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Seismic imaging of the hot source of Campi Flegrei unrest

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Campi Flegrei caldera is the site of the largest volcanic eruption in Europe during the past 100,000 years. Here, we propose a novel seismic attenuation and lapse-time source model supported by interdisciplinary data, which image the structures and dynamics active at the caldera with enhanced interpretational potential. The deepest anomaly in our model is a 4-5 km deep, NNW-SSE striking, aseismic hot zone offshore the city of Pozzuoli, active during the main seismic and deformation unrest of the caldera (1983-84). The hot zone is either a magma sill/fluid reservoir or the high-absorption top of of a molten domain, it feeds a reservoir of supercritical fluids/foams topping at a depth of about 3 km, and produces strong absorption, detected by 2D absorption mapping. Seismic activity, gravimetric anomalies, geomorphology, and geochemical data all confirm that the structure produces time-dependent pulses opening cracks in the generally aseismic western portion of the caldera, thus following the pattern of magma transfer active during the last eruption of the caldera, and stopping the unrest. After 1984, seismic activity oat Campi Flegrei has almost stopped due to changes in this deep feeding structure, which, as remote sensing data show, is still active today.