

GSLV launches consecutively. There have been just ten launches of GSLV yet - six with Russian cryogenic engines, and four with indigenously developed cryogenic engines. Out of these, only four have been successful

payloads into space more efficiently. It is the key to the success of any robust space programme and in making a space agency a commercial player. Very few countries possess this critical engine technology.

operational missions and making its mark in areas like satellite navigation.

Space Industry in India

Ever since India sent a spacecraft to Mars in 2014, India has earned its place in the top-ranking space-faring nations (which

sumers. In advanced space-faring nations, many of these blocks have already been deregulated and privatized to create a value chain and make a major contribution to the economy. Now that

Continued on page 29

EMPLOYMENT NEWS

DATE- 17&23 SEP 2016

PAGE NO. 1&31

CAREER IN METEOROLOGY

UNDERSTAND AND INTERPRET MOODS OF THE WEATHER

Pratibha Mishra

SR Ramanan from Chennai is one of the most popular weather forecasters of Tamil Nadu. He is also called 'Rain Man' by students as he helps schools declare their 'rain holidays'. Officially, He is the Director of Area Cyclone Warning Centre. Unofficially, he is a celebrity on social media. Ramanan shares, "I came in weather forecasting because I loved it. I was good at Geography but I took up Physics in college instead. At college level, my interest hovered around Atmospheric Physics, and I eventually became an observer."

Even though Ramanan works in Chennai, he depends on information and data from all over the world, including Malaysia, Singapore, and Sri Lanka. He has video-conferences with colleagues in Delhi every day, receives information from small observatories, and also receives pictures from the satellite division and the radar division. A meteorologist never works in isolation; he has to be abreast of global trends.

Careers in Meteorology have high job security and good income. There is a catch though. Government jobs are considered as jobs with fixed hours but 'weather forecasting' is a 24X7 job. Ramanan says that he works on weekends, and the festivals too. If you are passionate about the field, jobs in Meteorology are easier to find - relatively speaking.

Who should take up Meteorology as a career choice?

Do you look up at the clouds and wonder why do they look so different? Have you ever wondered how that lady predicting weather of the day on news predicts, where it will rain, and

how much? If you are curious about weather forecasts and climatic changes, a career in Meteorology may be your calling.

Meteorology is a branch of Atmospheric Sciences, which mainly focuses on predicting



weather and climate, and studying the forces that bring about change in our environment. 'Meteorol' is a Greek word which means something that occurs high in the sky. Specialists in the field are called Meteorologists or Climatologists or Atmospheric Scientists.

A Meteorologist should be good at Maths and Physics, and have an avid interest in environmental issues. Good problem solving, decision making, data analysis, and communication skills are also required. These days, meteorologists work using advanced technology and soft-

ware and hence, they should be equipped with excellent computer skills too.

What do Meteorologists do?

A meteorologist uses various equipments like thermometer to measure temperature, anemometer to measure wind speed, barometer to measure atmospheric pressure, rain gauge to measure precipitation etc. and uses all the various observations to predict weather conditions. They also measure humidity and air quality. Today, weather forecasting is done using more complex tools like weather satellites and dopple radars.

Satellites show cloud formations and are invaluable in studying worldwide weather systems. Since they can see weather across the globe - across the continents, oceans and poles; and have very detailed data, they can accurately predict large weather events like hurricanes.

In Doppler radars, sound waves are broadcast from a radar antenna, and their reflection is captured. If they come in contact with an object like ice crystals or dust particles, the frequency of their sound waves changes. It is a useful tool in helping meteorologists track progress of a storm over time.

Weather forecasts are useful for a variety of purposes. Every day commuters use it to decide which routes will be safer for them and whether they should carry an umbrella or not for the day. Mountaineers use it to keep themselves safe from snow storms and avalanches. Farmers need the information to decide when to plant and harvest their crops. Airlines keep a

Continued on page 31

CAREER IN ...

Continued from page 1

track of local weather conditions while scheduling flights. Meteorologists may also predict onset of storms and Tsunamis, and issue timely warnings to the people in the related areas.

Today, modern weather forecasting uses a combination of atmospheric observations, knowledge of historical trends and patterns, and computer models to make quite accurate forecasts to upto five days in advance.

For daily forecasts you see on news, satellites are launched, weather stations are set up, weather balloons are used and local weather observatories are set up.

Popular careers in Meteorology are Forecasting, Consulting, Teaching and Research.

Meteorology Specializations

Some of the major branches of the field in which one can specialize are:

- **Aerology**- It is the study of free air not adjacent to the earth's surface.
 - **Aeronomy**- It is the study of the physical properties of the upper atmosphere.
 - **Agricultural Meteorology**- Agricultural meteorologists study the effect of weather on crops, and how meteorological predictions can help the farmers plant better crops, improve their crops, and protect them from adverse weather conditions.
 - **Applied Meteorology**- Applied meteorologists use weather information for specific applications to day-to-day problems such as designing aircrafts, controlling air pollution, architectural designs, air conditioning plants, development of tourism in the area, solar and wind energy projects, and urban planning.
- In fields like fishing, agriculture, civil aviation, military operations, air and sea transportation, controlling air pol-

es, tropical cyclones, fronts, depressions and other weather systems.

Eligibility Requirements

Meteorology courses are not as famous in India as they are in the western world - mainly because of lack of information. A number of institutes offer meteorology courses at the undergraduate level. To take admission in the Under Graduate course, you must have cleared 10+2 with Science stream, and to take admission in the Post Graduate course, you must have completed B.Sc in the related field from a recognised University. Bachelor courses are generally of three to four year duration, Master courses are of two year duration, and those who choose to become researchers and scientists in the field will often need to undergo a PhD programme in Meteorology which usually takes about three years to complete.

There is a 1-year Diploma program in Meteorology too but a Bachelor course is preferable if you want to make the career in this field. The Diploma program may be good for those who already hold a graduate degree in Physics or Maths and now, want to foray into this field.

In the Meteorology courses, students are usually taught about Fundamentals of Meteorology, Weather Measurement & Analysis, Weather Forecasting, Atmospheric Physics and Thermodynamics, Global Atmosphere, Marine Meteorology etc. Skills like data collection, analysis and forecasting; and computer modeling are also included in the course.

For specialist fields like operational, synoptic, physical, environmental or hydro meteorologists, a Master degree is often required. The Indian Meteorological Department (IMD) recruits candidates at Grade II level through the Union Public Service Commission (UPSC), where minimum qualification has been specified as:

- B.Tech in Engineering, Computer Science or Computer Application; or

- Technology, Kerala
- IIT Delhi
- IIT Kharagpur
- Indian Institute of Tropical Meteorology, Pune
- Maharaja Sayajirao University of Baroda, Vadodara
- Shivaji University, Vidyanagar, Kolhapur, Maharashtra

Job Prospects for a Meteorologist

As the issue of 'Global Warming' is heating up and natural disasters like Tsunami have become more frequent, careers in Meteorology have become more and more popular. Meteorologists often get employed as researchers or teachers by colleges, universities, government agencies and private companies. Weather broadcasting stations, military departments, environmental agencies, radio and television stations, industrial weather research facilities, satellite space research centers, and global weather centers also hire meteorologists or climatologists.

Besides the Indian Meteorological Department, all news channels and agencies broadcast daily weather forecasting. Each and every airport has a Met office too which requires qualified meteorologists. Private architectural firms often hire Climatologists as consultants while designing houses, buildings, offices, bridges and flyovers etc.

Construction agencies, transport firms, and energy production, and agricultural departments also advertise jobs from time to time. Researchers and scientists can get employed by meteorological centres and institutes like IITM, Aryabhata Research Institute of Observational Sciences, Indian Association for the Cultivation of Science, Council of Scientific and Industrial Research, Indian Council of Agricultural Research (ICAR), Indian Air Force, National Remote Sensing Agency, Defence Research and Development Organization (DRDO) and

increases considerably as one gains knowledge and experience in the field. With some experience, one can easily make around Rs 35,000 per month.

In state-run offices, meteorologists get paid according to the state pay scale while in central government jobs and organizations like IMD and ISRC, salaries are paid according to Pay Commission.

Most atmospheric scientists often work indoors in offices, weather stations or laboratories but they may have to go out to do fieldwork occasionally to collect data and observe weather events like tornadoes up close. In such cases, they may observe actual weather conditions from the ground or may study it from up above (from an aircraft). In case of emergencies, they may have to work extended hours. Sometimes, these scientists may also create small replicas of weather phenomena to study how things may work in actual weather conditions.

Now, computer models have much improved the accuracy of forecasts which can be tailored for specific purposes. Businesses increasingly rely on weather reports for managing inventory and delivery services more efficiently. Utility companies also use weather forecasting reports to buy and sell solar and wind power. Hence, job opportunities in the field are definitely on the rise.

Meteorologists may also apply for jobs abroad, where they can make handsome salaries. In the US, it was noted that the job opportunities for meteorologists were increasing by 9 percent faster than average. In 2015, the median pay for an Atmospheric Scientist in the US was around \$89,820 per annum.

(The author is a columnist.
e-mail:pratibhatana@gmail.com)

Employment News

Dushinder Kaur (GM & Chief Editor)

In fields like fishing, agriculture, civil aviation, military operations, air and sea transportation, controlling air pollution, space sciences, and studying trends in the earth's climatic changes (such as global warming or depletion of ozone layer), Meteorology can be of great significance.

- **Climatology-** As the name suggests, it is about studying the climate of an area on the basis of its weather records accumulated over a long period of time.

- **Dynamic Meteorology-** Those who are mathematically sound can opt for this field as it is about creating numerical models to describe atmospheric processes.

- **Physical Meteorology-** Physical meteorologists find out ways to harness renewable energy sources (such as wind energy) in the best possible way by focusing on the chemistry of the atmosphere.

- **Synoptic Meteorology-** The experts in this field keep an eye on the movement of low pressure areas, air mass-

imum qualification has been specified as:

- B.Tech in Engineering, Computer Science or Computer Application; or
- B.Tech or M.Sc in Electronics.
- M.Sc in Physics, Maths, Applied Physics or Applied Maths with Astronomy or Astrophysics as one of the subjects; or
- Master's in Meteorology, Atmospheric Sciences or Geo - physics as one of the subjects; or

Selected students have to go through 1-year advanced course in Meteorology at IMD campuses in Pune or New Delhi.

Science graduates may also get picked up by IMD through employment exchanges from time to time.

Where to Study Meteorology?

Most popular meteorology courses in India are:

- Andhra University, Vishakhapatnam
- Aryabhatta Research Institute of Observational Sciences, Nainital
- Center for Atmospheric and Oceanic Science (CAOS), Indian Institute of Science (IISc), Bangalore
- Cochin University of Science and

Indian Air Force, National Remote Sensing Agency, Defence Research and Development Organization (DRDO) and Indian Space Research Organization (ISRO). Space application centers and airline companies recruit meteorologists as launching of satellites and scheduling of flights also depend on weather conditions.

Physical meteorologists study the transmission of light, energy, sound and radio waves in the atmosphere. Synoptic meteorologists may develop new weather forecasting tools and technology. Environmental meteorologists may predict problems due to pollution or shortage of food, fuel, and water. Hence, different fields can lead to jobs in different areas.

With satellite-based services increasing, the future of careers in Meteorology seems to be quite bright at the moment.

Remuneration and Work Conditions

The starting salary of meteorologists depends widely on their education, experience and place of employment. Usually, one may get around Rs 20,000 to Rs 25,000 per month at first but the salary

Employment News

Pushpinder Kaur (GM & Chief Editor)

Hasan Zia (Senior Editor)

Ayanedi Venkatappaiah (Asstt. Director, Advt.)

P.S. Madan Kumar (Editor)

Dr. Mamta Rani (Editor)

V.K. Meena (Joint Director, Production)

Sandeep Nigam (Production Officer)

P.K. Mandal (Sr. Artist)

K.P. Manilal (Accounts Officer)

Neeraj Jain (ASO Circulation)

Address: Employment News

7th Floor, Soochna Bhawan, C.G.O

Complex, Lodhi Road, New Delhi-110003

E-Mail: GM-cum-Chief Editor:

director.employmentnews@gmail.com

Advertisement: enewsadvt@yahoo.com

Editorial : 24369443

Advertisement : 24369429

Tele Fax : 24369430

Circulation : 24369567

Accounts (Advt.) : 24369419

Accounts (Cir.) : 24369440