



Advanced Simulation of Coupled Earthquake and Tsunami Events

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Tsunami-Earthquakes represent natural catastrophes threatening lives and well-being of societies in a solitary and unexpected extreme event as tragically demonstrated in Sumatra (2004), Samoa (2009), Chile (2010), or Japan (2011). Both phenomena are consequences of the complex system of interactions of tectonic stress, fracture mechanics, rock friction, rupture dynamics, fault geometry, ocean bathymetry, and coastline geometry. The ASCETE project forms an interdisciplinary research consortium that couples the most advanced simulation technologies for earthquake rupture dynamics and tsunami propagation to understand the fundamental conditions of tsunami generation.

We report on the latest research results in physics-based dynamic rupture and tsunami wave propagation simulation, using unstructured and adaptive meshes with continuous and discontinuous Galerkin discretization approaches. Coupling both simulation tools – the physics-based dynamic rupture simulation and the hydrodynamic tsunami wave propagation – will give us the possibility to conduct highly realistic studies of the interaction of rupture dynamics and tsunami impact characteristics.