



## **Macroseismic analysis of historical seismicity in the Ischia island (Southern Italy) and influence of geological conditions on the effects of earthquakes**

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The observations of seismicity of volcanic areas showed that, although the low values of magnitude generally recorded, earthquakes may produce heavy damages. This is usually related to the shallow hypocentral depth of volcanic earthquakes and to the poor mechanical properties of the rocks. Therefore, seismic hazard for the settlements close to the volcanic areas may be a reality. The examination of historical seismicity as well as the occurrence of a few low energy events in recent time in the island of Ischia show the peculiarity of earthquakes in volcanic areas, whose macroseismic analysis can only be interpreted by specific empirical laws. The studies of historical seismicity of the island, starting from 1228, and the detailed analysis of the effects of the most catastrophic 1883 event ( $I_{max} = XI$  MCS), have shown that the source of seismicity is located in the northern sector of the island, at shallow hypocentral depth (1-2 km). We present a detailed macroseismic analysis of damages of 1883 earthquake in order to define intensity versus distance law and its relation with geological and tectonic structures. The results confirm that the high intensity values, rapidly decreasing with distance, joined with the local amplification of damages and the strong directional attenuation of effects, can be related to the shallow source and to the different mechanical properties of rocks. The soil influence was taken into account segmenting the data of distribution of intensities by soil classes outcropping in the island (lavas, tuffs and reworked tuffs) in order to separate the different contributes of the amplification. Three attenuation model were fitted for each group of soils. The results show that local amplification of about 1.5 MCS degree is associated to the presence of soft soils. Therefore, in case of future earthquakes whose source is located in the northern sector of Ischia, high intensities are expected, even if earthquakes magnitude are moderate.