

High-performance Computation in Hazard and Risk Research

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Numerical modelling of geological, meteorological and hydrological hazards can be done for realistic scenarios in 3D and is increasingly requested by disaster management agencies. Examples include modelling of elastic wave propagation in complex structures (seismic hazard), development of high-resolution wind velocity maps for Germany (winter storm risk), and inundation scenarios of rivers during flood conditions. If results of these computations are to be incorporated in real-time decision making state-of-the-art still uses simplified computational approaches. However, it is obvious that full real-time computations can be very beneficial for early warning purposes for extreme events including tsunami early warning. We discuss this issue with reference to real-time damage prediction for storms, floods, and earthquakes.

Another emerging issue consist in handling increasing volumes of high-resolution (in time and space) data set that are generated continuously for instance in seismic networks. We report from work and experience within the Center for Disaster Management and Risk Reduction Technology (CEDIM, www.cedim.de), a joint center of GeoForschungszentrum Potsdam, Karlsruhe University, and Forschungszentrum Karlsruhe.