PREDICTION OF MAXIMUM POSSIBLE TSUNAMI FLOODING AIMED TO THE REDACTION OF PREVENTION, MITIGATION AND INTERVENTION PLANS

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Tsunami impact is known to leave a devastating mark on coastal areas; the recent experience of the February 11, 2011 Japan Tsunami, due to the high density of human settlements, showed that the effects of an unforeseeable tsunami can be unimaginably catastrophic. In order to safeguard continued human activity in case of an impact from extreme events, it is essential to actively search for monitor suspect areas and develop models that provide forecasting, warning and pre- and post-events managing instruments. In fact the implementation of mathematical models correspond realistically to the complexity of processes that occur during coastal inundation. The mathematical models were used to obtain the run up and the landward flooding limit produced by future tsunamis. Numerical models that simulate the potential of tsunamis have been produced; they are based on differential equations with particular boundary conditions according to the local coastal features. In particular, Hills & Mader's formula enables us to calculate the inland flooding limit of a tsunami. The results depend from the values of the n Manning's, corresponding to the hydraulic roughness. This formula has bee recently modified for sloping rocky coasts; in spite of this, it is strongly influenced by Manning's number. In function of different surface materials, many authors use different roughness coefficient values and quite often they are not the same. As a consequence, the use of the Hills & Mader equation is not always rigorous. Furthermore, the value does not remain constant over time in the same place, due to vegetation overgrowth and/or urban development and variations of flow conditions. As a consequence it is possible to obtain an evaluation of the present roughness. Our aims have been: i) develop a method to obtain a real Manning coefficient based on Terrestrial Laser Scanner and LIDAR topographical data; ii) test the method in study areas with evidence of a past tsunami impact; iii) present scenarios of possible depreciable future tsunami inundations.

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