

Tsunami hazard studies in South East Asia

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The 2004 Indian Ocean Tsunami has led to an increased awareness of tsunamis on a global level, and in particular in the South East Asian region. Emphasis has been on awareness as well as establishing warning system, and to a less degree on tsunami hazard and risk mapping. Notwithstanding, there is a need for quantifying the hazard and risk on a regional basis as an instrument for decision makers on national and regional scales.

In this presentation we discuss potential tsunamis in South East Asia and regional hazard mapping, with emphasis on the Philippines and eastern Indonesia. The hazard analysis presented here is conducted for a range of projects, which objectives are reviewed.

First, historical tsunamis and seismicity and the associated tsunami potentials is discussed briefly. A number of tsunami scenario simulations are conducted, examples of the seismic analysis leading to the scenarios briefly reviewed. Initial wave heights for the tsunami scenarios are computed using a standard analytical dislocation model, combined with a smoothing of the sea surface discontinuities above the fault line. The wave propagation is modelled using the dispersive wave model GloBouss. Because of the large geographical extent of the study area, the method for quantifying the tsunami hazard has been scenario based, focusing on overall trends rather than details. For a regional assessment of the shoreline run-up heights of each scenario, amplification factors computed for plane waves are utilised. Moreover, possibilities in coupling the propagation model to a run-up model for local run-up evaluations are exemplified.

The scenarios are based on a thorough investigation of past tsunami events throughout the recorded history, as well as the regional seismicity. Most of the scenarios are designed to closely resemble so called 'credible worst case scenarios', i.e. with magnitude equal to or slightly higher than the largest recorded earthquake within a given study region. The study regions include (i) Bali/Flores Sea region, (ii) The

Banda Sea, (iii) Northern Sulawesi, (iv) Irian Jaya, (v) South western Mindanao, and (vi) The Manila Trench and western Luzon Island. Results are presented for a selection of the above mentioned study regions. Finally, regional / merged hazard maps for the whole region are presented.