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Regional tsunami vulnerability analysis through ASTER imagery

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Analysis of vulnerability to natural hazards is a key issue of prevention measures within ICZM. Knowledge of susceptibility to damage and how this is distributed along the coast allows to optimize possible prevention and mitigation actions.
The present study focuses on tsunami vulnerability of a large extension of coastline: the entire westerly Thailand's coast. The work is a follow up of the CRATER project (Coastal Risk Analysis for Tsunamis and Environmental Remediation) carried out on the aftermath of the 26th December 2004 Tsunami event.
Vulnerability is analyzed considering an inundation scenario given by a tsunami of seismic origin, causing a maximum run-up of 25m..
An innovative methodology have been here developed and applied, based on the combined use of ASTER (Advanced Spaceborn Thermal Emission and Reflection Radiometer) satellite imagery, SRTM v-3 (Shuttle Radar Topography Mission – version #3) DEMs and GIS.
Vulnerability level has been calculated combining information on coastal geomorphology, land use, topography and distance from the shoreline.
Land use has been extrapolated from ASTER images through a multi-spectral analysis (a pixel-based and supervised classification process) of ASTER bands 1 to 9, plus one band for the NDVI index (Normalized Difference Vegetation Index). Coastal geomorphology has been obtained through a photo-interpretation process.
Results have been organized in a set of vectorial vulnerability maps with horizontal resolution of 90m.
The proposed methodology has the great advantage of being repeatable for any case of vulnerability analysis at small-medium scale (i.e. at Regional/National level) with a moderate investment in term of costs and human resources.