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## Geography and the Indian Ocean Tsunami

Watching televised coverage of the destruction wrought by the recent Indian Ocean tsunami, one can not help but feel tremendous and profound compassion for the disaster's many victims. On an individual and human level, the damage is both shocking and heartbreaking, yet as geographers, the disaster reminds us of the potential contributions our discipline offers toward understanding and responding to catastrophic events, a topic in geography that draws from all of our sub-disciplines.

### Immediate Aid

Government agencies and geographic software and satellite imagery producers have all pitched in to relief efforts. The U.S. Geological Survey (USGS), in cooperation with the American Geological Institute (AGI), is providing copies of the Global GIS DVD-ROM to U.S. Department of State-led teams traveling to Humanitarian Information Centers in affected areas. Numerous other private organizations are providing free satellite images of the tsunami area and ESRI is offering temporary software licenses and technical support to government agencies and official disaster relief organizations.

To help get relief to the areas where it is most needed, David Skole and the team from the Center for Global Change and Earth Observations at Michigan State University, along with the Indonesian government, is using satellite imagery to create a relief-need map. With many areas cut off from communication or transportation, the team is using techniques originally used for rainforest deforestation projects, cross-mapping thirty-meter resolution imagery with population-density and urban areas maps to locate the hardest-hit areas.

Somrudee Meprasert, a geography doctoral student at Oregon State University, joined a tsunami scientist emergency team

at Chulalongkorn University in Bangkok, Thailand to help her home country recover from the devastation. Before the tsunami struck, she had planned to study tourism management in marine protected areas (MPAs) in Southeast Asian countries (Thailand, Philippines, Vietnam, Malaysia, and Indonesia) but now with 75% of MPAs in the Andaman Sea, Thailand affected, she will aide the recovery efforts first, before starting on her adapted research plan.

### Warning Systems & Recovery Efforts

The tsunami's cataclysmic effect was exacerbated by the lack of a detection or warning system in the Indian Ocean. In an article carried by the *Los Angeles Times* and

other papers on January 1 entitled, "Vital technology as a human right" geographer Robert Chen of the Centre for International Earth Science Information Network at Columbia University and co-authors Arthur Lerner-Lam and Leonardo Seeber (seismologists with the Lamont-Doherty Earth Observatory) write that the disaster was "...the consequence of years of underinvestment in the scientific and technical infrastructure needed to reduce the vulnerability of developing countries to natural and environmental calamity." In response to the disaster the U.S. now has plans to help start an Indian Ocean tsunami warning system, as well as a system to protect U.S. coasts (for details see AAG Washington Monitor page 11.)

A recent article by geographers in *Coastal Management* (2004, Vol. 32, pp. 243-269) summarizes how GIS can be used to assess the vulnerability of harbor communities to tsunamis. The article, by Nate Wood (USGS, Menlo Park, CA) and Professor Jim Good (Oregon State University), details how GIS was used to integrate interpretations of physical phenomena

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## 10-Year-Old Geography Student Saves Lives

In one of the more hopeful tales from the recent tsunami disaster, a young British girl credited school geography lessons with her ability to recognize the impending tsunami and warn her family and other beachgoers in time to avoid the onslaught of the waves. The Associated Press reported in a story on January 1, 2005, that ten-year-old Tilly Smith from Surrey in England, was vacationing with her family on Maikhao beach in Phuket, Thailand, when the tide suddenly went out. Remembering a recent lesson on earthquakes and tsunamis from her geography teacher, Andrew Kearney, at Oxshott's Danes Hill Prep School, Tilly warned her mother about the danger. Her parents informed other beachgoers and staff at their hotel, which was quickly evacuated. The wave crashed a few minutes later, but no one on the beach was killed or seriously injured.

## Field Trips

Sign up for  
AAG Annual Meeting  
Field Trips now—  
Space is limited.

See page 8 for details  
or visit  
[www.aag.org/annualmeetings/  
Denver2005/sp\\_events.cfm](http://www.aag.org/annualmeetings/Denver2005/sp_events.cfm)

*Indian Ocean Tsunami from page 2*

along the Oregon Coast with spatial attributes of the population (employee, tourist, residential), economic assets, and community infrastructure to produce maps of composite hazards, composite assets, and composite vulnerability. One now encounters highway signs along U.S. Highway 101 in the vicinity of their study area, indicating when you are entering or leaving tsunami zones.

In addition to plans for warning systems, efforts are now underway at the National Geospatial-Intelligence Agency's Office of Global Navigation to redraw coastal and maritime maps. The tsunami's force moved huge volumes of sediment eroding some areas and filling in others resulting in reconfigured shorelines, swallowed islands, and silted shipping lanes. New maps will allow for safe delivery of relief supplies as well as the eventual resuming of shipping routes.

### Geographic Education

K-12 teachers are anxious to incorporate lessons from the tsunami into their classrooms, and although dramatic, news coverage has failed to deliver important geographic facts or put the devastation into context with population distribution and physical geography. To counter this, the National Geographic Society hosted a three-day forum on tsunamis for the Forces of Nature Community of teachers on the NGS EdNet website. During that time, I responded to tsunami questions posted by K-12 teachers and their students. The Arizona Geographic Alliance also includes on their website a "GeoMath" lesson on tsunamis by teacher/consultant Mike Baron ([http://alliance.la.asu.edu/azga/lp\\_view.php3?lesson\\_id=320](http://alliance.la.asu.edu/azga/lp_view.php3?lesson_id=320)).

In the *LA Times* article mentioned above, Chen and his co-authors point out that "Disasters affect poor and developing countries disproportionately. The poor's struggle for daily survival does not allow for disaster preparedness. Persistent environmental stress, such as recurring natural disasters, diverts long-term investment in sustainable development. Little is left for the sorts of investments that make for livable societies." Geographers hardly



Source: Wikipedia Commons

need to be reminded of this, but the public and our lawmakers certainly need to hear this message loud and clear. Fundraising by governments and non-governmental organizations have together already broken all records on an international scale

for relief. However, after the short-term relief efforts, one wonders about the spatial dimensions of aid allocation. Will resort areas receive more relief funds than low-lying areas populated by lower-income residents? Will ongoing assessment of disaster risk management be linked to foreign aid? This disaster reminds us that physical geography, hazard vulnerability, and social-economic impacts of extreme natural events have a strong spatial dimension that requires collaborative work by the core specialties in geography. Geographic dimensions of the tsunami disaster would be an appropriate and timely discussion topic at the 2005 AAG Annual Meeting in Denver as part of AAG President Vicky Lawson's call for us to build analyses of the "Geographies of Fear and Hope." ■

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