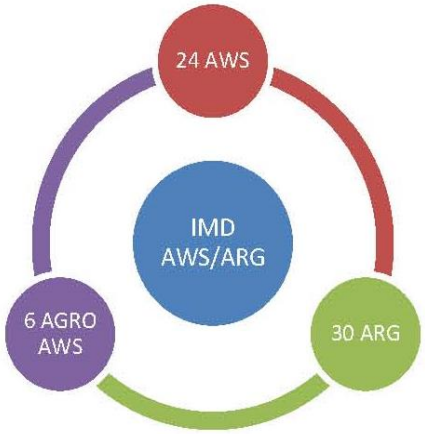


- Digital Current Weather Instrument System, Metar Display System and Drishti Transmissometer for RVR determination were established at AMO Thiruvananthapuram.
- IMD Thiruvananthapuram became a part of the System of Aerosol Monitoring And Research (SAMAR) - a system of 3 Aerosol and black carbon monitoring equipments namely, Sky radiometer, Nephelometer & Aethalometer.

Aethelometer

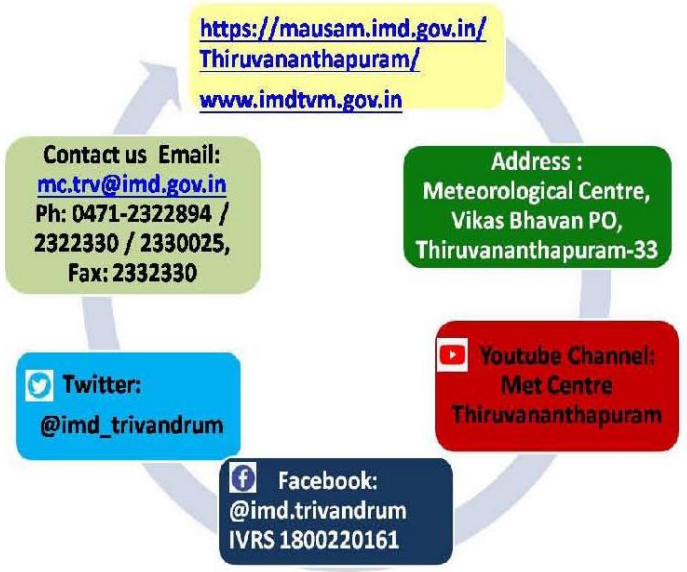
Nephelometer

Digital Sunshine recorder

GNSS equipment

- MC Thiruvananthapuram has become a part of the Integrated Network of Global Navigation Satellite System (GNSS), for continuous recording of integrated precipitable water vapour (IPWV) measurements and for seismic studies. This equipment has got advanced meteorological sensors to measure temperature, pressure, humidity and also capable of working independently in all weather condition with high temporal resolution.
- Continuous monitoring of solar & terrestrial radiation by radiation equipments and sunshine recorder (both conventional and electronic) form some of the routine activities of this office.
- Utilising the data from the S Band Doppler Weather Radar (DWR) under IMD installed at Kochi, more accurate and precise weather warnings are generated and issued.

Weather details / updates are available through:



Mobile Apps:

- **"MAUSAM App" for location specific forecast and warning**
- **" Meghdoot App" for Agromet advisory**
- **"Damini App" for Lightning warning.**

GOVERNMENT OF INDIA
INDIA METEOROLOGICAL DEPARTMENT
(Ministry of Earth Sciences)
METEOROLOGICAL CENTRE
Thiruvananthapuram

HISTORY OF METEOROLOGY IN KERALA

India is fortunate to have some of the oldest meteorological observatories of the world. The British East India Company established several such stations, for example, those at Calcutta in 1785 and Madras (now Chennai) in 1796 for studying the weather and climate of India. The Asiatic Society of Bengal founded in 1784 at Calcutta (now Kolkatta) , and in 1804 at Bombay (now Mumbai), promoted the scientific studies in meteorology in India.

The Observatory at Thiruvananthapuram has a long history, dating back to 1836 *and* is one of the oldest observatories of the country. Meteorological Centre, Thiruvananthapuram caters to the meteorological requirements of Kerala & Lakshadweep by supervising and co-ordinating the weather services in the state.

1

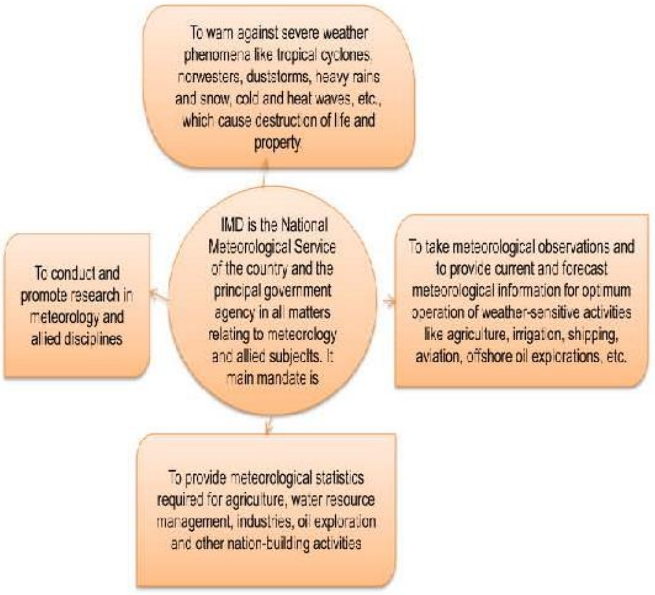
Brief History :

Meteorological Centre, Thiruvananthapuram was started as "The Trivandrum Observatory", by the Maharaja Swathi Thirunal of Travancore in 1836. During 1837 under the supervision of Mr.John Caldecott, the then Commercial Agent of Travancore Government at Aleppey, it was designed for both astronomical and meteorological work. Later in 1852, Mr.John Allan Brown, F.R.S started to take magnetic observations to study terrestrial magnetism.

- Meteorological Observatory took its origin in 1853 from this observatory.
- It was divided into 2 sections viz. Meteorological & Astronomical in 1927. In the same year, the Meteorological Section was recognized by Govt. of India as a Class I Meteorological Observatory and started sending the manual observations of the meteorological elements to IMD Pune telegraphically for weather forecasting.
- Pilot Balloon ascent for measurement of wind speed and direction of upper air was started in 1928.
- Meteorological Section was taken over by Govt. of India in 1951.
- Radiosonde observations were started in 1956.
- This office had started issuing weather forecast since 1963.
- Upgraded to Meteorological Centre in 1973.

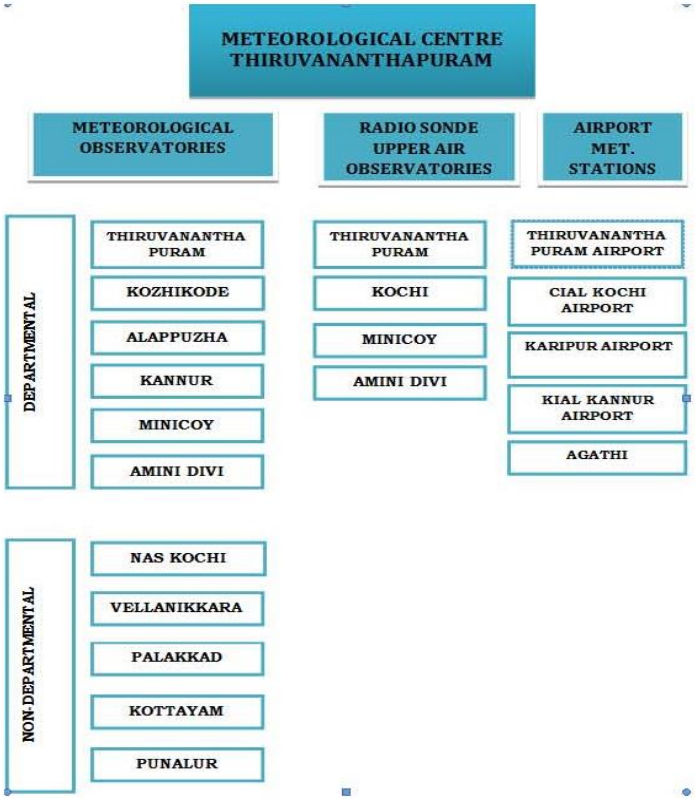
2

MANDATE OF IMD



3

Observations are the back bone of all meteorological work. *It has a network of 16 Observatories, about* 59 rain gauge stations, 30 AWS and 30 ARGs all over the state of Kerala and Lakshadweep Islands. Among these, 10 Surface observatories and all AWS/ARG are maintained by IMD, whereas Part-time observatories and rain gauge stations are located in the premises of State Government the Offices, Railways and other organizations. Accuracy of the meteorological observations is ensured by periodical inspection of observatories and rain gauge stations and also imparting necessary meteorological trainings to the Part-time observers by this Centre. Calibration of all instruments of observatories are done once in every year.



Organization structure

4 5

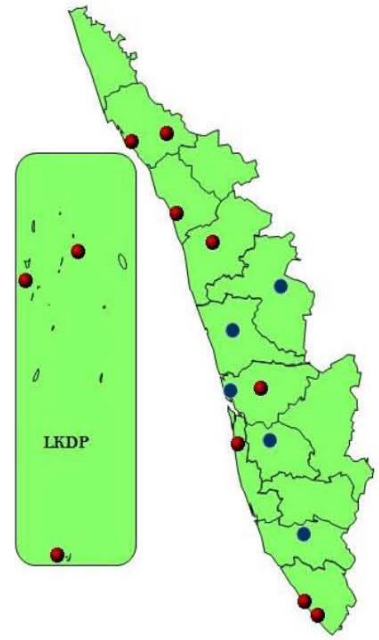
RAINFALL NORMALS (MONTHLY IN mm)												
STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
THIRUVANANTHAPURAM	22.9	23.5	41.2	117.9	195.4	302.9	209.1	140.9	188.1	281.5	198.0	63.0
TVPM AP	20.7	25.3	30.2	99.1	203.1	290.7	194.9	136.3	169.9	252.5	208.5	64.4
ALAPPUZHA	20.0	43.5	54.0	142.6	290.1	583.2	540.0	356.3	301.7	349.7	188.9	54.8
KOZHIKODE	3.3	3.5	21.4	84.0	260.3	800.3	814.0	457.1	246.8	275.1	139.8	30.3
KANNUR	2.8	0.6	21.0	50.2	228.2	991.3	837.1	541.9	238.4	240.6	124.0	25.2
MINICOY	28.0	22.7	24.6	76.3	183.4	293.5	257.2	219.0	175.2	160.2	149.8	84.9
AMINI DIVI	11.2	3.6	5.1	15.9	159.6	372.0	336.8	236.9	176.3	141.8	103.2	39.0
AGATHI	7.0	3.1	2.5	13.4	129.3	325.3	288.2	213.7	145.2	124.8	122.9	38.9
NAS KOCHI	24.7	22.2	38.4	103.6	318.6	678.9	638.5	392.7	295.4	331.2	162.4	46.3
KOTTAYAM	8.7	24.7	53.9	145.5	248.2	608.7	528.7	386.7	270.9	329.8	191.0	41.7
PUNALUR	14.5	45.5	77.8	220.2	246.6	453.8	431.9	286.2	241.0	414.9	227.7	43.5
PALAKKAD	2.3	5.3	21.1	70.8	124.7	400.0	502.7	327.1	158.0	211.3	112.6	25.4
KERALA	8.4	14	32.8	105.1	223.7	643	720	427	259.5	303	153.4	34.9
IAKSHADWEEP	15.4	9.8	10.7	35.2	157.4	330	294	223	165.6	142	125.3	54.3

Climate Normal (1981-2010) of all the observatories in Kerala (in deg.C)						
Station	Season	Winter	Pre Monsoon	SW Monsoon	NE Monsoon	Annual
Alappuzha	Max Temp	32.7	33.2	29.7	31.8	31.9
Alappuzha	Min Temp	23.0	25.2	23.6	23.4	23.8
Kozhikode	Max Temp	32.4	33.2	29.6	31.7	31.7
Kozhikode	Min Temp	23.3	26.0	24.0	23.7	24.2
Kannur	Max Temp	33.4	34.0	29.8	32.2	32.3
Kannur	Min Temp	22.0	25.0	23.3	22.8	23.3
NAS Kochi	Max Temp	32.0	32.7	29.9	31.3	31.5
NAS Kochi	Min Temp	23.6	25.7	24.1	23.8	24.3
Karipur	Max Temp	33.3	33.6	29.5	31.7	32.0
Karipur	Min Temp	22.7	25.0	23.3	22.9	23.5
Kottayam	Max Temp	33.3	33.8	30.2	31.7	32.2
Kottayam	Min Temp	22.5	24.0	22.9	22.9	23.1
Palakkad	Max Temp	34.0	36.1	29.5	31.5	32.8
Palakkad	Min Temp	22.2	24.6	23.0	22.8	23.2
Punalur	Max Temp	34.7	35.3	31.2	32.4	33.4
Punalur	Min Temp	21.2	23.5	22.8	22.0	22.4
Thiruvananthapuram	Max Temp	32.6	33.1	30.4	31.3	31.9
Thiruvananthapuram	Min Temp	22.6	24.8	23.5	23.1	23.5

6

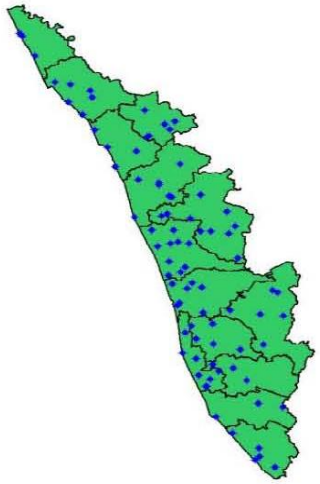
RAINFALL NORMALS (SEASONAL in mm)					
STATIONS	WINTER	PRE-MONS	SW MONS	POST MONS	ANNUAL
THIRUVANANTHAPURAM	46.4	354.5	841.0	542.5	1784.3
TVPM AP	46.0	332.4	791.8	525.4	1695.7
ALAPPUZHA	63.5	486.7	1781.2	593.4	2924.9
KOZHIKODE	6.8	365.7	2318.2	445.2	3135.9
KANNUR	3.4	299.4	2608.7	389.8	3301.3
MINICOY	50.7	284.3	944.9	394.9	1674.7
AMINI DIVI	14.8	180.6	1122.0	284.0	1601.4
AGATHI	10.1	145.2	972.4	286.6	1414.2
NAS KOCHI	46.9	460.6	2005.5	539.9	3053.0
KOTTAYAM	33.4	447.6	1795.0	562.5	2838.7
PUNALUR	60.0	544.6	1412.9	686.1	2703.5
PALAKKAD	7.6	216.6	1387.8	349.3	1961.3
KERALA	22.4	361.6	2049.2	491.7	2924.7
IAKSHADWEEP	25.2	203.3	1013.2	321.9	1563.4

AREA OF RESPOSIBILITY OF MC THIUVANANTHAPURAM AND MANUAL OBSERVATORY NETWORK



7

Network of ordinary raingauge stations (DRMS)



Network of AUTOMATIC WEATHER STATIONS / Automatic Raingauge Stations

8

Activities and Services

- Upper air observations of temperature, wind, humidity and pressure using hydrogen filled balloon bound GPS based radiosonde with meteorological sensors are made from Radio Sonde Radio Wind (RS/RW) unit twice a day at 00 & 12 UTC. 8 synoptic surface observations at 3 hourly interval starting from 00 UTC are also taken daily by this office.
- Continuous recording of various weather parameters are done, through different self-recording surface meteorological instruments.
- The observational data of the other stations in the state is collected and transmitted along with the observations taken at this office immediately after each synoptic hour, to HQ at New Delhi through different modes of communication.
- HQ re-transmits the data pertaining to India and neighbouring countries and also the plotted charts of surface and upper air observations to all the Forecasting offices .
- The challenging task of weather forecasting and issue of severe weather warnings for Kerala are done effectively by analyzing these weather charts, satellite imageries, Doppler weather radar outputs and different forecast model output disseminated from H.Q and taking into consideration of the climatology and orography of the region.

Stevenson screen for keeping meteorological instruments

Radiosonde instrument

9

- Early warning of disastrous weather events saves precious lives and property. Weather Forecast, cyclone warning, Wind warning for fishermen, heavy rainfall warning, port warnings and highway forecast are broadcasted though AIR, Doordarshan, other print and electronic media in addition to the website of IMD Thiruvananthapuram.
- Agromet Advisory Services (AAS) for farmers in collaboration with the Ministry of Agriculture / Agricultural Departmentt at 5 agroclimatic zones (cluster of 3-4 districts) have been successfully extended to the district level and operated across 14 districts of the state. Currently, over 5 lakhs farmers are receiving crop specific agro-meteorological advisories along with five day district level quantitative forecast for 7 weather parameters, viz, rainfall, maximum temperature, minimum temperature, wind speed, wind direction, relative humidity and cloudiness on Tuesdays & Fridays in Malayalam and English languages, as SMS and through the website.
- Weather data compilation for climatological purpose is done for archival and for answering various weather related enquiries from different users for research and planning purposes. For the efficient management of drought, flood and disaster mitigation planning, accurate knowledge of rainfall distribution in space and time is required. Necessary meteorological and climatological services are rendered to accomplish this.
- Interactive Voice Response System with toll free number 1800220161 and website www.imdtvm.gov.in & www.mausam.imd.gov.in/Thiruvananthapuram/ are maintained by this office for the service of general public.
- Continuous monitoring of earthquake is done by state-of-the-art instruments installed at this station, making it a part of Real Time Seismological Monitoring Network (RTSMN) for tsunami warning.
- Maintenance and repair of all meteorological instruments of observatories, automatic weather stations (transmission of hourly data to HQ is effected automatically through GPRS modem and airport meteorological equipments are also done by this office.