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# 3D Digital Outcrop Model analysis of fracture networks: insights from the Mt. Vettore Fault Zone.

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In the last years, several studies investigated the Mt. Vettore Fault Zone (MVFZ), activated during the 2016 Central Italy seismic sequence. Research has focused mainly on aftershocks and mainshock locations, coseismic slip and surface cracks, while an accurate study of the fracture network in the MVFZ was never conducted.

In this study we present a fracture analysis performed using very high resolution (0.5 – 5 cm) Digital Outcrop Models (DOMs) that developed by Unmanned Aerial Vehicle (UAV)-based digital photogrammetry. The UAV gave the possibility to investigate outcrops with dimensions up to hundreds of metres high and wide, and acquire big and precise fracture data using 3D digital automatic and manual mapping techniques. To investigate the structural variability of the MVFZ fracture network, we realized several DOMs located in different positions, along and around the major fault. All the selected outcrops are formed by Calcare Massiccio Fm., which better records brittle deformation in the study area.

This analysis aimed to better understand the MVFZ fracture network, including mechanics, kinematics and local structural evolution. In particular, it allowed to determine: 1) the main sets of fractures; 2) the geometrical parameters of the fracture network (e.g. fracture density, persistence, roughness and aperture); 3) the relative timing of the main tectonic brittle events. The preliminary analysis of the DOMs suggests a variability of the fracture network parameters over the MVFZ, especially for what concerned fracture set orientation and density.

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