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U.S. Contribution to the
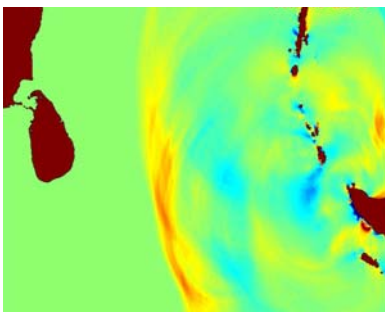Indian Ocean
Tsunami Warning
System

US IOTWS Small Grants Program
Mapping the Threat
DEVELOPMENT OF TSUNAMI HAZARD ZONATION MAPS FOR THE COASTAL BELT OF SRI LANKA

Tsunami inundation modeling and mapping locations along the coastal belt of Sri Lanka.

Snapshot of modeled tsunami propagation across the Indian Ocean towards Sri

US IOTWS Small Grants Program
The US Indian Ocean Tsunami Warning System (IOTWS) Program has funded 17 small grants in India, Indonesia, Sri Lanka and Thailand as part of its $16.6 million two-year effort to support the development of an end-to-end warning system in the region. The small grants program catalyzed and promoted pilot activities that contribute to community and bottom-up results in disaster mitigation, preparedness, and response.

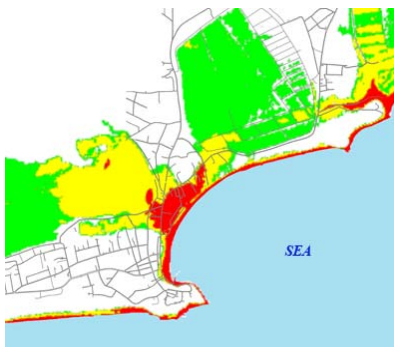### The Tsunami Hazard Mapping Project in Sri Lanka
Vulnerable coastal communities need to know where to go in the event of a tsunami and prior knowledge of safe areas is vital to ensure quick and safe evacuation. Tsunami hazard maps provide a graphical presentation of how far inland a tsunami will travel and how high the water depth will be in each locality, so that they are instrumental in planning effective evacuations.

Peradeniya University Engineering Faculty, in collaboration with Cornell University College of Engineering, developed tsunami hazard maps for five cities on the coastal belt of Sri Lanka by constructing state-of-the-art computer models of tsunami inundation. The computed tsunami inundation is shown on maps in three color-coded depth ranges: 0–0.5 meter in green, 0.5–2 meter in yellow, and depths greater than 2 meter in red. These depth ranges have been chosen because they are approximately knee-high or less, knee-high to head-high, and more than head-high. The five cities selected for the project were the most severely affected by the 2004 tsunami.

Project Achievements
The tsunami hazard maps developed for the five cities devastated by the 2004 tsunami were provided to the Disaster Management Center (DMC) of the Government of Sri Lanka. The DMC and others are expected to use these maps in evacuation planning as well as in public educational and awareness activities.

The project also trained two young engineers on tsunami inundation modeling and hazard mapping using advanced computer software. Project researchers shared experiences on the methodologies of tsunami inundation modeling and hazard mapping for 45 participants of the Master's Degree Program in Disaster Management as well as for 60 final year engineering students, at the Peradeniya University.

Computer simulated tsunami inundation for the city of Hambantota on the south coast of Sri Lanka.

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Lessons Learned

There is still great uncertainty in the quality of earthquake data used in the inundation model because the nature of the tsunami depends on the initial seabed deformation from the earthquake, which is poorly understood.

Another significant limitation is that the resolution of the modeling is no greater or more accurate than the available bathymetric and topographic data used. Although the near-shore seabed bathymetry was digitized from comparatively low-resolution navigation charts, high-resolution topographic data generated using remote sensing techniques, were used in the modeling of tsunami inundation onshore for three of the five cities.

Next Steps

The University of Peradeniya Faculty of Engineering will explore the possibility of establishing a physical entity dedicated to coastal hazard modeling and mapping and equipped with necessary hardware and software.

If funding could be secured for the forming of such an entity, we would then be able to: a) ensure long-term continuation of the tsunami modeling and mapping work for the rest of the vulnerable areas of the coastal belt of Sri Lanka, b) provide the necessary expertise and technical training in tsunami hazard mapping and modeling to relevant government agencies in Sri Lanka over a longer period to ensure further consolidation of such capabilities in Sri Lanka, and c) effect continuous improvements to the existing hazard maps as better spatial data and tools become available for numerical modeling and mapping.

About the Peradeniya University Engineering Faculty

The Peradeniya University Engineering Faculty is the oldest, premier seat of engineering education and research in Sri Lanka. The Faculty offers both undergraduate as well as postgraduate degree programs in several disciplines of engineering while contributing to the national development through research and development as well as enhanced interaction and collaboration with the industry.

For more information on activities or partnership activities, visit
www.civil.pdn.ac.lk/tsunami/tsunami_hazard_maps.htm
or www.civil.pdn.ac.lk.

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region. For more information please visit **www.iotws.org**.

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