Geophysical Research Abstracts, Vol. 8, 03547, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03547

Kinematics and structural properties of active fault segments in the Sila Massif, northern Calabria, Italy.

V. Spina (1), P. Galli (2), **E. Tondi** (3), S. Critelli (1), Giuseppe Cello (3)

(1) Department of Earth Sciences; Calabria University, Italy (spina@unical.it), (2) Civil Protection Department, Seismic Survey, Rome, Italy, (3) Department of Earth Sciences, Camerino University, Italy

The Sila Massif, in Northern Calabria, is made up of a thrust-pile nappe including Paleozoic crystalline-metamorphic rocks. The geometrically highest units are represented by both granulites and amphibolites of the Polia Copanello Unit intruded by the granites of the Sila Batholit. The medium-high grade metamorphic rocks overlay granatiferous micaschists and metagranitoides of the Castagna Unit. The underlying units include phyllites and schists of the Bagni Formation.

Along the western sectors of the Massif, N-S striking, W-dipping normal faults bound the Plio-Quaternary succession of the Crati basin. Towards the east, several fault systems of variable ages and kinematics cut both Neogene to Quaternary succession and overlying Paleozoic rocks cropping out along the Ionian coast.

In the central sectors of the Sila Massif, the morphotectonic expression of the main fault segments emphasizes the reciprocal relations among the latter and the remnants of a mature erosion landscape (Paleosuperfice sommitale Auct.) which represents a distinctive geomorphological feature consisting of peculiar landforms consistently cut by the faults.

The most recent fault segments in the central sector of the Sila are part of a single structure (the Lakes Fault, Auct.) that extends for about 30 km between the Ampollino and Arvo lakes. This structure has been identified by previous Authors as the seismogenic fault responsible for the 1638 earthquake (M= 6.8) which struck this sectors of the Sila Massif.

The Lakes fault trends roughly N130° and includes two main NW-SE striking fault

segments, and related lower-rank features, cutting through both bedrock units and Holocene sediments. Shorter splays, are mostly oriented NNW-SSE and E-W, and show compressive and transtensional kinematics, respectively.

The Cagno Basin area, located in the underlap zone between the two active fault segments, represents a soft-linked zone. There the separation (S) between the two segments is less than 10% of the total length of the Lakes Fault, hence suggesting that the above value is quite in agreement with the boundary values for interacting strike-slip faults (Auct.).

The results of our study, aimed at defining in detail the overall architecture and structural properties of the Lakes Fault, suggest therefore that this features is a left-lateral active shear zone.

Our analyses highlighted that a coseismic displacement of about 1m is constant along both two fault segments. We interpreted this as the evidence that, in the 1638 earthquake, the Lakes Fault worked as a single structure.