T. Srinivasa Kumar

T. Srinivasa Kumar

T. Srinivasa Kumar of the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, holds multiple responsibilities. He is Head of the Advisory Services and Satellite Oceanography Group (ASG) and Chairman of the Indian Ocean Global Ocean Observing System (IOGOOS). He is also in-charge of the National Tsunami Early Warning System (NTEWS). He has been awarded the 2012 National Geoscience award conferred by the Ministry of Mines. In this interview he talks about the NTEWS and how it works.

What does NTWES consist of?

It consists of a real-time network of seismic stations, bottom pressure recorders, tide gauges and 24×7 tsunami warning centres to detect tsunamigenic earthquakes, monitor tsunamis and provide timely advice to vulnerable communities. This is supported at the back-end by a scenario database, vulnerability modelling and a decision support system.

Why do you need a scenario database? Can you explain how it works?

Our work starts when an submarine earthquake of magnitude greater than 6.5 occurs in the Indian Ocean region (or one of magnitude higher than 8 outside the Indian Ocean region). We are able to detect such submarine quakes within 6–8 min of their occurrence. If we were to run a simulation of the parameters to find out if a tsunami will be generated it would take 20–30 min, which we cannot afford. So we compare them instead to pre-run scenarios which have been developed for parameters that closely match the received values. Based on this, we issue the warning. This is a procedure that only takes a minute or two from the time we receive the earthquake information. We have a graded and granular warning system. We either give a warning, alert or watch depending on the severity of the situation.

Does the estimation have a range? How do you actually put it to use?

Earthquakes can be of different types. For example, the 11 April 2012 earthquake was a strike–slip type, which would not have generated a vertical displacement of water needed for a tsunami to form. But in order to be on the safer side, we look at the worst case scenario of a tsunamigenic earthquake of the similar magnitude. We do not, however, over-warn and take the warning system cautiously.

Have you tested out the warning system?

We had a mock drill on 12 October 2011 and the result was good. We tried out 58 centres and 35 responded well. In fact, in Maharashtra, Pudhucherry and Odisha, they took it right down to the community level and tested the eviction of people. We learnt several lessons out of the drill. For example, that the automated fax machine is better than a manually operated one. We found that in a drill that lasted 12 h there were some centres that had a power cut. So we learnt that the control rooms should have uninterrupted power supply. Also, for the sake of villages that may not have the internet or be literate about it, the dissemination of information should be done through satellites.

How long did it take to develop the NTEWS?

In 2004, immediately after the devastating tsunami of 26 December, INCOIS was asked to set up the tsunami warning system. From then to now it has been a long journey. The tsunami is a subject of multidisciplinary study. Many institutes were part of the work, such as India Meteorological Department; Survey of India (SoI); National Institute of Ocean Technology (NIOT), Chennai; Integrated Coastal and Marine Area Management (ICMAM), Chennai and Indian Space Research Organisation (ISRO). After a collaboration of nearly two and a half years, we were able to set up the NTEWS in 2007. It has been operational since October 2007, but we have continued developmental work on it since then.

What was the contribution of each of the above institutes?

The tsunami buoys were contributed by NIOT. SoI was involved in setting up the tide gauges. These give us an idea about the coastal sea level, and have been set up all along the coastlines of India. ICMAM was responsible for the tsunami modelling and hazard assessment along the coast. ISRO developed the INSAT-based communication system. We also needed high-resolution topographic data of the entire region, which was provided by the National Remote Sensing Centre, Hyderabad. It is a complex system involving varied expertise, from oceanography to computer engineers and geophysicists, and so on. Even the hardware and establishment of the standard operating procedure needed inputs from various sources. So, it is a truly collaborative effort.

Shubashree Desikan
(*S. Ramaseshan Fellow*)
e-mail: shuba.desikan@gmail.com