HIGH RESOLUTION ACUSTIC IMAGING OF INCIPIENT SEAFLOOR INSTABILITY IN THE POZZUOLI BAY, EASTERN TYRRHENIAN SEA MARGIN

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Pozzuoli Bay is located on the eastern Tyrrhenian margin, an area characterized by active tectonics and volcanism during the Pleistocene. The bay itself is part a densely urbanized coastal zone, where documented human activities have been developing for more than two thousand years.

During the Holocene two major period of eruptive volcanic activity occurred in the this area, namely from 10.0 to 8.0 ka B.P and 4.5 to 3.7 ka B.P. These periods were followed by the September 1538 Monte Nuovo eruption. Numerous monogenic volcanoes formed close to the shoreline and volcanic debris interpreted as submarine counterpart of subaerial flow and surge, has been detected in the Pozzuoli Bay. Particularly, in the eastern part of the bay a debris due to submarine reworking of the pyroclastic flow and surge deposits of Agnano-M.Spina (4.4 ka B.P.) has been recognized. Sedimentation in the Bay of Pozzuoli evolved along with folding deformation. Structural and stratigraphic analysis yield quantitative data including the timing of fold inception, and the amount of uplift rates that ranges between 20 and 7 mm/year for the Pozzuoli anticline over the last 8.0 ka B.P.

A synthesis of integrated multibeam batimetry, sidescan sonar imagery and sub-bottom (CHIRP) profiles reveals incipient gravitational instability affecting the debris flow unit of Agnano-M.Spina and its sedimentary cover. The area is fan-shaped in plan view and exhibits wavy a bottom surface that is a morphobathymetric expression of the deformation. The slump is characterized by 1) a decollement surface at the base of the volcanic layer; 2) creep deformation in the upper part of the slope affecting
the volcanic debris unit and the lower part of the underlying sedimentary layers; 3) normal growth faults in the middle slope and folds at the base of the slope that involve the volcanic deposits and the whole sedimentary cover.

The tectono-stratigraphic model we propose for the study area, includes a progressive deformation of the seafloor and subsurface, due to gravitational instability on the slope of the Pozzuoli anticline, a seismically active structure. The last step of our evolutionary model suggest that prominent scar area may develop on the upper slope, at present unaffected by evidence of rupture along the slope profile.