



A scattering Image of Campi Flegrei from the Auto Correlation Functions of Velocity tomograms

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We propose a new quantitative approach for the joint interpretation of velocity and attenuation tomography images, performed through the lateral separation of scattering and intrinsic attenuation. The horizontal P-wave scattering attenuation structure below Campi Flegrei Caldera (CFC) is imaged using the Auto Correlation Functions (ACF) of P-wave vertical velocity fluctuations. Cluster Analysis (CA) is then applied to interpret the images derived from ACF and the available P-wave total attenuation images at 2000 m quantitatively. The analysis allows the separation of intrinsic and scattering attenuation on a 2D plane, adding new geophysical constraints to the present knowledge about this volcanic area. The final result is a new, quantitative image of the past and present tectonic and volcanological state of CFC. P-wave intrinsic dissipation dominates in an area approximately located under the volcanic center of Solfatara, as expected in a region with a large presence of fluids and gas. A North-South scattering attenuation region is mainly located below the zone of maximum uplift in the 1982-1984 bradiseismic crisis, in the sea side of the Pozzuoli bay, but also extending below Mount Nuovo. This evidence favors the interpretation in terms of a hard but fractured body, contoured by strong S-wave scatterers, corresponding to the caldera rim: the region is possibly a section of the residual magma body, associated with the 1538 eruption of Mt. Nuovo.