'Ocean modelling is the next big thing. We have tons of data, you need new techniques to analyse it'

As India launches its ambitious Deep Ocean Mission (DOM), Preeti Biswas speaks to Srinivas Kumar Tummala, Director, Indian National Centre for Ocean Information Services (INCOIS) – an autonomous body under the ministry of earth sciences – on future technology in oceanography and the impact of climate change on the Indian coastline:

Q&A

■ **In the Union Budget, the government allocated Rs 4,000 crore for the DOM. What is INCOIS's role in this mission?**

In the DOM, INCOIS has a component called ocean climate change advisory services for which we would be coordinating with other institutions such as Indian Institute of Tropical Meteorology and National Centre for Coastal Research. We plan to come up with an ocean climate change advisory for which we make observations in the deep oceans by deploying argo floats, deep argo floats, which can go to deeper depths in the oceans and then collect temperature and salinity data. Using this observational data, we will come up with climate change, ocean climate change advisories. Not just this, we will also do ocean modelling. Statistical downscaling of these models will help us understand sea level rise, get regional estimates and understand how they might impact our coastal areas.

■ **Where does India stand in terms of tsunami, earthquake and other such warnings?**

As far as tsunami is concerned, India has a very advanced warning system. We have all the observational components. Countries such as India, Australia and Indonesia, had the resources and expertise to set up their own systems. Currently, these three countries together provide information to all the other countries in the Indian Ocean region. India is not only generating warnings for its own citizens but also for 25 countries in the Indian Ocean region. We have a very advanced state-of-the-art tsunami early warning system. It's not second to anybody as we are considered one of the best tsunami warnings centres around the world. Globally, there are only about nine systems – two in Pacific, five in the Northeast Atlantic and Mediterranean, three in the Indian Ocean and one in the South China Sea. So all put together, 11 systems provide information to all the global coastlines that are threatened by tsunami.

■ **What is the new technology being used in oceanography?**

Ocean modelling is the next big thing. We have tons of data generated by argo floats, gliders and moors deployed in the ocean. But then you need to have new techniques to analyse the data. We are now using IT techniques such as AI, neural networks and big data analytics to analyse oceanic data. Increased usage of these techniques is the direction we are going over the next five years.

■ **What is in the pipeline on new warning systems?**

We are looking at providing services such as marine heatwaves, rip current forecast etc, which are especially meant for the tourism sector. Right now, what we provide is wave height, wave direction, wind speed and direction, current speed and direction, for mariners, fishermen, coastal communities etc. Products possible for day-to-day beach goers and tourists is the next goal. They would like to know what the water quality is and whether you can bathe or surf in the beach today. Rip current can dislocate swimmers. Our motive is to get to a higher level of granularity in forecasting that actually needs a lot of modelling efforts and observational data. So that's the direction we are going with higher resolution forecasts based on user requirement.

■ **What is the larger impact of sea level rise and rising sea level temperature?**

Sea level rise will impact coastal areas and low lying areas – they're the first ones to get threatened. Though we say that Indian Ocean is rising by certain millimetres a year, it's not constant throughout the Indian coastline. Deeper studies are required to understand what would be the impact of climate change on a particular coastal region. So studying specific coastal regions is a part of DOM. Once we know the exact coastal impact, we would be able to know how to mitigate it.

■ **Isn't INCOIS developing a navigation protection plan for vessels?**

It's called the inland vessel limits (IVL). Depending upon the type of the vessel, you need information on how close to the coast or how far from the coast could it actually come for conducting its operations. Bigger vessels can navigate much rougher waters. Whereas, smaller vessels can't navigate rough waters. INCOIS is providing this information to several maritime boards. We will come up with an atlas that can cover all the ports and harbours to set IVL. That's a product on which we are already working with some maritime boards and we will eventually expand it to other regions.