A tsunami early warning system based on database of flood model results for Aceh and Nias

B. van Veen (1), D. Vatvani (2), Alamsyah Kurniawan (3), T. van der Plas (4)

(1) Witteveen+Bos, The Netherlands, (2) Deltaris, The Netherlands, (3) Instute of Technolgy Bandung, Indonesia, (4) DHV, The Netherlands

Arrival time of an earthquake-generated tsunami in Aceh is extremely short (20 - 30 min). To determine within seconds the tsunami floodzone based on earthquake location, depth and magnitude SDC established a tsunami scenario database. About 300 simulations of tsunami propagation and inundation scenarios generated by possible earthquakes along the Sunda Trench off the coast of North Sumatra have been carried out. Results are stored in a geo-database after being analyzed and geo-referenced. The result is a database which will be used for the Tsunami Early Warning in Aceh and Nias to provide information on most likely tsunami hazards along the coast seconds after a tsunamigenic earthquake occurs.

Initial wave fields for tsunamis are determined for earthquakes with different magnitude, epicentre and focal depth using the OKADA model. The wave fields are used as initial conditions in the tsunami propagation and inundation model constructed with Delft3D that among others has been validated with the December 2004 tsunami event. The associated tsunami propagation and inundation were reproduced very well. Accurate inundation patterns were obtained mainly due to the applied special flooding approach in the Non-Linear Shallow Water (NSWE) solver. By simulation of the initial wave fields, accurate detailed information is gained on nearshore tsunami wave height, tsunami inundation length and run-up. By smart-storage of the gained data, a geo-related tsunami database is constructed that can be accessed quickly and contains only the requisite information.

Automated linking of the tsunami database to a (national) warning system would al-

low to issue reliable tsunami warnings for specific locations along the coast that are most likely to be hit by a significant tsunami. The absence of warnings for locations that are most likely not to be affected can minimize panic reactions in those regions. Emergency response can be narrowed down to the sites that are most likely in need of aid.