

CLIMATOLOGICAL INFORMATION FOR NATIONAL DEVELOPMENT

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1 *Climatological Information*

Climate is an invaluable natural resource. It has numerous applications to every human activity. Design and operation of any project require climatological information. Industry demands climatological specialisation for siting, lay outs, air-conditioning, heat and light etc., while agricultural and irrigation projects require varied forms of climatological statistics for their working. Civil aviation, multipurpose hydel projects also cannot do without climatological data. Competitive maritime commerce calls for information of average weather conditions over the neighbouring seas for safe and optimum routing. Microwave towers, port installations, telecommunications, powerline projects and tall structures require information regarding maximum wind pressure at their sites to allow for safe weather tolerance.

Climatological summaries become extremely valuable and decisive for strategic and tactical planning during emergency and war. Further, by reference to climatological statistics, many controversial questions regarding the occurrence of extreme weather elements, claims about climatological changes or trends etc. can be subjected to critical examination.

2 *Climatological Records and Data in India*

Hence, one of the important functions of any meteorological service is the preservation of long period climatological records of weather archives and preparation of climatological statistics. India Meteorological Department has preserved the climatological records not only for periods after 1875 when it came into existence, but also those of earlier periods. The oldest observatory at Madras was established in 1792. It started recording meteorological observations in 1793 and these are the earliest climatological records which have been preserved at Kodaikanal Observatory. Meteorological records since 1841 have been preserved at Colaba (Bombay), the second oldest observatory in India, while records of other very old observatories have also been published and preserved for varying periods. At present the office of the Deputy Director General of Observatories (Climatology & Geophysics), Poona, is the repository of all the climatological data of the department. It is the National Data Centre for weather data in India. It has an IBM 1620 computer, Hollerith tabulator, sorter,

reproducer and a number of punchers and verifiers. The CDC 3600 computer at TIFR Bombay also is being made use of for processing climatological data.

The primary responsibility for collecting the surface observational records from the departmental observatories in various States is vested with the Regional Centres at Delhi, Calcutta, Bombay, Madras and Nagpur, and the Meteorological Centres at some of the State Capitals. Observations recorded at each of the observatories are entered in standard meteorological registers. After scrutiny, the data are being transferred to punched cards and sent to Poona where climatological summaries are prepared. The upper air data are sent by the observatories direct to Poona where before punching manual method of horizontal and vertical consistency checks are applied to ensure the space and time consistency of the data. The daily and monthly upper air data are published separately in monthly volume by offset printing computer outputs. The data of autographic instruments of observatories are sent to the concerned RCs/MCs where they are scrutinised and then sent to Poona where mean monthly tables are published.

3 *Varieties of Data*

The following types of data are being collected and archived at Poona:-

31 *Surface*

Consisting mainly of daily synoptic observations (2 to 8 per day) recorded at nearly 500 surface observatories in the country, and hourly observations recorded by autographic instruments at nearly 100 observatories.

Synoptic surface data are being transferred to punch cards for past years. At present the transfer has proceeded backwards upto 1957.

32 *Rainfall*

Daily rainfall data of about 5000 raingauge stations in the country and autographic data of over 100 self-recording raingauge stations. Cards are available for the period 1867 to 1970.

33 *Evaporation*

Data relating to evaporation recorded at over 100 stations in the country.

34 *Marine*

Daily synoptic observations (4 per day) from voluntary observing fleet of Indian Registry now numbering 225 are collected from Ships Logs and transferred to punch cards. They are available in this form from 1946 onwards. In addition, from 1961 onwards punch cards of ships' observation for the Indian Ocean north of 15°S are received on punch cards from various countries whose merchant ships ply over these waters. India functions as a Marine Data Collection & Processing Centre of WMO for this area. The number of cards containing ships' data since 1961 is 1,156,000.

35 *Agro-meteorological*

These consist of simultaneous observation on crop growth and meteorological observation of temperature, wind, cloud, rainfall, dew, evaporation, soil moisture etc. recorded at a number of observatories attached to agricultural farms (about 125 stations). Cards are available for the period 1944 up-to-date.

36 *Aeronautical*

Hourly and half hourly observations from all principal airports and current weather observatories. These comprise parameters like pressure, temperature, humidity, wind direction and speed, visibility, cloud and rainfall. Punch cards are available for 10 years 1955-64.

37 *Upper air*

All data of upper air temperature, pressure, humidity, wind direction and velocity at standard levels recorded at 19 radiosonde and 27 radiowind observatories and 74 (including naval and IAF stations) pilot balloon observatories (3 to 4 times daily) are available on punch cards since 1951.

38 *Rocket Meteorology*

Meteorological data of temperatures and winds collected at the Thumba Equatorial Rocket Launching Station (TERLS) near Trivandrum are available on punch cards.

391 *Radiation*

Hourly observation of global solar radiation and diffuse sky radiation at 14 stations are being collected. Effective long wave out going radiation and total solar radiation from sun, sky and earth data are also being collected. These are all available on punch cards.

392 *Atmospheric physics*

Total Ozone, atmospheric electricity, micro-meteorological observations, air quality and pollution characteristics are also recorded at a few stations in the country and their data are being collected.

India Meteorological Department has got raw data on punch cards amounting to 25 millions. The punch cards are preserved in specially designed steel trays with pressure plates so that they may retain their original quality of being useable in card readers and data processing machine. Original records and such derived forms of data contained in them as are appropriate are archived in specially designed cabinets. 2.5 lakhs of punched cards are subjected every month to stringent quality control with machine and manual edit. The new technology of electronic automation provided by IBM 1620 computer at the IITM Poona and the CDC 3600 computer at TIFR Bombay is

pressed into service for checking initial consistency of data and quick preparation of climatological summaries for feed-back to national and international users. Surface and upper air data are summarised into useful statistics.

4 *National Data Centre of Poona*

In order to preserve very old records and publications a microfilm unit forms part of the National Data Centre.

The National Data Centre at Poona meets the requirements of national and international users to the best of its ability. There are plans to acquire a modern third generation computer to meet the urgent need for modern data processing abilities. It is planned to transfer the large number of cards on magnetic tape with the help of computer in order to assure a compact and quick data storage and retrieval system and reduce the demand of space for increasing bulk of punch cards which deteriorate rapidly with time and become unusable after some years.