Geophysical Research Abstracts
Vol. 15, EGU2013-13112-1, 2013
EGU General Assembly 2013
© Author(s) 2013. CC Attribution 3.0 License.

Modeling the 1958 Lituya Bay mega-tsunami with a PVM-IFCP GPU-based model

José M. González-Vida (1), Diego Arcas (2), Marc de la Asunción (3), Manuel J. Castro (3), Jorge Macías (3), Sergio Ortega (4), Carlos Sánchez-Linares (3), and Vasily Titov (2)

(1) Dpt. Matemática Aplicada, Escuela Politécnica Superior, Universidad de Málaga, Spain., (2) National Oceanic and Atmospheric Administration, Pacific Marine Environmental Laboratory. Seattle. USA., (3) Dpt. Análisis Matemático, Facultad de Ciencias, Universidad de Málaga. Spain., (4) Laboratorio de Métodos Numéricos, SCAI, Universidad de Málaga. Spain

In this work we present a numerical study, performed in collaboration with the NOAA Center for Tsunami Research (USA), that uses a GPU version of the PVM-IFCP landslide model for the simulation of the 1958 landslide generated tsunami of Lituya Bay. In this model, a layer composed of fluidized granular material is assumed to flow within an upper layer of an inviscid fluid (e. g. water). The model is discretized using a two dimensional PVM-IFCP [Fernández - Castro - Parés. On an Intermediate Field Capturing Riemann Solver Based on a Parabolic Viscosity Matrix for the Two-Layer Shallow Water System, J. Sci. Comput., 48 (2011):117-140] finite volume scheme implemented on GPU cards for increasing the speed-up.

This model has been previously validated by using the two-dimensional physical laboratory experiments data from H. Fritz [Lituya Bay Landslide Impact Generated Mega-Tsunami 50th Anniversary. Pure Appl. Geophys., 166 (2009) pp. 153-175]. In the present work, the first step was to reconstruct the topobathymetry of the Lituya Bay before this event ocurred, this is based on USGS geological surveys data. Then, a sensitivity analysis of some model parameters has been performed in order to determine the parameters that better fit to reality, when model results are compared against available event data, as run-up areas.

In this presentation, the reconstruction of the pre-tsunami scenario will be shown, a detailed simulation of the tsunami presented and several comparisons with real data (runup, wave height, etc.) shown.