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The interplay between deformation and volcanic activity: new data from the central sector of the Campi Flegrei caldera

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The new excavation of a tunnel in the central sector of the Campi Flegrei caldera allowed us to collect new stratigraphic and structural data shedding light on the volcano-tectonic evolution of the last 10 ka. The analyzed sequences are composed by an alternation of volcanic, lacustrine, fluvial and marine sediments hosting several deformation structures such as faults, sedimentary dykes and fractures. A review of available well log togheter with the new data were used to perform a 3D reconstruction of paleo-surfaces resulted after the main volcanic and deformation episodes. Results show as the paleo-morphology was strictly controlled by faults and fractures that formed meso-scale channels and depressions subsequently filled by tephra and volcanoclastic sediments. The measured structures indicate an extensional deformation accompanying the ground uplift occurred in various stages of the caldera evolution. Stratigraphic relationships between structures and volcanic deposits further constrain the timing of the deformation phases. Presently an unrest phase of the Campi Flegrei caldera is marked by variations of different parameters such as ground deformation activities well recorded by GPS data, topographic leveling and satellite surveys. The results of this study provide further insight into the long term deformation pattern of the caldera and provide a key to interpret the ground deformation scenarios accompanying a possible resumption of volcanism.