Tsunamis

Education, Preparation, Key to Reducing Tsunami Risks

After the devastation wrought by the powerful 9.0 earthquake and ensuing tsunami in Asia in late 2004, many people in other coastal areas were left wondering if they, too, were vulnerable to a similar catastrophe. Tsunamis, which are long, seismic sea waves, can be caused by a variety of triggering events, such as earthquakes, volcanic eruptions, or massive undersea landslides. In the open ocean, these waves are barely noticeable even as they travel at speeds up to 700 kilometers per hour. Upon reaching shallow waters, their power becomes all too visible as either towering waves tens of meters tall or mighty surges of swiftly flowing water.

Tsunamis occur relatively infrequently as compared to other natural phenomenon, but they remain unpredictable and even the best warning systems – if in place and working – provide but a limited amount of time for people to evacuate and find safe haven.

With more than 200,000 deaths attributed to the 2004 Indian Ocean tsunami, South Florida and the Caribbean have come into the spotlight as government officials evaluate the need for global tsunami warning. Not surprisingly, Rosenstiel School researchers are involved.

Changes from east to west

In the Pacific, earthquakes are the most common triggers of tsunamis, so seismometers, which detect earthquake ground motion, provide critical information for early warnings. While earthquakes could generate a tsunami in the Atlantic or Caribbean, scientists believe that landslides and volcanic eruptions pose a greater threat. The problem is that such events would not necessarily trigger a seismometer-based warning system. Additional sensors, such as volcano-monitoring instrumentation, are required. A tsunami generated close-in by a so-called local event, leaves little time for warning, so it is critical for any tsunami warning system to include an education component. Educating the public on how to respond to warning signs such as seismic shaking or the quick retreat of the sea may be equally as valuable as the most high-tech, expensive warnings systems.

NOAA is investigating the most cost-effective approach to take and scientists at the Rosenstiel School have weighed in. It is critical that long-term planning is done to understand the full spectrum of natural hazards coastal communities face and to design and implement a cost-effective warning system that takes into account both frequent and infrequent events and minimizes loss of life and economic damage.

Understanding the waves

It is important to know precisely where and how tsunamis could cause damage in any region. Some Rosenstiel School researchers are, in fact, developing wave models that factor in a variety of environmental indicators to ultimately provide a more accurate estimate of tsunami impact.

Better policy as important as better science

In Rosenstiel School’s Marine Affairs and Policy Division, researchers are providing a unique and distinctive perspective on natural disasters: sometimes science isn’t enough. At the cutting-edge of a new trend in addressing what technology cannot control, these researchers consider how a society can address its vulnerabilities through better urban planning and practical public education. After the Indian Ocean tsunami, international nongovernmental organizations contacted Rosenstiel School: how do we better prepare coastal communities in the face of very limited warning. What can we do to reduce risks?

And that’s when researchers focus on sensible, community and individual preparation: from new techniques for building strong structures and village loudspeakers that can announce a tsunami’s imminent arrival to public education campaigns that teach people to run to higher ground or to be aware of instances when the tides seem to go out rapidly. And within the context of urban planning, officials must weigh the benefits of various approaches (e.g., do we spend our money on a cholera prevention campaign which can occur with tsunamis and other natural disasters or do we invest in a loudspeaker system?)

Rosenstiel School recognizes the magnitude of natural disasters, and that’s why it and other institutions, are working to better understand the hazards and reduce risks for coastal communities.