



Uncertainties in Tsunami Simulations from Uncertain Bathymetry

Serge Guillas*

University College London, UK – s.guillas@ucl.ac.uk

Xiaoyu Liu

University College London, UK – xiaoyu.liu.12@ucl.ac.uk

VOLNA, a nonlinear shallow water equations solver, produces high resolution simulations of earthquake-generated tsunamis. However, the uncertainties in the bathymetry (from irregularly-spaced observations) have an impact on tsunami waves. We first employ a Gaussian field to quantify uncertainties in these boundary fields via the Bayesian INLA-SPDE method. These uncertainties are then parametrised to be used as inputs of an Gaussian Process emulator of VOLNA. We finally propagate uncertainties in the bathymetry to obtain an improved probabilistic assessment of tsunami hazard.

Keywords: emulation, spatial statistics, tsunamis