



## **Lessons learned and modeling the tsunami vulnerability and damage assessment for the Balchik (NE Bulgaria Black Sea coast) test site**

Boyko Rangelov (1), Stefan Scheer (), and Garo Mardirossian ()

(1) Geophysical Institute - BAS, Seismology, Sofia, Bulgaria (brangelov@gmail.com, +359 2 971 30 05), (2) JRC, Ispra, Italy, (3) SRI-BAS, Sofia, Bulgaria

Two scenarios of the tsunami effects produced by two earthquakes generated from a well known seismic source are developed. This source produced several strong seismic events during the last two millenniums. The first case is related to the 543 earthquake – a seismic event with limited information about its position, power and consequences. Only an archeological site called Cybele temple discovered during 2007 keep the well preserved consequences generated probably by this event. The preserved effects have been localized in the ruing of the above mentioned temple. The second case is the 1901 seismic event with a magnitude 7.2 (maximum observed intensity 10 EMS) and generated a tsunami (with intensity V Papadopoulos-Imamura intensity scale) is much better studied. For both events two different scenarios based on normal faults seismic sources (Ist case – subparallel strike, IInd case – sublateral to the maximum shelf gradient strike) have been developed. First case modeled by the NOAGI team during the EU SCHEMA Project and the second – by the UniBo EU TRANSFER Project show some specificities of the travel times, virtual tide gauges records and the possible consequences to Balchik – the most vulnerable city of the coast. These specificities are related to the observed ray diffraction, which focused the tsunami effects to the coast line and produced local magnification effects. These effects are considered to the vulnerability and damage effects to the buildings and infrastructures.