Geophysical Research Abstracts,
Vol. 11, EGU2009-8019, 2009
EGU General Assembly 2009

Methodology for local tsunami hazard mapping and assessment for Mediterranean and North Atlantic coasts, SCHEMA Project (EC FP6).

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At local level, tsunami hazard is usually described by inundations maps providing inundation depths and extension. However, many other parameters such as eddies, fast currents, erosion, receding seas, impact of breaking waves have effects on natural and human environment. Modern tsunami modelling tools can provide a part of these informations and allow producing hazard maps with multiple parameters.
Nevertheless, a benchmark is necessary to qualify the capacity of the models for traducing the reality. A comparison of five modelling tools has been undertaken in the framework of SCHEMA Project, using a single set of data on an Island of Seychelles. A simulation of the 26th December 2004 Indian tsunami has been carried out on each model and simulated tide gauges have been compared to the Point la Rue Tide recorded tide gauge close to the Airport of Mahé Island. The inundation extension is also compared to the mapped Dec 2004 inundation. The results show that each model represent generally well the first waves for 2 or 3 hours but they almost all loose compatibility with reality beyond, whereas the real effects were recorded during 24 hours on the Seychelles. The modelled inundation can also vary significantly and introduce a high level of uncertainty on inundation depth and extents.
This sets the difficulty to have trust in models simulations for long duration events especially in the aim of emergency planning after warning or confirmation of a real tsunami.
After a first stage of qualification of models, a set of hazard parameters are produced for a given tsunami source. Each of these factors is represented by a map and simulated tide gauges complete the set of information describing the hazard. The operational hazard mapping scales ranging generally from 1/25000 to 1/5000 require using a higher ground resolution than what is generally used in most tsunami modelling software's. A ground resolution around 10m appears to be an optimal target.
The uncertainty level is assessed and represented for some of the factors and land use features are added for a first representation of vulnerability. For the chosen location, the final global hazard map is produced by the extraction of each maximum tsunami scenario for some parameters with a potential use for coastal zone planning and management. Each tsunami scenario and its associated hazards are a tool for early warning, alert, crisis management and rescue operations by relief operators. Considering the rarity of tsunamis both in Seychelles and in the western Mediterranean and NE Atlantic, the probability of occurrence is not considered as a relevant parameter in this first stage of the analysis.