



## **Normal fault morphology and ageing of cataclasites at Campo Imperatore, Abruzzi Apennines, Italy**

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The development of the Apennine range of Italy is characterized by nappe stacking followed by extension combined with vertical uplift, which is still active, as indicated by numerous historical earthquakes. We study the morphology and geology of the Assergi and Campo Imperatore fault systems, respectively, to demonstrate that the appearance of cataclasites changes with age.

The morphology of the fault systems is controlled by:

- (1) interaction of landscape-forming processes (e.g., slope denudation, stream incision, fanhead trenching) and normal faulting,
- (2) shifting activity of initially isolated fault segments that progressively overlap with time and finally merge, and
- (3) structural inheritance (not discussed here).

All studied faults are located at the toes of south-dipping slopes, and are therefore comparable. The mountain flank crossed by the Assergi fault system is characterized by gently convex slopes with a long, rectilinear planar upper slope segment ( $\sim 35\text{-}40^\circ$  dip) intercalated with regularly-spaced snow avalanche chutes. Erosional excavation of the scarp of the dormant fault proceeded at a higher pace than denudational lowering of the slope by periglacial processes.

In contrast, the Campo Imperatore fault (CIF) rejuvenates the morphology of the inherited periglacial slopes by vertical offset of talus deposits. Geomorphologic indices (elevation, catchment area, outlet spacing, height of triangular facets) indicate that the older parts of the CIF are located in its eastern third, and the CIF grew toward the West.

The field appearance of cataclasites reflects these differences: in the eastern part of the CIF and at the Assergi fault, cataclasites are strongly overprinted by meteoric-diagenetic processes as recorded by dissolution vugs lined or filled by cement, internal breccias, and karstic voids with geopetally-laminated internal sediments; these diagenetic features can also be found reworked into younger cataclasites (see poster contribution by Sanders et al. in this session for details). In contrast, the cataclasites in the westernmost (youngest) segment of the CIF are very poor in to typically devoid of, both, meteoric-diagenetic phenomena as well as cataclasite intraclasts.

The field appearance of cataclasites is therefore a first-order criterion for relative age estimation of fault activity on the time scale of intramontane basin-scale landscape evolution, which is probably in the range of a few tens of ka to more than 100 ka.