

Active volcano-tectonic deformations: a 3D seismic reflection experiment in the resurgent dome of the NYT Caldera (Pozzuoli Bay, Campi Flegrei, Naples)

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An ultra-resolution, 3D seismic reflection data cube was collected during an oceanographic cruise organized in the frame of a joint project involving Italian research institutions, the University of Palermo, Catania and Napoli, CNR of Napoli and INGV Roma, and two companies, the Geo Marine Survey System (The Netherlands) and GeoSurvey (Portugal). The data acquisition approach charted during this cooperation was based on innovative technologies for the offshore imaging of stratigraphy and structures at continental margins with horizontal and vertical resolution at decimetric scale. In this work, we present the methodology used for the 3D HR-seismic reflection data acquisition and the preliminary interpretation of the 3D seismic cube. The 3D seismic data were acquired onboard the N/O Minerva Uno by using an innovative data acquisition equipment composed by two sparker sources fired in flip-flop mode, and eight HR 48-channel, slant streamers, with group spacing variable from 1 to 2 meters, at 10 kHz sampling rate. An innovative navigation system was used to perform all necessary computations to determining real-time positions of sources and receivers. The investigated area is located in the central-northern part of the Pozzuoli (Naples) Bay that represents the offshore prolongation of the Campi Flegrei caldera. Here, an antiformal structure, corresponding to the resurgent dome associated with Neapolitan Yellow Tuff (NYT) caldera, characterizes the structure and morphology of the inner shelf (e.g. Sacchi et al., 2014). Previous research works based on 2 or 2.5D high-resolution reflection seismics (e.g. Steinmann et al., 2018), have documented the presence of collapse faults on the summit (apical graben) of the resurgent dome. However the 3D pattern of this structure and the style of ground deformation are still poorly defined. The results of this study provide the base for the quantitative analysis of active faults and stress field that are important for understanding the volcano-tectonic process responsible for the formation of the resurgence dome inside the caldera and its related hazard.

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