature and Relative Humidity (SAGAR ISLAND)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	24.9	16.3	30.6	1931 Jan 28	7.8	1899 Jan 22	77	68
February	27.0	19.5	33.9	1952 Feb 18	7.2	1950 Feb 12	75	70
March	29.8	23.9	38.3	1964 Mar 30	12.2	1906 Mar 02	78	77
April	31.2	26.4	39.4	1908 Apr 16	12.9	1962 Apr 03	81	83
May	32.0	27.2	38.7	1982 May 06	17.8	1898 May 26	82	83
June	31.9	27.4	40.0	1929 Jun 02	19.4	1925 Jun 29	84	83
July	30.6	26.9	36.1	1920 Jul 01	16.2	1960 Jul 13	86	85
August	30.6	26.8	36.7	1903 Aug 23	16.4	1974 Aug 16	86	85
September	30.8	26.8	36.1	1921 Sep 09	17.6	1981 Sep 14	85	84
October	30.7	25.4	34.9	1991 Oct 01	16.9	1984 Oct 18	79	78
November	28.6	21.6	32.8	1944 Nov 14	12.2	1883 Nov 23	75	72
December	25.6	17.3	30.3	1979 Dec 01	9.4	1896 Dec 21 1968 Dec 10	75	69
Annual	29.5	23.8					80	78

TABLE – 4

Mean Wind Speed in km/hr. (SAGAR ISLAND)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
10.5	12.6	18.4	25.6	28.4	24.8	24.2	20.7	16.9	11.5	10.5	10.5	17.8

TABLE – 5

Special Weather Phenomena (SAGAR ISLAND)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	1.1	1.7	3.6	5.0	4.3	3.4	3.9	4.1	2.6	0.2	0.0	30.0
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.1	0.3	0.8	1.9	0.5	0.2	0.1	0.1	0.0	0.0	0.0	4.0
Fog	19.6	8.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	7.2	16.8	55.0

TABLE – 3(a)

Normals of Temperature and Relative Humidity (SANDHEADS)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum Ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.4	20.8	32.9	1965 Jan 02	10.0	1978 Jan 06	70	66
February	27.1	22.5	34.5	1963 Feb 21	11.6	1968 Feb 28	74	69
March	29.3	25.1	36.6	1989 Mar 30	14.2	1974 Mar 27	79	78
April	30.5	26.6	38.6	1966 Apr 14	16.7	1971 Apr 16	82	83
May	31.7	27.4	40.4	1979 May 31 1989 May 12	18.0	1977 May 23	81	83
June	31.5	27.3	37.0	1961 Jun 26	16.7	1962 Jun 18	82	83
July	30.5	26.6	35.8	1972 Jul 16	15.0	1972 Jul 02	85	85
August	30.5	26.4	37.4	1933 Aug 12	12.4	1972 Aug 07	85	84
September	30.9	26.8	36.8	1964 Sep 14	10.4	1976 Sep 02	81	81
October	31.2	26.7	38.0	1988 Oct 01	10.0	1955 Oct * * on many days in Oct 1985	75	74
November	29.2	24.8	36.3	1962 Nov 23	13.7	1973 Nov 25	68	65
December	26.4	22.1	36.6	1962 Dec 06	10.4	1975 Dec 28	66	63
Annual	29.5	25.3					77	76

TABLE – 4(a)

Special Weather Phenomena (SANDHEADS)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	0.2	0.7	0.5	0.3	0.2	0.2	0.6	0.1	0.0	0.0	2.9
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

TABLE – 3(b)

Normals of Temperature and Relative Humidity (CANNING)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest ever Maximum recorded		Lowest ever Minimum recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.9	13.5	31.8	25 Jan 1999	7.6	14 Jan 1989	75	63
February	29.2	17.1	35.8	27 Feb 1999	9.8	01 Feb 1996	74	57
March	33.6	21.7	40.6	30 Mar 1986	13.4	01 Mar 1984	72	56
April	35.6	24.9	40.6	12 Apr 1992	14.7	01 Apr 1990	72	68
May	35.3	26.2	42.5	17 May 1987	18.8	03 May 1987	75	73
June	33.9	26.5	40.6	05 Jun 1986	21.5	12 Jun 1990	81	79
July	32.4	26.3	38.8	04 Jul 1986	21.2	04 Jul 1983	85	82
August	32.1	26.3	35.6	19 Aug 1987	22.4	01 Aug 1987	86	84
September	32.2	25.9	35.8	15 Sep 1996	22.5	06 Sep 1989	85	86
October	32.1	24.2	36.2	25 Oct 1984	18.2	31 Oct 1990	80	82
November	30.0	19.6	33.6	10 Nov 1996	12.9	30 Nov 1982	75	75
December	27.3	14.7	31.8	04 Dec 1984	9.6	11 Dec 1996	73	68
Annual	31.6	22.2					78	73

TABLE – 4(b)

Special Weather Phenomena (CANNING)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	1.7	2.6	4.6	6.4	6.8	8.7	9.9	1.2	5.8	0.8	0.0	58.8
Hail	0.0	0.1	0.2	0.3	0.2	0.4	0.3	0.3	0.3	0.1	0.0	0.0	2.2
Dust storm	0.1	0.0	0.4	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.4	1.2
Squall	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	20.8	13.1	4.2	0.6	0.0	0.0	0.1	0.0	0.2	0.5	6.4	16.3	62.2

TABLE – 3(c)

Normals of Temperature and Relative Humidity (DIAMOND HARBOUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.4	14.4	30.3	25 Jan 1990	9.0	05 Jan 1990	76	65
February	28.3	17.8	35.2	17 Feb 1987	10.2	26 Feb 1984	77	65
March	31.8	22.5	37.4	25 Mar 1987	14.1	01 Mar 1984	76	66
April	33.2	25.6	41.8	07 Apr 1987	13.8	29 Apr 1984	78	75
May	33.4	26.6	40.4	06 May 1994	19.3	02 May 1992	80	78
June	32.8	27.1	39.0	03 Jun 1984	18.5	03 Jun 1984	84	83
July	31.6	26.8	37.8	22 Jul 1986	23.2	24 Jul 1984	87	85
August	31.5	26.7	35.8	19 Aug 1987	21.5	12 Aug 1983	88	86
September	31.7	26.4	36.4	06 Sep 1986	20.4	04 Sep 1995	87	85
October	32.0	24.6	36.0	19 Oct 1987	19.2	29 Oct 1983	80	78
November	29.7	19.9	34.9	05 Nov 1987	13.3	30 Nov 1982	76	71
December	26.7	15.5	32.0	17 Dec 1985	10.3	21 Dec 1984	75	68
Annual	30.7	22.8					80	75

TABLE – 4(c)

Special Weather Phenomena (DIAMOND HARBOUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	1.1	1.9	3.5	5.0	5.2	5.8	5.6	7.6	3.6	0.6	0.0	40.1
Hail	0.0	0.0	0.1	0.3	0.1	0.2	0.3	0.2	0.3	0.1	0.0	0.0	1.6
Dust storm	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.7
Squall	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	8.3	3.9	2.0	0.3	0.0	0.1	0.0	0.0	0.1	0.5	1.1	5.1	21.4

DISTRICT SUMMARY
WEST MEDINIPUR

WEST MEDINIPUR DISTRICT

The climate of this district is characterised by an oppressive hot summer, high relative humidity nearly all the year round and generally an unfailing and well distributed seasonal rainfall. The year can be divided into four seasons. The period from about the middle of November to February constitutes the winter season. The hot season is from March to May. The southwest monsoon season which follows thereafter continues upto the end of September. October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 13 raingauge stations for periods ranging from 16 to 141 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1421.1 mm. The southwest monsoon arrives over the district by first week of June and withdraws by about the end of September. About 77% of the annual rainfall is received during southwest monsoon months i.e. June to September, July and August are the rainiest months. The year to year variation of the annual rainfall in the district is not large. Considering the district as a whole, during fifty years period from 1951-2000, the highest annual rainfall in the district amounting to 190% of the normal occurred in 1971, while 1954 was the year with lowest annual rainfall which was 63% of the normal. There are four years in which annual rainfall was less than 80% of the normal. However, none of them were consecutive years. It is seen

from Table 2 that in 28 years out of 41 years, the annual rainfall was between 1201 and 1800 mm.

On an average there are 68 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 44 at Chandrakona to 87 at Danten (Hydro).

The heaviest rainfall in 24 hours recorded at any station in the district was 400.0 mm at Danten (Hydro) on 9 June, 1994.

Temperature

There is a meteorological observatory in the district at Medinipur. The records of this observatory may be taken as representative for the meteorological conditions prevalent in the district. The temperatures begin to rise rapidly from about the middle of February. Heat in the summer season is oppressive mainly due to high moisture contents in the air. May is the hottest month when the mean daily maximum temperature is about 37^0C and the mean daily minimum temperature is about 25^0C. The highest maximum temperature may sometimes reach upto about 47^0C. January is the coldest month with the mean daily maximum temperature at about 25.9^0C and the mean daily minimum temperature at about 13.4^0C. In association with the passing of western disturbances, spells of cold weather are sometimes experienced in the winter season and temperature may go down upto about 5^0C.

The highest maximum temperature ever recorded was 47.2^0C on 12th June 1942 while the lowest minimum temperature ever recorded was 5.0^0C on 3rd January 1971.

Humidity

The values of relative humidity are generally high throughout the year. During the months January to April, these values remain below 50% in the afternoons.

Cloudiness

Skies are moderately clouded in May and heavily clouded to overcast in the southwest monsoon season. Cloudiness decreases in October and the skies are mostly clear or lightly clouded in the rest of the year.

Winds

The winds are generally light with some increase in force in the late summer and the early southwest monsoon season. Winds are predominantly from the south or southwest in latter part of summer and southwest monsoon season. They are mostly from direction north or northeast in the post monsoon and winter season.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal during the period May to October often reach the district or its neighbourhood and cause widespread heavy rain and gusty winds. A large proportion of the rainfall especially during the monsoon and post monsoon seasons is due to these depressions and storms. Thunderstorms occur commonly during hot season and southwest monsoon season, their frequency being large during May to September. Thunderstorms during the hot season are sometimes accompanied with violent squalls from northwest and occasionally with hail. These thunderstorms are called ‘Norwesters’ or ‘Kalbaisakhi’. Fog occurs occasionally in the mornings during the cold season. Dust storms occur occasionally during summer season.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Medinipur observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Balicha	13	a	16.2	12.2	31.8	40.4	83.0	194.0	249.2	207.3	247.7	61.0	7.4	0.0	1150.2	123	78	266.7	05 Jun 1927
		b	0.6	1.2	2.2	3.5	4.6	10.0	13.9	13.3	12.8	4.4	0.4	0.0	66.9	(1952)	(1969)		
Chandrakona	10	a	30.3	17.5	13.5	25.1	31.5	160.4	195.0	240.4	175.2	44.0	6.1	0.0	939.0	149	55	221.5	25 Jun 1907
		b	1.7	0.8	0.6	1.5	2.0	6.1	9.6	10.5	8.3	2.3	0.4	0.0	43.8	(1956)	(1954)		
Danten	12	a	2.0	19.5	36.9	72.5	163.1	294.2	385.3	431.7	340.4	126.4	27.1	5.7	1904.8	134	65	400.0	09 Jun 1994
(Hydro)		b	0.3	1.5	2.3	4.8	9.7	11.6	17.3	15.6	13.6	6.8	2.6	0.5	86.6	(1973)	(1974)		
Gadghat	18	a	24.0	22.4	15.1	67.9	90.3	234.6	283.9	358.3	321.6	139.7	13.9	0.4	1572.1	234	65	264.2	30 Sep 1971
		b	1.1	1.3	1.8	3.2	4.2	10.4	12.7	14.7	12.2	6.5	0.9	0.1	69.1	(1971)	(1962)		
Ghatal	12	a	9.7	14.5	15.4	39.6	112.9	211.6	253.0	224.2	332.8	70.6	6.3	1.8	1292.4	152	75	256.0	22 Sep 1878
		b	0.4	1.0	0.8	2.5	5.1	9.5	11.2	11.9	11.0	3.7	0.2	0.1	57.4	(1959)	(1963)		
Jhargram	12	a	10.8	16.2	34.4	33.3	107.3	205.2	263.3	239.1	263.6	87.7	14.1	5.0	1280.0	128	72	217.9	30 Jun 1922
		b	0.7	1.5	2.2	2.6	4.5	8.2	10.6	11.0	10.7`	4.4	0.5	0.1	57.0	(1956)	(1954)		
Kesiary	13	a	5.2	26.4	17.4	27.4	122.5	177.9	301.0	299.4	262.0	116.5	17.4	0.0	1373.1	146	56	209.6	15 Sep 1946
Kaltikri		b	0.4	1.3	1.3	1.8	4.6	8.9	12.5	13.8	10.7	5.6	0.6	0.0	61.5	(1956)	(1957)		
Kharagpore	19	a	16.7	18.9	26.5	54.3	109.6	213.4	352.1	328.0	316.1	99.8	15.6	3.3	1554.3	131	60	291.1	16 Oct 1942
		b	1.0	1.3	2.1	3.1	5.7	10.6	16.1	15.1	13.3	5.7	0.8	0.1	74.9	(1971)	(1954)		
Kharagpore	14	a	15.5	23.5	53.5	50.5	124.7	241.2	363.3	356.6	313.9	133.6	19.6	9.1	1705.0	134	76	314.0	27 Aug 1972
I.I.T Hydro		b	0.9	2.3	2.8	4.5	6.4	11.2	17.2	15.6	13.5	6.5	1.3	0.6	82.8	(1993)	(1998)		

Contd…..2

TABLE - I (contd...)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Lachmanpur	13	a	28.0	26.7	33.6	59.9	73.5	219.5	316.1	251.9	323.7	116.6	11.5	0.0	1461.0	115	77	183.9	14 Sep 1958
		b	1.0	1.9	2.3	3.7	4.0	11.3	17.7	16.5	11.4	6.1	0.5	0.0	76.4	(1967)	(1965)		
Medinipur	49	a	11.8	23.0	37.6	57.8	103.6	244.7	323.6	323.3	278.5	112.3	18.3	5.4	1539.9	154	49	325.1	17 Oct 1942
(Obsy)		b	0.9	1.3	2.3	3.8	5.8	11.7	15.3	15.9	12.7	5.5	1.0	0.3	76.5	(1971)	(1954)		
Narayangarh	11	a	10.1	32.1	16.0	22.1	95.2	209.1	250.9	276.9	290.2	123.3	4.1	7.9	1337.9	147	67	335.3	19 Aug 1953
		b	0.8	1.6	1.0	1.3	4.5	9.0	13.0	13.3	11.9	5.9	0.5	0.2	63.0	(1953)	(1954)		
Salda	15	a	8.2	9.6	16.2	34.0	67.5	204.6	309.4	326.3	275.2	99.7	9.8	1.7	1362.2	160	53	266.7	30 Aug 1909
Belpahari		b	0.5	0.9	1.4	2.3	4.6	11.2	15.3	15.4	13.5	5.1	0.5	0.2	70.9	(1968)	(1954)		
West		a	14.5	20.2	26.8	45.0	98.8	216.2	295.9	297.2	287.8	102.4	13.2	3.1	1421.1	190	63		
Medinipur																			
(District)		b	0.8	1.4	1.8	3.0	5.1	10.0	14.0	14.0	12.0	5.3	0.8	0.2	68.4	(1971)	(1954)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(WEST MEDINIPUR)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	1	1801 – 1900	1
901 – 1000	0	1901 – 2000	0
1001 – 1100	2	2001 – 2100	1
1101 – 1200	3	2101 – 2200	1
1201 – 1300	5	2201 – 2300	2
1301 – 1400	7	2301 – 2400	1
1401 – 1500	4	2401 – 2500	0
1501 – 1600	3	2501 – 2600	0
1601 – 1700	3	2601 – 2700	1
1701 – 1800	6		

(Data available for 41 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(MEDINIPUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.9	13.4	35.7	1973 Jan 23	5.0	1971 Jan 03	62	49
February	29.1	16.5	37.9	1967 Feb 22	5.6	1950 Feb 13	57	43
March	34.1	20.7	42.8	1986 Mar 31	11.1	1925 Mar 03	57	40
April	37.4	24.2	45.6	1938 Apr 24	16.8	1990 Apr 05	62	51
May	37.2	25.5	47.0	1972 May 20	16.4	1977 May 08	67	58
June	34.9	26.0	47.2	1942 Jun 12	16.4	1988 Jun 17	75	71
July	32.4	25.5	39.8	1982 Jul 04	20.5	1975 Jul 29	82	81
August	31.9	25.5	37.5	1965 Aug 21	21.3	1975 Aug 29	83	82
September	32.1	25.1	37.4	1979 Sep 05	20.0	1971 Sep 28	82	81
October	31.7	23.0	36.1	1907 Oct 10	15.5	1966 Oct 27	74	72
November	29.4	18.4	35.2	1981 Nov 05	9.4	1975 Nov 23	66	61
December	26.3	13.7	32.2	1984 Dec 14	6.0	1966 Dec 21	61	55
Annual	31.9	21.5					69	62

TABLE – 4

Mean Wind Speed in km/hr.
(MEDINIPUR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.3	3.9	5.5	7.5	9.0	6.8	5.7	5.0	4.1	3.2	3.1	3.2	5.0

TABLE – 5

Special Weather Phenomena
(MEDINIPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.4	1.1	3.9	4.6	5.8	5.8	6.1	6.6	5.5	2.5	0.1	0.3	42.7
Hail	0.0	0.1	0.2	0.4	0.5	0.4	0.5	0.5	0.4	0.1	0.0	0.0	3.1
Dust storm	0.0	0,1	0.4	1.0	1.6	0.6	0.2	0.0	0.0	0.0	0.0	0.0	3.9
Fog	3.4	2.5	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.5	1.9	10.2

DISTRICT SUMMARY
COOCH BEHAR

COOCH BEHAR DISTRICT

The climate of this district is characterised by a highly humid atmosphere and abundant rains with the temperatures being seldom excessive. The cold season is from mid-November to the end of February. This is followed by the hot season from March to May. The period from June to about the beginning of October is the southwest monsoon season. The period from October to mid-November constitute the post-monsoon season.

Rainfall

Records of rainfall are available for 5 raingauge stations for periods ranging from 20 to 104 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 3254.6 mm. About 78% of the annual rainfall is received during the southwest monsoon season, July being the rainiest month. The variation in the rainfall from year to year is large. During the fifty year period from 1951 to 2000 the highest annual rainfall which was 230% of the normal occurred in 1990 while 1994 was the year with the lowest annual rainfall which amounted to 61% of the normal. There were four years when the rainfall was less than 80% of the normal, and none of them being consecutive. From Table 2 it is seen that the rainfall was between 2501 and 3900 mm in 36 years out of 47 years in the district.

On an average there are 97 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 87 at Mathabhanga to 103 at Cooch Behar Aero observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 800.6 mm at Mathabhanga Hydro on 13 August 1990.

Temperature

There is one meteorological observatory at Cooch Behar and the records of this observatory may be taken as representative of the climatic conditions in the district as a whole. The cold season commences by about the middle of November when both night and day temperatures begin to decrease steadily. January is the coldest month of the year with the mean daily minimum temperature at 9.2^0C and the mean daily maximum temperature at 23.6^0C. During the winter season in association with the passage of western disturbances spells of cold weather affect the district and at times night temperature may drop down upto about 3^0C-4^0C. Hot season commences by about the beginning of March and temperatures rise rapidly till April and remain steady throughout the summer and southwest monsoon season. The mean daily maximum temperature in summer season is about 31.0^0C while the mean daily minimum temperature is about 21^0C. Although the temperature in summer is not excessive, dampness of the air makes the weather rather unpleasant. Thundershowers bring some welcome relief from this weather in this season. Even in the southwest monsoon period, day temperatures are not appreciably below those in summer, even on some days heat is intense than summer days, while night temperatures are higher than those during summer. In the post monsoon season temperatures decrease progressively.

The highest maximum temperature ever recorded at Cooch Behar was 41.0^0C on 11th September 1977 and the lowest minimum temperature ever recorded was 3.3^0C on 31st January 1964.

Humidity

The values of relative humidity are high throughout the year. The period from February to April is comparatively drier when the values of relative humidity in the afternoon are between 50 to 60%.

Cloudiness

During the period October to April, skies are generally clear or lightly clouded. In May cloudiness increases. In the southwest monsoon season skies are heavily clouded to overcast.

Winds

Winds are generally light except for short spells during thunderstorms in the period March to May. In the post monsoon and winter season, wind is from east direction in the morning and variable in the evening. In the summer and southwest monsoon season winds are mostly from east direction.

Special Weather Phenomena

Some of the cyclonic storms and depressions originating from the Bay of Bengal in the southwest monsoon and post monsoon season which move northwards affect the weather causing widespread heavy rain and high winds. Thunderstorms occur during the period March to October, being more common before the onset and towards the end of the southwest monsoon season. The thunderstorms in the summer season are occasionally associated with hail and are similar to the Norwesters and are sometimes violent.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Cooch Behar observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Cooch Behar	49	a	9.7	12.9	38.0	131.9	379.5	727.8	872.2	582.2	474.5	166.6	12.4	5.2	3412.9	157	72	417.3	27 Sep 1970
Aero (Obsy)		b	0.7	1.0	2.9	7.2	14.1	18.8	21.0	16.3	14.5	5.5	0.8	0.5	103.3	(1988)	(1979)		
Mathabhanga	12	a	16.1	7.1	29.5	69.5	396.6	695.4	746.4	591.4	357.9	193.8	17.1	0.7	3121.5	126	77	403.3	20 Jul 1879
		b	1.3	0.8	2.2	4.2	12.7	17.7	17.0	14.9	9.9	6.0	0.6	0.1	87.4	(1962)	(1957)		
Mathabhanga	22	a	8.0	19.2	27.8	148.7	293.5	607.6	861.2	906.2	465.0	119.8	16.4	11.3	3484.7	343	61	800.6	13 Aug 1990
(Hydro)		b	0.7	1.1	2.0	7.6	12.9	18.0	21.0	16.7	13.4	5.0	1.0	0.8	100.2	(1990)	(1994)		
Mekhliganj	17	a	9.1	21.5	26.8	117.1	265.5	467.7	794.6	525.0	540.6	125.6	8.5	7.6	2909.6	130	64	335.0	10 Sep 1991
(Hydro)		b	0.8	1.3	2.1	6.2	11.6	15.2	20.4	16.0	14.8	5.6	0.7	0.7	95.4	(1988)	(1994)		
Tufanganj	11	a	5.1	11.4	49.3	138.4	456.5	779.5	866.6	500.0	401.2	125.6	9.4	1.0	3344.0	135	84	322.6	27 Sep 1897
		b	0.5	1.1	3.2	6.7	17.1	17.7	19.3	14.8	10.4	5.1	0.6	0.2	96.7	(1964)	(1962)		
Cooch Behar		a	9.6	14.4	34.3	121.1	358.3	655.6	828.2	621.0	447.8	146.3	12.8	5.2	3254.6	230	61		
(District)		b	0.8	1.1	2.5	6.4	13.7	17.5	19.7	15.7	12.6	5.4	0.7	0.5	96.6	(1990)	(1994)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000..

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(COOCH BEHAR)

Range in mm	No. of years	Range in mm	No. of years
1901 – 2000	1	4701 – 4800	0
2001 – 2100	0	4801 – 4900	0
2101 – 2200	0	4901 – 5000	0
2201 – 2300	0	5001 – 5100	0
2301 – 2400	1	5101 – 5200	0
2401 – 2500	1	5201 – 5300	0
2501 – 2600	2	5301 – 5400	0
2601 – 2700	2	5401 – 5500	0
2701 – 2800	3	5501 – 5600	0
2801 – 2900	1	5601 – 5700	0
2901 – 3000	1	5701 – 5800	0
3001 – 3100	3	5801 – 5900	0
3101 – 3200	2	5901 – 6000	0
3201 – 3300	4	6001 – 6100	0
3301 – 3400	3	6101 – 6200	0
3401 – 3500	5	6201 – 6300	0
3501 – 3600	1	6301 – 6400	0
3601 – 3700	2	6401 – 6500	0
3701 – 3800	2	6501 – 6600	0
3801 – 3900	5	6601 – 6700	0
3901 – 4000	0	6701 – 6800	0
4001 – 4100	1	6801 – 6900	0
4101 – 4200	1	6901 – 7000	0
4201 – 4300	1	7001 – 7100	0
4301 – 4400	1	7101 – 7200	0
4401 – 4500	2	7201 – 7300	0
4501 – 4600	1	7301 – 7400	0
4601 – 4700	0	7401 – 7500	1

(Data available for 47 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(COOCH BEHAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum Ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	23.6	9.2	29.6	1982 Jan 28	3.3	1964 Jan 31	85	68
February	25.7	11.3	31.5	1966 Feb 28	3.6	1983 Feb 04	77	58
March	30.0	15.5	37.6	1992 Mar 31	7.1	1979 Mar 11	65	50
April	31.5	19.9	39.4	1954 Apr 29 1989 Apr 23	10.1	1988 Apr 16	70	60
May	30.9	21.9	39.9	1960 May 09	16.1	1968 May 14	81	72
June	31.4	23.9	40.3	1997 Jun 06	18.2	1981 Jun 07	86	79
July	31.1	24.5	38.9	1972 Jul 05	20.3	1984 Jul 12	89	82
August	31.9	24.8	38.0	1985 Aug 25	20.0	1991 Aug 16	86	80
September	31.0	23.8	41.0	1977 Sep 11	19.7	1984 Sep 18	87	83
October	30.5	20.8	36.1	1952 Oct 24	13.9	1991 Oct 28	80	78
November	28.5	15.2	33.0	1995 Nov 03	8.2	1991 Nov 26	74	73
December	25.2	10.6	29.9	1998 Dec 02	3.9	1991 Dec 30	80	71
Annual	29.3	18.5					80	71

TABLE – 4

Mean Wind Speed in km/hr.
(COOCH BEHAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.3	3.2	4.7	6.9	6.5	5.0	4.2	3.7	3.5	3.6	2.3	1.8	4.0

TABLE - 5
Special Weather Phenomena
(COOCH BEHAR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.8	2.2	7.4	11.9	10.2	8.1	7.5	9.5	2.3	0.3	0.3	60.7
Hail	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Dust storm	0.0	0,0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Squall	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.6
Fog	10.2	3.3	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.8	4.8	20.3

DARJEELING DISTRICT

The climate of the different parts of the district is largely influenced by the elevations which range from 300 meters in the terrain region which forms the southern portion of the district to 3600 meters in the region of ridges and deep valleys of the lower Himalayas in the northern part of the district. In the terrain and the lower valleys, the climate is similar to that of the adjoining districts in the plains of West Bengal and Bihar. The northern region with higher elevation enjoys a cool and bracing climate. The summer season is from March to May. Thereafter, southwest monsoon commences and lasts till about the beginning of October. October and the first half of November constitute the post-monsoon season. The period from mid-November to the end of February is the winter season.

Rainfall

Records of rainfall are available for 14 raingauge stations well distributed over the district for the period ranging from 12 to 104 years. The details of the rainfall at these stations are given in Table 1. On account of the hilly nature of the terrain, there are sharp contrasts in the amount of rainfall even between nearby stations. The rainfall is in general heavier in the southern terrain region and the ridges and slopes near the plains. On the southern slopes of the lower Himalayas (Kurseong) gets an annual rainfall of 4105.4 mm while Kalimpong observatory gets an average rainfall of 2286.6 mm. The rainfall during the southwest monsoon season constitutes about 80% of the annual rainfall. Thunderstorm rain occurs in summer and in October.

On an average there are 120 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The number of rainy days varies from 90 at Kalimpong observatory to 152 at Phalut (Hydro).

The heaviest rainfall in 24 hours ever recorded at any station in the district is 546.1 mm at Mongpoo on 12 June 1950.

Temperature

There are meteorological observatories at Darjeeling and Kalimpong in the district. The data of temperature and other meteorological elements at these observatories are available for long period of years, represent the climatic conditions in the northern hilly regions with higher elevations of the district, while in the terrain and lower valleys, the climate is similar to that of adjoining districts in plains of the Bengal and Bihar. The heat in summer in the plains and valleys is as oppressive as in other Sub-Himalayan districts of West Bengal. But, at a higher elevated portions of the district, even summer is very pleasant. In the plains, the period from March to May is one of the increasing temperatures. The mean daily maximum temperature is the highest in April in the plains and is about 32^0C, but the night temperatures are higher in the southwest monsoon season than in the summer season.

In the hilly portion of the district both day and night temperatures are higher in the monsoon season than in summer. After the withdrawal of the southwest monsoon both day and night temperatures begin to decrease throughout the district, the decrease being more rapid from November. January is the coldest month when the mean daily maximum and mean daily minimum temperatures are about 24^0C and 8-9^0C respectively in the plains whereas at higher elevation say at a station like Darjeeling the mean daily maximum temperature in January is 9.9^0C and mean daily minimum temperature is 1.2^0C. Frosts are fairly common throughout the cold season in the northern hilly parts of the district. In association with the passage of western disturbances cold waves affect the district during the period November to early March and the minimum temperatures may go down to a degree below the freezing point of water at places like Kalimpong and 6 to 7^0C below the freezing point of water at Darjeeling.

The highest maximum temperature ever recorded at Darjeeling was 28.5^0C on 21st August 1970 while at Kalimpong it was 34.1^0C on 17th July 1987. The lowest minimum temperature ever recorded at Darjeeling and Kalimpong were -7.2^0C on 30th January 1971 and -0.6^0C on 27th December 1922 respectively.

Humidity

In the northern hilly part of the district, the atmosphere is highly humid throughout the year and values of relative humidity are between 90 and 95 percent in the southwest monsoon season. In the southern low lying tracts relative humidity is slightly less about 80%.

Cloudiness

During the southwest monsoon season the skies are heavily clouded or overcast. In the rest of the year skies are lightly to moderately clouded. Cloudiness increases in May. In the winter season skies get obscured in the mornings on many days due to lifted fog in the hilly region.

Winds

In the northern hilly parts of the district, orography influences the speed and directions of surface winds to a large extent. At Darjeeling winds are light and variable in directions, while at Kalimpong wind speed is slightly more than that at Darjeeling and directions are mostly northwesterly in the mornings and southeasterly in the afternoons. In the lower plains winds are light and variable in the post monsoon and cold seasons. In the summer and southwest monsoon seasons winds blow mostly from east direction.

Special Weather Phenomena

Some cyclonic storms and depressions which originate in the Bay of Bengal in the post-monsoon season and in May, move in a northerly direction and affect the district causing widespread heavy rain. Thunderstorms are accompanied occasionally with hail or dust storm in the summer season. Rain in the southwest monsoon season is also sometimes associated with thunder. Fog and mists occur in the winter months.

Tables 2, 3, 4 and 2(a), 3(a), 4(a) give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Darjeeling and Kalimpong observatories.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bagdogra	20	a	16.6	5.1	32.2	61.0	238.3	614.1	841.2	691.0	456.4	153.4	6.7	1.2	3117.2	129	77	345.2	05 Oct 1968
Aero (Obsy)		b	1.4	0.7	2.5	4.1	10.8	19.7	22.3	22.3	15.1	5.6	0.7	0.2	105.4	(1952)	(1953)		
Bagrokote	19	a	10.4	14.4	44.6	151.2	381.4	823.8	959.0	739.2	589.5	174.9	37.5	14.0	3939.9	136	76	374.0	12 Jul 1996
(Hydro)		b	1.1	1.1	3.4	7.4	14.2	20.9	25.2	21.9	17.8	7.1	1.7	0.9	122.7	(1991)	(1994)		
Bijanbari	21	a	5.2	14.0	26.3	85.8	148.2	367.8	517.6	428.3	316.4	120.8	10.4	4.0	2044.8	169	33	240.0	13 Oct 1973
(Hydro)		b	0.5	1.2	1.9	6.5	10.4	15.7	22.5	20.2	14.4	4.2	0.8	0.5	98.8	(1999)	(1980)		
Champasari	12	a	22.6	18.1	51.5	83.2	268.0	791.2	1022.3	767.9	616.4	214.2	23.6	10.5	3889.5	143	57	373.0	10 Sep 1991
(Hydro)		b	1.3	1.6	2.9	5/2	12.2	20.2	22.7	20.2	17.3	7.3	1.3	1.1	113.3	(1998)	(1994)		
Darjeeling	47	a	24.2	14.1	44.4	78.0	166.0	492.5	784.5	533.3	413.3	94.7	14.2	3.0	2662.2	158	77	504.4	31 Jul 1995
(Obsy)		b	1.5	1.6	3.7	6.7	12.0	19.9	25.5	22.9	16.3	5.0	1.2	0.4	116.7	(1995)	(1994)		
Jhepi	13	a	6.4	22.9	24.4	111.2	179.3	451.3	849.2	466.7	450.6	195.9	6.3	14.1	2778.3	141	67	231.4	13 Oct 1973
(Hydro)		b	0.8	1.5	1.8	8.4	14.8	21.0	27.1	22.9	18.0	6.9	0.8	0.7	124.7	(1977)	(1972)		
Kalimpong	47	a	17.8	15.7	33.2	75.7	136.5	381.7	663.9	472.0	374.4	105.1	6.8	3.8	2286.6	145	80	419.2	05 Oct 1968
(Obsy)		b	1.2	1.3	2.6	4.9	9.4	15.6	21.0	17.6	12.0	3.2	0.6	0.4	89.8	(1993)	(1958)		
Kurseong	17	a	17.0	18.7	79.4	88.2	224.0	742.7	1138.4	966.2	707.6	109.3	12.4	1.5	4105.4	173	68	501.7	11 Jun 1950
		b	1.6	1.6	3.2	4.6	1.1	20.9	26.3	25.4	20.1	5.8	0.8	0.2	121.6	(1952)	(1957)		

Contd….2

TABLE - I (contd…)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Mongpoo	21	a	23.8	10.8	67.4	116.3	233.8	640.5	861.1	606.7	428.4	130.8	12.5	2.9	3135.0	118	81	546.1	12 Jun 1950
		b	1.5	1.0	4.1	7.4	13.8	21.2	24.4	21.7	14.8	4.3	1.0	0.4	115.6	(1968)	(1957)		
Pedong	13	a	21.3	26.1	56.1	88.2	214.4	397.1	629.4	520.7	356.0	118.1	21.7	2.0	2451.1	110	88	239.4	19 Jun 1896
		b	2.0	2.6	5.3	7.2	14.8	21.2	25.8	26.5	16.8	4.9	1.8	0.2	129.1	(1963)	(1959)		
Phalut (Hydro)	32	a	103.6	74.1	97.4	233.2	477.9	735.6	867.5	934.0	725.7	161.5	30.3	24.6	4465.4	202	41	301.0	09 Sep 1973
		b	3.1	3.3	5.1	10.8	19.3	25.0	26.7	24.5	21.3	8.8	2.5	1.3	151.7	(1968)	(1961)		
Sandakphu (Hydro)	27	a	68.4	45.5	89.0	220.0	344.5	638.8	926.7	785.8	544.9	116.1	23.9	9.5	3813.1	165	62	310.0	07 Aug 1962
		b	2.3	2.1	4.4	9.0	15.8	23.0	27.4	25.9	19.5	5.4	1.8	0.7	137.3	(1972)	(1958)		
Siliguri (Hydro)	12	a	22.5	17.0	24.8	114.9	294.6	677.4	922.0	716.1	451.5	242.6	11.1	6.2	3500.7	133	94	378.0	20 Jul 1993
		b	1.0	1.0	2.1	6.5	12.6	18.9	23.2	18.1	15.9	8.9	1.1	0.9	110.2	(1974)	(1976)		
Tanglu (Hydro)	22	a	40.8	33.7	84.9	165.3	408.7	646.3	969.1	909.6	536.6	123.5	15.9	7.5	3941.9	189	59	305.6	12 Jul 1964
		b	2.3	2.6	4.9	9.7	19.3	23.0	27.5	27.0	20.0	6.2	1.4	0.7	144.6	(1957)	(1956)		

a: Normal rainfall in mm.

b: Average number of rainy days (days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000.

** Years of occurrence given in brackets.

Hill stations not considered for subdivisional mean.

TABLE – 2

Normals of Temperature and Relative Humidity
(DARJEELING)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest ever Maximum recorded		Lowest ever Minimum recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	9.9	1.2	18.9	1952 Jan 20	-7.2	1971 Jan 30	81	84
February	11.7	2.5	18.3	1969 Feb 28	-6.4	1971 Feb 02	80	82
March	15.5	6.0	25.0	1986 Mar 21	-4.8	1971 Mar 01	70	72
April	18.1	8.9	27.0	1991 Apr 26	0.0	1971 Apr 16	77	79
May	18.8	10.5	25.7	1964 May 30	3.2	1969 May 01	87	89
June	20.1	13.0	25.6	1979 Jun 02	6.6	1970 Jun 06	92	92
July	20.0	13.4	28.0	1988 Jul 22	3.9	1944 Jul 26	95	95
August	20.5	13.1	28.5	1970 Aug 21	8.0	1975 Aug 21	91	92
September	20.2	11.9	27.5	1973 Sep 03	6.2	1972 Sep 27	91	92
October	19.9	9.9	26.0	1985 Oct 03	3.2	1972 Oct 31	83	87
November	16.9	6.0	24.5	1988 Nov 01	-4.4	1970 Nov 26	72	79
December	13.1	3.4	20.0	1947 Dec 14 1988 Dec 04	-4.6	1970 Dec 29	73	78
Annual	17.1	8.3					83	85

TABLE – 3

Mean Wind Speed in km/hr.
(DARJEELING)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.2	2.9	3.8	4.6	3.9	3.1	2.8	2.7	2.4	2.0	1.8	1.8	2.8

TABLE – 4

Special Weather Phenomena
(DARJEELING)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.1	0.5	0.9	1.0	0.4	0.1	0.3	0.0	0.0	0.1	0.1	3.7
Hail	0.1	0.0	0.1	0.1	0.4	0.2	1.8	0.0	0.1	0.0	0.0	0.0	2.8
Dust storm	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Fog	4.8	3.5	0.5	2.6	7.2	10.6	14.2	10.1	6.3	2.6	2.2	1.2	65.8

TABLE – 2(a)

Normals of Temperature and Relative Humidity
(KALIMPONG)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	21.2	8.7	31.0	1981 Jan 24	0.4	1970 Jan 21	77	78
February	20.9	9.6	29.9	1988 Feb 16	1.2	1970 Feb 01	78	77
March	22.1	10.9	30.9	1988 Mar 30	3.8	1965 Mar 02	79	79
April	23.8	12.2	31.4	1988 Apr 30	6.4	1991 Apr 21	76	76
May	24.8	12.9	33.1	1987 May 31	4.4	1991 May 09	78	78
June	25.6	13.5	33.6	1987 Jun 12	4.6	1991 Jun 14	78	77
July	26.2	14.5	34.1	1987 Jul 17	6.4	1991 Jul 11	77	77
August	26.0	14.7	30.9	1957 Aug 23	7.4	1971 Aug 24	76	77
September	26.3	15.7	30.3	1974 Sep 07	5.9	1991 Sep 10	77	80
October	25.5	14.7	31.1	1960 Oct 20	6.0	1971 Oct 25	79	81
November	24.6	12.4	30.1	1986 Nov 16	3.9	1962 Nov 28	81	81
December	22.8	9.7	29.9	1986 Dec 09	- 0.6	1922 Dec 27	80	80
Annual	24.1	12.5					78	78

TABLE – 3(a)

Mean Wind Speed in km/hr.
(KALIMPONG)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.5	5.1	6.7	6.8	6.6	5.8	5.2	5.6	5.4	5.2	5.2	5.4	5.7

TABLE – 4(a)

Special Weather Phenomena
(KALIMPONG)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.1	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	1.5

JALPAIGURI DISTRICT

The climate of this district is similar to that of districts in the plains to the south, but owing to its proximity to the hills, the rainfall is much heavier and the temperature is seldom excessive. The winter season is from mid-November to the end of February. This is followed by summer season from March to May. The period from June to September is the southwest monsoon season. October to mid-November constitute the post monsoon season.

Rainfall

Records of rainfall are available for 17 raingauge stations for periods ranging from 12 to 132 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 3714.1 mm. The southwest monsoon arrives over the district by first week of June and withdraws by about the first week of October. About 79% of the annual rainfall is received during southwest monsoon months i.e. June to September. The rainfall generally increases from the southwest to the northeast direction in the district in the latter half of summer season and in October the district gets some rainfall mostly as thundershowers. July is generally the rainiest month when the rainfall amounts to about one fourth of the annual total. During fifty years period from 1951-2000, the highest annual rainfall in the district amounting to 182% of the normal occurred in 1984, while 1994 was the year with lowest annual rainfall which was 65% of the normal. There are six years in which annual rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that in 32 years out of 49 years, the annual rainfall was between 2901 and 4200 mm.

On an average there are 109 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 83 at Falakata to 124 at Chengamari/Diana Hydro.

The heaviest rainfall in 24 hours recorded at any station in the district is 805.3 mm at Nagarkata (Hydro) on 6 August, 1990.

Temperature

There is one meteorological observatory in the district at Jalpaiguri and the records of this station may be taken as representative for the meteorological conditions in the district. The cold season commences by the middle of November when temperatures begin to drop. January is the coldest month with the mean daily minimum temperature at 9.9^0C and the mean daily maximum temperature at about 24.3^0C. In association with cold spells in the wake of passing of western disturbances moving eastwards, during January and February, night temperatures may drop to a couple of degrees above the freezing point of water and frosts may occur. The temperatures begin to rise by about the beginning of March. April is the hottest month with the mean daily maximum temperature at 32.0^0C. The maximum temperature in summer may sometimes reach 40^0C or above. Even in the southwest monsoon day temperatures continue to be as in summer and the night temperatures are higher than those in summer season. With the withdrawal of the southwest monsoon in October, both day and night temperatures decrease and the weather gradually become cooler.

The highest maximum temperature ever recorded at Jalpaiguri was 40.4^0C on 20th May 1987. The lowest minimum temperature was 2.2^0C on 3rd February 1905.

Humidity

The atmosphere is highly humid throughout the year. During the period February to April, the values of relative humidity in the afternoon are comparatively lower being only between 52 and 63%.

Cloudiness

In the monsoon season skies are heavily clouded or overcast. During the period October to April, skies are generally clear or lightly clouded. Cloudiness increases in May.

Winds

The winds are generally light with some strengthening in force in premonsoon season. During winter and post monsoon months, winds blow from north direction. In the pre monsoon and southwest monsoon season winds blow from easterly direction.

Special Weather Phenomena

Some of the cyclonic storms and depressions originate in the Bay of Bengal in the southwest monsoon and post monsoon season and move in a northerly direction and affect the district causing widespread heavy rain. Thunderstorms occur all the year round being least frequent in the winter. Thunderstorms during the months of April and May are occasionally associated with squall and hail. These thunderstorms are similar to the Norwesters of South Bengal and are sometimes violent. Fog occurs in the winter months.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Jalpaiguri observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Alipurdwar	22	a	8.4	17.7	34.6	139.0	337.7	733.6	1024.7	820.0	507.2	155.0	14.6	5.7	3798.2	132	71	414.0	28 Jul 1979
(Hydro)		b	0.6	1.3	2.2	8.2	13.8	18.7	21.4	17.7	14.7	6.1	1.1	0.6	106.4	(1988)	(1994)		
Buxa	17	a	47.7	28.0	87.4	210.3	652.8	1115.4	1282.9	852.4	704.6	234.5	39.1	16.1	5271.2	147	64	538.5	08 Jun 1921
		b	2.1	1.1	3.6	6.8	17.4	22.4	22.6	19.3	16.4	7.3	1.4	1.7	122.1	(1954)	(1957)		
Buxadur	17	a	21.9	33.4	63.8	177.1	397.4	940.1	1021.3	999.1	711.1	212.7	28.7	10.4	4617.0	158	87	400.3	26 Jul 1989
(Hydro)		b	1.6	2.7	3.0	8.5	15.0	19.6	22.5	19.3	19.0	7.3	1.7	0.9	121.1	(1990)	(1978)		
Chel	10	a	4.6	19.6	54.5	142.0	282.7	618.0	980.8	525.9	588.7	191.2	24.2	16.4	3448.6	115	87	279.0	31 Aug 1986
(Hydro)		b	0.7	1.4	3.7	8.1	12.2	18.7	24.8	17.6	17.3	7.1	2.1	0.6	114.3	(1985)	(1982)		
Chengamari/	20	a	15.5	88.5	49.5	220.7	353.2	814.5	916.3	691.5	532.4	174.9	29.6	14.4	3901.0	139	81	660.0	14 Feb 1990
Diana Hydro		b	1.1	2.1	2.9	8.9	14.4	20.2	24.2	21.4	17.7	8.1	1.7	1.0	123.7	(1998)	(1978)		
Damohani	22	a	8.9	14.3	38.1	108.4	283.4	567.0	896.9	663.6	443.1	163.0	12.2	10.7	3209.6	135	68	347.2	10 Jul 1999
(Hydro)		b	0.6	1.3	2.4	6.3	11.8	18.0	22.1	17.9	14.3	5.7	0.7	0.8	101.9	(1998)	(1997)		
Falakata	13	a	15.8	5.7	29.0	85.8	287.4	581.6	636.5	551.9	298.9	106.7	5.4	1.0	2605.7	129	75	383.3	04 Sep 1887
		b	0.6	0.3	1.3	4.1	12.8	17.3	16.6	15.4	9.8	3.8	0.3	0.3	82.6	(1958)	(1963)		
Falakata	24	a	7.0	12.6	35.1	98.4	305.7	549.7	920.5	656.9	432.2	132.9	12.9	6.6	3170.5	174	54	350.0	20 Jul 1993
(Hydro)		b	0.5	0.8	2.1	5.7	12.3	15.3	19.7	16.0	12.7	4.2	0.7	0.4	90.4	(1991)	(1982)		
Hasimara	22	a	8.6	27.7	48.5	141.7	378.4	777.6	1036.3	714.0	509.4	165.1	16.8	5.0	3829.1	139	74	790.6	21 Jul 1993
(Hydro)		b	1.0	2.2	3.1	8.4	14.6	20.5	23.0	19.0	15.9	6.2	1.1	0.6	115.6	(1998)	(1994)		

Contd 2….

TABLE - I Contd…..
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Hasimara (Aero Obsy)	24	a	12.9	27.7	47.1	176.4	391.7	738.0	1104.7	753.8	691.8	175.9	22.0	8.9	4150.9	163	74	474.1	17 Sep 1984
		b	0.9	2.2	2.8	8.5	14.7	19.5	23.4	19.3	16.2	5.3	1.3	0.6	114.7	(1984)	(1969)		
Jalpaiguri (Obsy)	49	a	10.6	12.6	33.5	109.4	306.0	618.6	873.3	661.7	505.5	152.6	7.6	2.8	3294.2	146	72	474.0	10 Jul 1999
		b	1.0	1.1	2.2	5.6	12.5	18.6	21.6	18.6	14.4	5.6	0.7	0.4	102.3	(1998)	(1994)		
Kalchini	16	a	14.3	13.5	49.1	153.5	442.6	821.1	1151.0	853.4	528.3	175.0	9.9	5.9	4217.6	127	77	354.1	20 Jul 1993
		b	1.3	1.3	3.5	7.4	16.1	20.0	23.1	20.4	14.1	7.6	0.9	0.6	116.3	(1954)	(1953)		
Kumargram (Hydro)	24	a	4.9	24.8	37.6	180.7	474.4	882.5	1072.7	741.4	551.8	155.6	13.8	3.1	4143.3	157	61	657.5	21 Jul 1993
		b	0.4	1.6	2.3	8.2	15.1	18.4	20.4	16.4	13.6	5.9	0.6	0.3	103.2	(1998)	(1980)		
Murti (Hydro)	15	a	1.5	21.8	56.1	141.7	266.0	598.2	929.6	592.4	545.1	190.6	21.4	16.3	3380.7	150	78	294.4	10 Jul 1999
		b	0.1	1.6	3.3	7.7	12.2	18.7	24.7	18.6	16.9	6.6	1.8	1.2	113.4	(1998)	(1982)		
Nagarkata (Hydro)	20	a	9.4	20.2	43.1	120.2	345.6	881.0	825.5	683.2	501.5	156.3	25.1	12.1	3623.2	205	79	805.3	06 Aug 1990
		b	0.8	1.6	2.8	8.4	14.3	19.9	24.5	19.9	17.4	6.6	1.8	1.0	119.0	(1995)	(1997)		
Neora (Hydro)	23	a	12.4	27.4	51.3	133.9	399.6	751.3	904.8	662.5	532.4	189.1	36.1	10.1	3710.9	153	62	802.4	26 May 1990
		b	0.9	2.3	3.2	7.3	13.8	19.1	23.7	20.4	16.5	7.5	2.0	0.8	117.5	(1990)	(1994)		
NH31 Bridge (Hydro)	21	a	7.1	20.0	29.7	90.1	268.2	478.5	788.6	522.0	413.5	137.3	10.3	4.4	2769.7	167	53	303.4	20 Jul 1993
		b	0.6	1.7	1.8	5.5	11.2	15.8	20.7	16.0	12.8	5.3	0.6	0.5	92.5	(1991)	(1980)		
Jalpaiguri (District)		a	12.4	24.4	46.4	142.9	363.1	733.3	962.7	702.7	529.3	168.7	19.4	8.8	3714.1	182	65		
		b	0.9	1.6	2.7	7.3	13.8	18.9	22.3	18.4	15.3	6.2	1.2	0.7	109.3	(1984)	(1994)		

a: Normal rainfall in mm.
b: Average number of rainy days (days with rainfall of 2.5 mm or more)
* Based on all available data up to 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(JALPAIGURI)

Range in mm	No. of years	Range in mm	No. of years
2401 – 2500	1	4601 – 4700	0
2501 – 2600	1	4701 – 4800	0
2601 – 2700	0	4801 – 4900	2
2701 – 2800	1	4901 – 5000	0
2801 – 2900	1	5001 – 5100	3
2901 – 3000	3	5101 – 5200	0
3001 – 3100	2	5201 – 5300	0
3101 – 3200	3	5301 – 5400	0
3201 – 3300	2	5401 – 5500	1
3301 – 3400	2	5501 – 5600	0
3401 – 3500	2	5601 – 5700	0
3501 – 3600	4	5701 – 5800	1
3601 – 3700	3	5801 – 5900	0
3701 – 3800	2	5901 – 6000	0
3801 – 3900	1	6001 – 6100	0
3901 – 4000	3	6100 – 6200	0
4001 – 4100	3	6201 – 6300	0
4101 – 4200	2	6301 – 6400	0
4201 – 4300	1	6401 – 6500	1
4301 – 4400	0	6501 – 6600	0
4401 – 4500	1	6601 – 6700	0
4501 – 4600	2	6701 – 6800	1

(Data available for 49 years only)

TABLE – 3

Normals of Temperature and Relative Humidity (JALPAIGURI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum Ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	24.3	9.9	29.4	1988 Jan 30	4.0	1964 Jan 30	87	67
February	26.4	11.7	32.9	1987 Feb 25	2.2	1905 Feb 03	79	58
March	30.5	15.3	37.4	1989 Mar 13	7.8	1906 Mar 01	66	52
April	32.0	19.9	40.0	1932 Apr 11	10.3	1978 Apr 05	71	63
May	31.8	21.9	40.4	1987 May 20	15.4	1987 May 31	78	72
June	32.1	23.7	39.4	1981 Jun 17	16.5	1987 Jun 13	85	79
July	31.5	24.2	38.4	1987 Jul 31	16.4	1986 Jul 12	88	81
August	32.2	24.5	38.4	1987 Aug 30	18.1	1987 Aug 14	86	80
September	31.5	23.6	38.5	1987 Sep 04	17.7	1999 Sep 15	86	81
October	31.6	21.3	38.4	1987 Oct 30	15.4	1986 Oct 16	81	76
November	29.3	16.4	35.1	1987 Nov 08	9.4	1914 Nov 25 1926 Nov -	77	71
December	26.3	12.2	32.4	1988 Dec 02	5.6	1918 Dec 18	83	70
Annual	30.0	18.7					81	71

TABLE – 4

Mean Wind Speed in km/hr. (JALPAIGURI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.6	4.8	6.4	8.6	9.0	7.6	6.7	5.9	5.5	4.4	3.6	3.3	5.8

TABLE – 5

Special Weather Phenomena (JALPAIGURI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.3	1.0	3.6	5.0	2.6	2.3	3.0	2.7	1.0	0.2	0.0	21.8
Hail	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	2.7	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	1.0	5.1

MALDA DISTRICT

The climate of this district is characterised by a hot and oppressive summer season, plentiful rains and moistness in the atmosphere throughout the year. The year may be divided into four seasons. The winter season commences by about the middle of November and continues till the end of February. The period from March to May is the summer season. The southwest monsoon season commences by about the first week of June and continues till the end of September. October and first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for one station, Malda for the period of 105 years. The details of the rainfall at this station and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1411.8 mm. The rainfall during the southwest monsoon season constitutes about 79% of the annual normal, July being the rainiest month. The variation in the rainfall from year to year is large. Considering the district as a whole, during the fifty year period 1951-2000 highest annual rainfall was 167% of the normal, which occurred in 1995, while 1979 was the year with the lowest annual rainfall which was 44% of the normal. There are 10 years in which annual rainfall was less than 80% of the normal and two of them were consecutive viz. 1966-1967. It is seen from Table 2 that in 23 years out of 42 years, the annual rainfall was between 901 and 1400 mm.

On an average there are 69 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district.

The heaviest rainfall in 24 hours ever recorded in the district was 567.5 mm at Malda (Obsy) on 28th September 1995.

Temperature

The only meteorological observatory in the district is at Malda. The records of this observatory may be taken as representative of the conditions in the district in general. From about the beginning of March temperatures begin to rise rapidly. Although the day temperatures reach a maximum in April, night temperatures continue to rise even in the monsoon season. In April, the mean daily maximum temperature is 36.8°C and the mean daily minimum temperature is 22.4°C. The heat during the summer is oppressive as the moisture in the air is high. With the arrival of the monsoon early in June the day temperatures decrease by one or two degrees, but the night temperatures continue to rise. On account of increased humidity and high night temperatures, oppressive weather is experienced even in the monsoon season, particularly in between the rains. With the withdrawal of the southwest monsoon by about the first week of October both day and night temperatures drop steadily. The cold season commences after the middle of November and the night temperatures drop more rapidly than the day temperatures. January is the coldest month with the mean daily maximum temperature at 24.8°C and the mean daily minimum temperature at 12.2°C. In the cold season, in association with passing western disturbances spells of cold weather are experienced and the minimum temperature may go down upto 4°C.

The highest maximum temperature ever recorded at Malda was 47.0°C on 5th June 1988 and the lowest minimum temperature ever recorded was 3.9°C on 3rd February 1905.

Humidity

Relative humidity is high throughout the year, but during the early part of the summer. They are comparatively less being about 58% to 60% in the mornings and 44% to 47% in the afternoons.

Cloudiness

Skies are moderately clouded in latter part of summer and heavily clouded to overcast in the southwest monsoon season. There is some moderate clouding in October. In the rest of the year skies are mainly clear or lightly clouded.

Winds

Winds are generally light with some increase in force in the late summer and monsoon season. In the latter part of summer and southwest monsoon season winds blow mostly from directions between south and east. In October winds are variable in direction. From November to January, they are from directions between north and northwest. In February and March, winds are from west/northwest.

Special Weather Phenomena

Storms and depressions from the Bay of Bengal in May and the post monsoon months often reach the district and its neighbourhood and cause widespread heavy rain and high winds. Depressions which originate at the head of the Bay of Bengal during the monsoon season also affect the district and heavy rains occur. In the hot weather months March to May, thunderstorms occur generally in the afternoons, accompanied often with heavy rain, hail and severe squalls coming usually from the northwest. These phenomena called Norwesters or locally as ‘Kalbaisakhi’ are often violent and cause sharp drop in temperature. Rainfall during the monsoon season is often associated with thunder. A few thunderstorms occur in October. Usually fog occurs in the cold season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Malda observatory.

TABLE - I

Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Malda	48	a	14.1	10.1	14.0	32.6	104.6	209.6	339.6	287.7	277.6	102.3	12.9	6.7	1411.8	167	44	567.5	28 Sep 1995
(Obsy)		b	1.0	1.2	1.1	2.5	5.5	10.2	15.6	14.0	11.6	4.6	0.7	0.6	68.6	(1995)	(1979)		
Malda		a	14.1	10.1	14.0	32.6	104.6	209.6	339.6	287.7	277.6	102.3	12.9	6.7	1411.8	167	44		
(District)		b	1.0	1.2	1.1	2.5	5.5	10.2	15.6	14.0	11.6	4.6	0.7	0.6	68.6	(1995)	(1979)		

a: Normal rainfall in mm.

b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)

* Based on all available data upto 2000.

** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(MALDA)

Range in mm	No. of years	Range in mm	No. of years
601 – 700	2	1501 – 1600	1
701 – 800	0	1601 – 1700	4
801 – 900	1	1701 – 1800	0
901 – 1000	3	1801 – 1900	3
1001 – 1100	4	1901 – 2000	1
1101 – 1200	3	2001 – 2100	0
1201 – 1300	5	2101 – 2200	2
1301 – 1400	8	2201 – 2300	2
1401 – 1500	2	2301 – 2400	1

(Data available for 42 years only)

TABLE – 3

Normals of Temperature and Relative Humidity
(MALDA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	24.8	12.2	32.5	1980 Jan 27	4.4	1937 Jan 16	72	60
February	28.1	14.6	37.8	1964 Feb 26	3.9	1905 Feb 03	66	52
March	33.4	18.6	41.7	1941 Mar 29	7.2	1898 Mar 05	58	44
April	36.8	22.4	44.1	1980 Apr 27	11.1	1953 Apr 03	60	47
May	35.8	24.1	45.0	1958 May 27	13.7	1979 May 02	66	56
June	34.6	25.8	47.0	1988 Jun 05	18.0	1986 Jun 26	73	67
July	32.6	25.9	38.7	1984 Jul 04	15.5	1988 Jul 05	78	74
August	32.8	26.1	40.0	1978 Aug 15	19.3	1986 Aug 24	78	73
September	32.8	25.6	40.9	1978 Sep 25	17.9	1979 Sep 30	77	74
October	32.1	23.4	40.5	1978 Oct 01	11.7	1979 Oct 29	73	69
November	29.9	18.5	34.4	1990 Nov 15	8.3	1934 Nov 30	69	63
December	26.5	13.8	34.0	1981 Dec 18	5.0	1896 Dec 21	`70	62
Annual	31.7	20.9					70	62

TABLE – 4

Mean Wind Speed in km/hr.
(MALDA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.5	4.0	4.8	6.2	6.9	6.4	6.0	5.7	5.1	3.5	2.9	3.3	4.9

TABLE - 5

Special Weather Phenomena
(MALDA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	1.0	1.7	3.0	5.0	6.8	8.0	6.9	8.0	3.0	0.2	0.1	44.0
Hail	0.0	0.0	0.1	0.1	0.3	0.2	0.5	0.2	0.3	0.0	0.0	0.0	1.7
Dust storm	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.3
Fog	3.8	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	3.5	9.7

NORTH DINAJPUR DISTRICT

The climate of this district is characterised by a hot summer, plentiful rains and a humid atmosphere practically throughout the year. The winter season is from the middle of November to the end of February. This is followed by the summer season from March to May. The southwest monsoon season is from June to September. October and the first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for one station Raiganj only, for period of 18 years, which is taken as representative of whole district. The details of rainfall at this station are given in Tables 1 and 2. The average annual rainfall in the district is 1710.9 mm. The rainfall during the southwest monsoon season, June to September constitutes about 78% of the annual rainfall, July being the rainiest month. The variation in the rainfall from year to year is large. Considering the district as a whole, in the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 216% of the normal occurred in 1999 while the lowest annual rainfall which was 52% of the normal occurred in 1975. In the same fifty years period, there were 2 years in which annual rainfall was less than 80% of the normal. It is seen from table 2 that the rainfall in the district was between 1201 mm and 1500 mm in 3 years out of 8 years.

On an average there are 72 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district.

The heaviest rainfall in 24 hours ever recorded in the district was 680.0 mm at Raiganj (Hydro) on 11th July 1999.

Temperature

As there is no meteorological observatory in the district, the description of climate which follows is based on the records of the observatories viz. Balurghat and Jalpaiguri in the neighbouring district South Dinajpur and Jalpaiguri respectively. The hot season commences by about the beginning of March, when temperature begins to rise rapidly. April and May constitute the hottest part of the year, when the mean daily maximum temperature is at about 33°C whereas the mean daily minimum temperature is at about 21°C. During April and May, on individual days, the maximum temperature may sometimes rise up to about 42°C.The weather is oppressive hot in these months due to high moisture content in the air. With the onset of the southwest monsoon early in June, day temperatures drop a little and remain steady upto September. However, night temperatures are somewhat more than those in the hot months and nights continue to be warm. By the beginning of October, the southwest monsoon withdraws and both day and night temperatures decrease progressively. This drop in temperature continues upto January. The winter season commences by about the middle of November, when the night temperatures drop more rapidly than the day temperatures. January is usually the coldest month with the mean daily minimum temperature at about 10°C and the mean daily maximum temperature at about 25°C. During the winter season, in association with passage of western disturbances across north India, short spells of cold weather occur and the minimum temperature may sometimes drop down upto about 5°C.

Humidity

Except in the afternoons during February to April, values of relative humidity are high throughout the year.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. In May and October skies are moderately clouded. In the rest of the year clear or lightly clouded skies prevail.

Winds

Winds are generally light throughout the year with some increase in speed in the latter part of the summer and southwest monsoon season. In the southwest monsoon season, winds blow mostly from southeast or easterly directions. In the post monsoon season winds are variable in direction. In the cold season they are from north to west. In the summer season south easterlies are also common.

Special Weather Phenomena

In May and post-monsoon season, storms and depressions from the Bay of Bengal approach the district and its neighbourhood and cause strong winds and widespread heavy rains. During the southwest monsoon season also, the district is affected by depressions, which form at the head of the Bay of Bengal and heavy rain occurs. Thunderstorms are common in hot season, mostly in the afternoons. In association with these, violent squalls and heavy rain sometimes accompanied with hail occur. These thunderstoms with squalls usually from the northwest direction are called “Norwesters” or locally known as “Kalbaisakhi”. Such phenomena is preceded by an oppressive heat followed by sharp drop in temperature. Sometimes rain in the southwest monsoon season is also associated with thunder and few thunderstorms occur in October. Occasional fog occurs in the cold season.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Raiganj	14	a	11.6	13.1	22.2	56.1	150.3	212.3	434.4	367.9	314.0	114.7	9.2	5.1	1710.9	216	52	680.0	11 Jul 1999
(Hydro)		b	0.8	0.9	1.3	3.5	7.5	10.0	16.5	14.3	11.0	4.8	0.9	0.4	71.9	(1999)	(1975)		
North Dinajpur		a	11.6	13.1	22.2	56.1	150.3	212.3	434.4	367.9	314.0	114.7	9.2	5.1	1710.9	145	52		
(District)		b	0.8	0.9	1.3	3.5	7.5	10.0	16.5	14.3	11.0	4.8	0.9	0.4	71.9	(1998)	(1975)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets.

TABLE – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(NORTH DINAJPUR)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	1	1701 – 1800	1
901 – 1000	0	1801 – 1900	0
1001 – 1100	0	1901 – 2000	1
1101 – 1200	0	2001 – 2100	0
1201 – 1300	1	2101 – 2200	0
1301 – 1400	1	2201 – 2300	0
1401 – 1500	1	2301 – 2400	0
1501 – 1600	0	2401 – 2500	1
1601 – 1700	1		

(Data available for 8 years only)

SOUTH DINAJPUR DISTRICT

The climate of this district is characterised by a hot summer, plentiful rains and humid atmosphere practically throughout the year. The winter/cold season is from the middle of November to the end of February. This is followed by the pre monsoon/hot season from March to May. The southwest monsoon season is from June to September. October and the first half of November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for three stations, for the periods ranging from 39 and 70 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1678.7 mm. The rainfall during the southwest monsoon season, June to September constitutes about 78% of the annual rainfall, July being the rainiest month. The variation in the rainfall from year to year is large. Considering the district as a whole, in the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 192% of the normal occurred in 1953 while the lowest annual rainfall which was 56% of the normal occurred in 1966. In the same fifty years period, there were 6 years in which annual rainfall was less than 80% of the normal, three of them being consecutive. It is seen from Table 2 that the rainfall in the district was between 1201 mm and 1700 mm in 14 years out of 23.

On an average there are 67 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 65 at Gangarampur to 72 at Balurghat observatory.

The heaviest rainfall in 24 hours ever recorded at any station in the district was 481.8 mm at Balurghat on 1st October 1937.

Temperature

There is a meterological observatory in the district at Balurghat. The records of this observatory may be taken as representative of the climatic conditions in the district, in general. The following description is based on the data recorded at this observatory. The hot season commences by about the beginning of March, when temperatures begin to rise rapidly. April and May constitute the hottest part of the year, when the mean daily maximum temperature is at about 34.6°C, whereas the mean daily minimum temperature is at about 21.9°C at Balurghat. During May and June, on individual days, the maximum temperature may sometimes rise up to about 43°C.The weather is oppressive hot in these months due to high moisture content in the air. With the onset of the southwest monsoon early in June, day temperatures drop a little and remain steady upto September. However, night temperatures are somewhat more than those in the hot months and nights continue to be warm. By the beginning of October, the monsoon withdraws and both day and night temperatures decrease progressively. This drop in temperature continues upto January. The winter season may be said to commence after the middle of November, when the night temperatures drop more rapidly than the day temperatures. January is usually the coldest month with the mean daily minimum temperature at about 10.6°C and the mean daily maximum temperature at about 25.0°C. During winter season, in association with passage of western disturbances across north India, short spells of cold weather occur and the minimum temperature may sometimes drop down upto about 5°C.

The highest maximum temperature ever recorded at Balurghat was 43.4°C on 2nd May 1966 and the lowest minimum temperature ever recorded was 4.1°C on 28th January 1964.

Humidity

The values of relative humidity are high throughout the year except in the afternoons of February to April.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. In May and October skies are moderately clouded. In the rest of the year clear or lightly clouded skies prevail.

Winds

Winds are generally light throughout the year with some increase in force in the latter part of the summer and southwest monsoon season. In the southwest monsoon season, winds blow mostly from southeast or east directions. In the post monsoon season winds are variable in direction. In the cold season they are from north to west. In the summer season, south easterlies are also common.

Special Weather Phenomena

In May and post-monsoon season, storms and depressions from the Bay of Bengal approach the district and its neighbourhood and cause strong winds and widespread heavy rains. During the southwest monsoon season also, the district is affected by depressions, which form at the head of the Bay of Bengal and heavy rain occurs. Thunderstorms are common in hot season mostly in the afternoons. In association with these, violent squalls and heavy rain sometimes accompanied with hail occur. These thunderstorms with squalls, usually from the northwest direction are called “Norwesters” or locally known as “Kalbaisakhi”. Such a phenomena is preceded by an oppressive heat, followed by a sharp drop in temperature. Sometimes rain in the southwest monsoon season is also associated with thunder and few thunderstorms occur in October. Occasional fog occurs in the cold season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Balurghat observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST / ANNUAL RAINFALL AS % OF NORMAL & YEARS **	LOWEST / ANNUAL RAINFALL AS % OF NORMAL & YEARS **	HEAVIEST RAINFALL in 24 HOURS * Amount (mm)	HEAVIEST RAINFALL in 24 HOURS * Date
Balurghat	15	a	28.7	8.2	30.3	45.7	154.6	419.4	486.8	355.3	362.3	107.3	5.8	0.0	2004.4	168	32	481.8	01 Oct 1937
		b	1.3	0.6	1.7	1.6	5.2	12.1	15.0	12.4	11.0	3.6	0.4	0.0	64.9	(1952)	(1966)		
Balurghat (Obsy)	38	a	8.6	15.0	21.1	57.9	177.4	301.3	370.6	253.9	277.2	127.5	11.3	4.9	1626.7	152	65	275.2	04 Oct 1984
		b	0.7	0.8	1.4	3.2	8.2	12.7	14.8	12.2	11.8	5.2	0.6	0.4	72.0	(1991)	(1972)		
Gangarampur	16	a	20.1	4.4	18.4	38.5	98.4	278.3	325.2	275.0	227.9	111.7	6.5	0.5	1404.9	154	76	344.4	26 Aug 1918
		b	1.1	0.5	1.4	2.2	5.0	11.8	14.3	12.3	10.5	4.7	0.5	0.2	64.5	(1956)	(1960)		
South Dinajpur (District)		a	19.1	9.2	23.3	47.4	143.5	333.0	394.2	294.7	289.1	115.5	7.9	1.8	1678.7	192	56		
		b	1.0	0.6	1.5	2.3	6.1	12.2	14.7	12.3	11.1	4.5	0.5	0.2	67.0	(1953)	(1966)		

a: Normal rainfall in mm.
b: Average number of rainy days (i.e days with rainfall of 2.5 mm or more)
* Based on all available data upto 2000.
** Years of occurrence given in brackets

Table – 2

Frequency of Annual Rainfall in the District
(Data 1951 - 2000)
(SOUTH DINAJPUR)

Range in mm	No. of years	Range in mm	No. of years
901 – 1000	1	2101 – 2200	0
1001 – 1100	1	2201 – 2300	0
1101 – 1200	1	2301 – 2400	1
1201 – 1300	2	2401 – 2500	0
1301 – 1400	4	2501 – 2600	1
1401 – 1500	2	2601 – 2700	1
1501 – 1600	4	2701 – 2800	0
1601 – 1700	2	2801 – 2900	0
1701 – 1800	1	2901 – 3000	0
1801 – 1900	0	3001 – 3100	0
1901 – 2000	0	3101 – 3200	0
2001 - 2100	1	3201 – 3300	1

(Data available for 23 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(BALURGHAT)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest ever Maximum recorded		Lowest ever Minimum recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.0	10.6	32.0	1982 Jan 29	4.1	1964 Jan 28	74	68
February	27.4	12.9	34.3	1964 Feb 23	6.2	1968 Feb 05	67	59
March	32.3	17.3	39.1	1966 Mar 30	9.7	1965 Mar 02	63	54
April	35.1	21.0	42.2	1961 Apr 24	12.4	1968 Apr 01	68	61
May	34.1	22.7	43.4	1966 May 02	14.8	1974 May 13	76	71
June	33.7	24.5	43.0	1979 Jun 07	14.8	1971 Jun 27	80	76
July	32.9	25.2	39.0	1985 Jul 26	12.8	1981 Jul 19	82	80
August	33.2	25.6	38.0	1990 Aug 20	16.8	1971 Aug 31	82	80
September	32.7	25.2	38.5	1989 Sep 18	14.3	1990 Sep 04	83	82
October	31.7	23.2	38.0	1987 Oct 07	12.2	1971 Oct 29	82	82
November	29.5	17.8	35.0	1990 Nov 12	7.3	1962 Nov 26	75	75
December	26.5	12.2	33.0	1966 Dec 08	4.7	1961 Dec 31	75	72
Annual	31.2	19.9					76	72

TABLE – 4

Mean Wind Speed in km/hr.
(BALURGHAT)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.5	3.0	4.6	6.3	7.1	7.4	6.5	6.2	5.0	3.2	2.4	2.4	4.7

TABLE – 5

Special Weather Phenomena
(BALURGHAT)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.3	1.5	3.0	6.8	6.2	5.7	3.6	5.0	1.6	0.2	0.1	34.1
Hail	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2