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The November 17, 2015 Lefkada offshore (non-?)tsunamigenic earthquake: preliminary considerations and implications for tsunami hazard and warning in the Ionian Sea

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A Mw = 6.5 earthquake occurred on November 17, 2015 just offshore the western coast of the Ionian island of Lefkada (western Greece). The earthquake caused two fatalities and severe damage, especially in the island of Lefkada. Several landslides were set in motion by the earthquake, some of which occurred along the coastal cliffs. The earthquake was clearly felt also along the eastern coasts of Apulia, Calabria and Sicily (Italy). The computed focal mechanisms indicate that the rupture occurred along a dextral strike-slip, sub-vertical fault, compatible with the well-known transcurrent tectonics of the Lefkada-Cephalonia area. At the time of the drafting of this abstract no heterogeneous slip distribution has been proposed. No clear evidence of tsunami effects is available, with the only exception of the signal recorded by the tide gauge in Crotone (eastern Calabria, Italy), where a clear disturbance (still to be fully characterised and explained) emerges from the background at approximately 1 hour after the earthquake origin time.

From the tsunami research point of view, the November 17 Lefkada earthquake poses at least two problems, which we try to address in this paper. The first consists in studying the tsunami generation based on the available seismic information and on the tectonic setting of the area. We present results of numerical simulations of the tsunami generation and propagation aimed at casting light on the reasons why the generated tsunami was so weak (or even absent). Starting from the official fault parameters provided by the seismic agencies, we vary a number of them, there including the length and width calculated on the basis of different regression formulas, and the depth. For each configuration we perform tsunami simulations by means of the in-house finite-difference code UBO-TSUFD. In parallel, we analyse the Crotone tide-gauge record in order to understand whether the observed "anomalous" signal can be attributed to a tsunami or not. In the first case we will try at least to reproduce the observed signal, otherwise we will try to understand whether the non-tsunamigenic nature of the event is confirmed by the tsunami simulations.

The second problem is more related to tsunami early warning issues, in particular with the performance of the Tsunami Decision Matrix for the Mediterranean, presently adopted for example by the candidate Tsunami Service Providers at NOA (Greece) and INGV (Italy). We will briefly discuss whether the present form of the matrix, which does not include any information on focal mechanism, is well suited to a peculiar event like the November 17 earthquake, which was of strike-slip nature and had a magnitude lying just at the border between two distinct classes of tsunami potential forecast.

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