

PYROCLASTIC LUMPS: QUICK DIAPIRIC STRUCTURES OFF THE NAPLES BAY, ITALY

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Diapiric structures consisting of massive volcanoclastic deposits have been recently discovered beneath the sea floor a few kilometers offshore the Naples Bay (Eastern Tyrrhenian Sea). High-resolution single-channel seismic reflection profiles show these pyroclastic diapirs ("pyroclastic lumps") uplift through the uppermost Pleistocene - Holocene deposits and dramatically deform the sea floor over a quasi-circular area of ca. 2 km in diameter. The pyroclastic lumps of the Naples Bay are rooted in the uppermost layers of a large volcanic unit several tens of meters beneath the sea floor. Chemical analysis of the pumice collected from core-samples suggests that the pyroclastic deposits forming the diapirs derive from widespread eruptions of Latest Pleistocene-Earliest Holocene, i.e. the "Neapolitan Yellow Tuff" (12 Ka BP) or, alternatively, the "Pomici Principali" (10.3 Ka BP). A numerical model is presented in order to explain the origin of the pyroclastic lumps: according to our model the key factors controlling the dynamic system include: 1) the viscosity of the ascending pyroclastic material, 2) the density of the overlying deposits, 3) the density contrast between these structures and the overlying sediments, 4) the initial width of the individual diapiric structures. The modeled rates of uplift of pyroclastic lumps are in the order of several mm/year.

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