

Indian Institute of Tropical Meteorology (IITM), Pune

Press Release

India's fastest and first multi-petaflops supercomputer inaugurated at IITM Pune by Dr. Harsh Vardhan, Union Minister for S&T, Earth Sciences, and Environment, Forest and Climate Change on 08 January 2018.

Pune, January 08: Honorable Union Minister of Earth Sciences Dr. Harsh Vardhan today dedicated India's fastest and first multi-petaflops supercomputer to the nation. The supercomputer named as 'Pratyush' meaning the Sun, established at the Indian Institute of Tropical Meteorology (IITM), Pune, will be a national facility for improving weather and climate forecasts and services under the umbrella of the Ministry of Earth Sciences (MoES), Govt. of India.

While inaugurating the facility at IITM, Pune, Dr. Harsh Vardhan said that it will be India's #1 HPC facility in terms of peak capacity and performance. This facility is part of Ministry's continuous endeavor to provide world class forecast services to the citizens of India through upgrading various operational and research activities and the needed infrastructure. India needs better forecasts for Weather and Climate conditions like monsoon, extreme events, Tsunamis, Cyclones, earthquakes, air quality, lightning, fishing, hot/cold waves, flood/drought, etc.

Some highlights of the services provided by MoES institutes to the country are:

- Best weather/climate prediction system in terms of accuracy/skill for monsoon climate.
- Operational forecasts at a very high resolution of 3 km at regional scale and 12 km at global scale for weather forecasts at par with any other leading weather/climate forecast center in the world.
- Fastest Tsunami alert/advisory to the stakeholders in Asia/Pacific region.
- Advisories on Potential fishing Zones, operational ocean wave/weather watch forecasts and air quality forecasts, climate projections are provided regularly to the citizens of India.

MoES also plays leadership role in South Asian region by providing more accurate weather/climate forecasts to its neighboring countries.

To provide all such forecast and prediction services, we need to run computer models on high performance computing (HPC) facilities. HPC constitutes one of major basic infrastructural requirements to run the various forecast models. To provide more accurate and reliable forecasts, we need to constantly increase our computational (HPC) power. MoES has set up high resolution weather and climate dynamical coupled forecast systems for providing reliable forecasts and is constantly working in this direction to increase our HPC power.

Constantly augmenting its High Performance Computing infrastructure at regular intervals is mandatory to keep MoES abreast with new technologies and to be at par with other leading weather/climate/ocean service centers worldwide.

In last 10 years, the HPC infrastructure at MoES institutes has grown from 40 Tera flops in 2008 to 1 Peta flops in 2013/14. As a result of providing HPC infrastructure to MoES

scientists, in addition to its constant research activities, MoES stands tall in the international weather and climate sciences community and constantly endeavours to provide the best services to the country and the Neighborhood.

Presently, with around 1.0 PF peak capacity, India's ranking in HPC is much below the HPC rankings of major countries that generate weather/climate forecasts. With the augmentation of this new 'Pratyush' high performance computing (HPC) facility of 6.8 Peta Flops (PF), India's ranking will move from the 368th position to around the top 30 in the Top500 list of HPC facilities in the world. India will also be placed at the 4th position after Japan, UK and USA for dedicated HPC resources for weather/climate community. The new HPC of 6.8 PF computational power is installed at two MoES Institutes: 4.0 Peta Flops HPC facility at IITM, Pune and 2.8 Peta Flops facility at NCMRWF, Noida.

Our improved forecast systems and increased HPC capacity has helped to provide reliable forecast services. For example, better prediction of seasonal, extended range short and media range predictions of monsoon, prediction cyclones like "Phailin", "HudHud", and the recent one "Ockhi" with adequate lead time, Tsunami warnings, extreme events like Uttrakhand floods, Kashmir floods, Bombay/Gujarat extreme rainfall events last year, etc.

The HPC facility inaugurated at IITM will be used for carrying out research on improving weather and climate forecasts and its applications. This MoES HPC facility will also be utilized by other MoES institutes (like INCOIS, IMD, NIOT, NCAOR, NCESS) for research activities to improve their respective weather and climate services.

The second HPC facility at NCMRWF, Noida will be mainly used to cater daily operational forecasts of respective MoES institutes (INCOIS, IMD, IITM, NCMRWF).

This new HPC facility 'Pratyush' will enable MoES scientists to use more detailed components of the Earth System for making better weather and climate forecasts at very high resolution. The facility is expected to improve the following services:

- Improved weather forecasts at block level over India which can predict extreme weather events.
- High resolution seasonal/extended range forecasts of active/break spells of Monsoon.
- Very high resolution coupled models for prediction of cyclones with more accuracy and lead time.
- Improved Ocean state forecasts including marine water quality forecasts at very high resolution.
- Tsunami forecasts with greater lead time.
- Air quality forecasts for different smart cities
- Climate projections at very high resolution.

This increase in supercomputing power will go a long way in delivering various societal applications committed by MoES. This will also give fillip to research activities not only in MoES but also in other academic institutions working on various problems related to Earth Sciences.