



Seismic reflections reveal a melt layer beneath the Campi Flegrei caldera, southern Italy

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Campi Flegrei (Phlegrean Fields) is an active, resurgent volcanic caldera that is located a few kilometres west of the city of Naples, a densely populated urban settlement in southern Italy. Identifying, locating at depth and better defining the geometry of the magma feeding system of the caldera is highly relevant for assessing and monitoring its volcanic hazard. Based on a high resolution seismic reflection dataset, we investigated the deep structure of the volcano. Here we show that seismic wave amplitude variations with distance from the source provide clear evidence for large amplitude reflections from the top of an extended, supercritical fluid-bearing rock formation at about 3000 m depth and of an about 7500 m deep low-velocity layer, which is associated with a mid-crust, partial melting zone beneath the caldera (around 70 percent of molten rock). These new data suggest that a large magmatic sill is present well within the basement formations, which is possibly linked to the surface through a system of deep fractures bordering the caldera. The lateral extensions and similar depths of melt layers observed beneath Campi Flegrei and beneath the nearby Vesuvius volcano support the hypothesis of a single continuous magma reservoir feeding both of these volcanoes.