The role of fractures and faults in the evolution of Campi Flegrei caldera

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The present study was focused to analyze fractures and faults in the Campi Flegrei calderas presently hosting several volcanic edifices, such as lava domes, scoria, and tuff cones. A complex network of fractures and faults affects the volcanic rocks, mostly as planar with highly variable density. Frequently faults appearing as conjugate structures showing normal kinematics often associated with ductile deformation such as drag folds and deflexed layers, suggesting a syn-eruption deformation. However, the most of faults, mainly hosted along the caldera/crater rims, are very steep with dominant normal and secondary reverse movements. The fracture pattern indicates a slight prevalence of NE–SW and NW–SE directions, but N–S and E–W trends also occur. Fractures and faults found in rocks older than 15 ka (Neapolitan Yellow Tuff included), measured in western and eastern sectors of the study area, indicate a rotation of ca. 30° of the main directions among these two sectors. For the faults occurring along the caldera/crater rims, we suggest a kinematic evolution characterized by the reactivation of tensile fractures previously formed in response to both regional extension and locale resurgent dome. Finally, normal faults located in the central sector of caldera, between La Starza and Accademia localities, cutting the youngest volcanic deposits, indicate a constant NNE–SSW extension probably related to the caldera resurgence.