



Indian Meteorological Society- Ahmedabad Chapter (IMSA)



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SIMPLE

Student Involvement in Meteorological Parameter Learning



August 2016



Indian Meteorological Society – Ahmedabad Chapter

C/O Secretary, IMSA

Space Applications Centre (SAC), ISRO

Ahmedabad – 380 015

www.imsa.net.in

IMSA to distribute Meteorological Parameter Measuring (MPM) Units to Schools in Ahmadabad.

Program Title: Student Involvement in Meteorological Parameter Learning (SIMPLE)

Background:

Weather affects every human/living being. Information about weather is obtained through a host of measurement techniques that involve a variety of approaches – direct measurement by sampling the air near ground or up in the air using balloon borne sensors, OR indirect measurement using sensors which operate using remote sensing techniques from balloons, rockets and satellites. Space based synoptic imaging of cloud patterns associated with variety of weather systems that develop in the atmosphere also help in diagnosing the weather.

Understanding the earth's weather and forecasting the likely changes/developments requires measuring the meteorological parameters accurately at as many places as possible and as frequently as possible. This is due to the fact that weather at any given location is also influenced, at least in part, by non-local and global factors.

India has been in the forefront of setting up meteorological measurement stations for a long time. Over time, new advancements, e.g. remote sensing from space using meteorological satellites, have added unique global weather monitoring capabilities. More recently, India Meteorological Department (IMD) has set up a very comprehensive network of AWS (Automatic Weather Stations) which measure all the weather parameters nearly continuously and send the information to a central location using satellite communication. Indian Space Research Organisation (ISRO) also develops and operates dedicated meteorological satellites in Low-Earth Orbit (LEO) and Geostationary Orbit (GEO). ISRO and IMD disseminate the meteorological information gathered through all such sensors in usable format on www.mosdac.gov.in and www.imd.gov.in resp. Most recently, IMD has started making use of social networking sites -Facebook (<https://m.facebook.com/India.meteorological.department>),Twitter (<https://mobile.twitter.com/indiametdept>) for this purpose.

India is a vast country and in spite of all this, there is need for improving weather information at local scale i.e. within the city areas where weather is influenced by many local factors – e.g. presence of tall buildings, energy usage, automobile fuel consumption, waste burning and generation of aerosols/pollution etc. etc. In-situ measurements also form an important component of any remote sensing measurement for validation. For meteorology, the in-situ measurements of temperature, humidity, rain fall etc. are thus very important.

It is, therefore, of value if there is some effort towards involving public (students and citizens) in generating the local weather information. This is in addition to large scale efforts being put in by the Govt. agencies like IMD and ISRO etc. In some of the advanced countries, many individuals also put up weather monitoring stations out of their interest. In India, this is yet in its infancy. A complete weather station has been set up at Rajkot (www.gujaratweather.com) and a full scale weather forecasting effort has been started in the private sector by a company called SKYMET (www.skymetweather.com) at New Delhi. Weather information and forecasts plays a vital role in all human activities – safe living, health and hygiene, agriculture, industry, transport, business of all kinds, even rocket launching etc.

Here, the professional meteorological societies e.g. IMS can play a very meaningful role in involving the public in generating the much needed local weather information. It is also essential to increase the awareness about the science and applications of weather, climate and meteorology.

In view of the above, the Indian Meteorological Society, Ahmedabad Chapter (IMSA) has taken the initiative "SIMPLE" in involving the students in generating the much needed local weather information. Under this, Meteorological Parameter Measurement (MPM) kits are being distributed to schools.

Objectives:

The Ahmedabad Chapter of IMS – IMSA – has taken a lead in undertaking a program to involve student/teacher community in schools situated in Ahmedabad region. Under this program, it has been decided that, to start with, several schools would be provided with simple, easy to handle, meteorological parameter measuring (MPM) devices/units. In each of the schools, a student/teacher team would be identified and would be made responsible to collect meteorological parameter measurements on a regular basis, and take interest in analyzing and discussing it with their science teacher. The experts from IMSA would be available at all times for any discussions/guidance.

Periodically, IMSA would arrange a seminar-cum-interaction session with the student community about the developments and progress in this venture. Participation would be appreciated and encouraged through awards based on performance etc.

Details:

IMSA has procured about 50 MPM Units that provide continuous measurement of Temperature(T) and Relative Humidity (RH), Daily Maximum and Minimum T and RH. The T & RH unit provides reasonably accurate values and display results on a digital screen. A unit that records rainfall (R) is also provided.

Description of the MPM Units:



Temp./Humidity Measuring Unit , Raingauge & Measuring Cylinder

Technical Specifications:

- Temperature Range, Resolution and Accuracy: -50 to +70 °C, 0.1 °C, +/- 1 °C
- RH Range, Resolution and Accuracy : 10 to 99 %, 5%, +/- 5%

The T & RH MPM unit is battery operated (single battery cell) and does not require any special attention/training. The unit displays current T, RH, Time and there are buttons to read Max. & Min. values of T and RH from memory and set up a time Alarm.

Amount of rainwater collected every 24 hrs in the raingauge has to be measured manually using the graduated cylinder to convert it into daily rainfall values.

Instructions:

As discussed earlier, the local weather is influenced by many factors. In order for a meteorological parameter to be representative of the surrounding air, care needs to be taken about installing the MPM units.

- The T & RH unit should be installed at a location where it samples the free flowing air in an undisturbed manner – i.e. the air that is not conditioned by any human factor nearby. This means the unit should be placed in open, but it has to be ensured that it is not affected by direct sunlight. The T & RH measurements must refer to volume of free flowing environmental air in shade.
- The T & RH unit should be installed at eye height for ease of reading. The place should be safe and secure for the unit and for the students to undertake measurements/readings.
- The raingauge should be installed in open on a terrace – where no other input, except the raindrops, enters it. Again the falling rain should not be influenced by nearby walls or objects. Here, shading from the Sun is not important, but the unit should not be located in rain-shadow area. Rain drops should have unrestricted access to the raingauge.
- All measurement readings should be taken daily at a pre-decided time in a regular fashion, and entered in the Data-sheet provided. The time of measurement, as provided in the T & RH unit should also be entered.
- The student should be attentive while taking measurements and any discrepant values noticed should be brought to the notice of the teacher, and not discarded without understanding the cause.

As a guide, the **climatology** of meteorological parameters on a **monthly average** basis for **Ahmedabad** is presented in the diagram below. The values at any time on any individual day can depart from these averages.

Implementation:

Initially, all measurements would have to be entered manually in the Data-sheet. Subsequently, it is proposed to develop a real-time communication system to collect all measurements at a central location. This may be achieved through a Mobile App specially designed for the purpose, or through WhatsApp group etc. It is also proposed to place the measurements on IMSA website (www.imsa.net.in) in the spatial domain – i.e. by placing all the measurements on map of Ahmedabad region and updated every hour or so.

It is proposed to monitor the program regularly and to review the progress to implement the necessary changes. Depending on the success, the program may be expanded to cover larger areas in Gujarat.

Expected Outcome:

Through this program, IMSA aims to achieve the following–


- Involvement and encouragement of student/teacher community directly in meteorological parameter measurement activity, and in understanding basic aspect of weather and how it develops on the scale of a city like Ahmedabad. It may be seen as a small ‘crowd-sourcing’ initiative.
- Popularization of the science of weather and meteorology.
- Generate future Human Resources in the subject area.


Acknowledgements:

The genesis of the Program “SIMPLE” may be traced back a few years when Shri A. S.Kiran Kumar (currently Chairman, ISRO) was Chairman, IMSA and Director, SAC-ISRO Ahmedabad, suggested involvement of the student community. IMSA is indebted to him for his constant interest, guidance and encouragement over the years. We also thank Shri Tapan Misra, Director, SAC for his interest and encouragement. The success of IMSA programs is a result of involvement and cooperation from IMSA Executive Committee and Members from various organizations. Their efforts are highly appreciated.

Extreme Weather Information


Extreme Cold and Hot Places:

 The lowest world temperature ever recorded (-89.6°C) was at Vostok, Antarctica on 21 July 1983.....Dras in Ladakh in J&K (India) is the second coldest place in the world.

 The highest ever recorded temperature was a sweltering 58°C in Libya on Sept, 13, 1922.

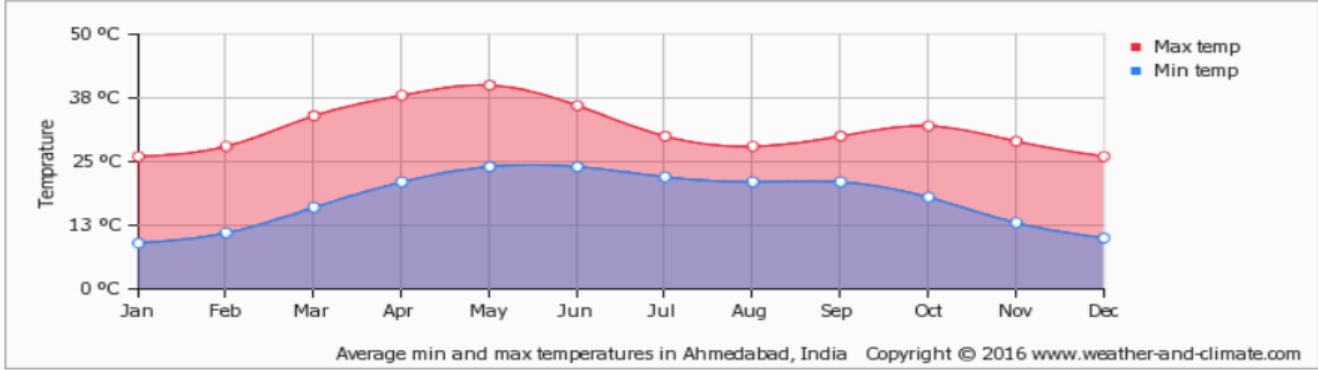
Extreme Wet and Dry Places:

 Mawsynram in India is noted as being the wettest place on Earth with over 11 meters of rain/year.

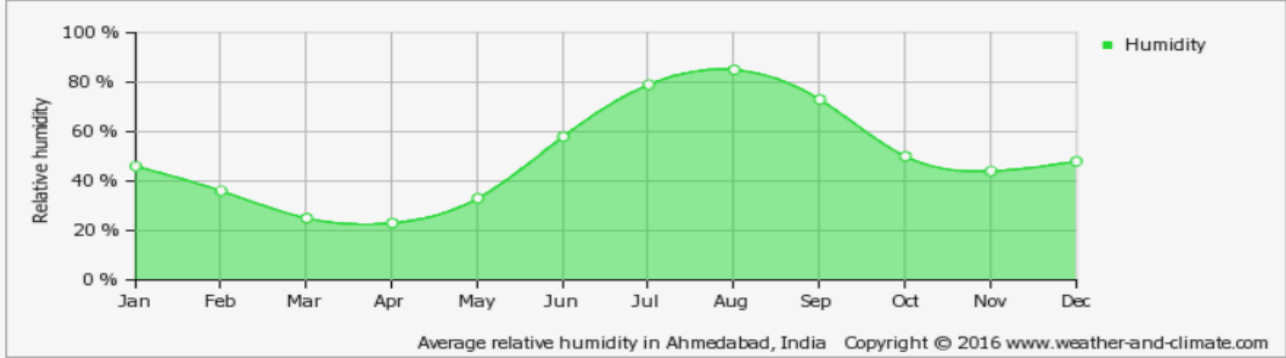
 Antofagasta in Chile is the driest place with < 0.1mm per year, and no rain in many years.

Ahmedabad (Gujarat)
 (Lat. = 23° 04' N, Long. = 72° 38' E, Height= 55 m amsl)
Monthly Average Climatic Parameters

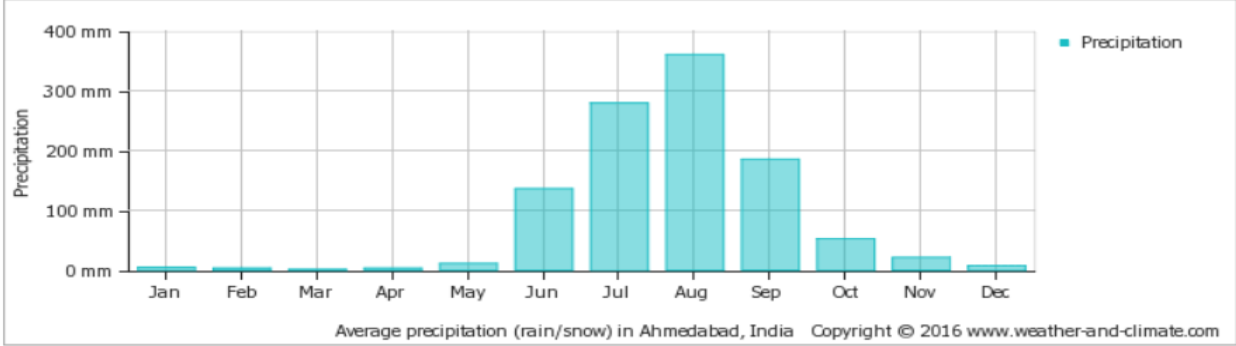
The monthly mean minimum and maximum daily temperature.



This is the mean monthly relative humidity



This is the mean monthly precipitation, including rain, snow, hail etc.



Source: <https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine>



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School Name & Location (Lat. & Long.):

Name of the Student :

Data Sheet

Month & Year :

		Temperature in °C			Rel. Humidity in %			Rainfall in mm	
Date	Time IST	Temp.	Daily Max.	Daily Min.	Humidity	Daily Max.	Daily Min.	Daily	Relevant Env. Observation (see Key below)
Months									
Average									

Key ; 1 – Clear, 2- Partly Cloudy, 3- Heavy Clouds/overcast, 4- Light rain, 5- Heavy rain, 6- Windy, 7- Dusty

Teacher's Remarks and Recommendations:

Teacher's Name and Signatures:



INDIAN METEOROLOGICAL SOCIETY

AHMEDABAD CHAPTER

IMS-AC Executive 2016-2018

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Dr. Raj Kumar
rksharma@sac.isro.gov.in

Vice-Chairman

Dr. Somkumar Sharma
somkumar@prl.res.in

Secretary

Shri D. Ram Rajak
rajakdr@sac.isro.gov.in

Joint-Secretary

Dr. Indrani C. Singh
icaug4@yahoo.com

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Dr. Sanjib Kr Deb
sanjib_deb@sac.isro.gov.in

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