Geophysical Research Abstracts
Vol. 17, EGU2015-12572, 2015
EGU General Assembly 2015

Plio-Quaternary tectonic evolution of the western Catanzaro Trough (Calabria, South Italy)

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The Catanzaro Trough (CT; South Italy) is a Neogene-Quaternary sedimentary basin developed between the Serre and the Sila massif, located in the central Calabrian Arc, and with a geodynamic role in the last architecture of the Calabrian Arc. The western Catanzaro Trough is a sub-basin developed in the frame of the Pleistocene tectonics that has deeply shaped the Calabrian Arc.
Structural data analysis, applied to brittle elements and classified on the base of kinematics and fault directions, allowed us to define the stress field of the whole study area. Distribution of poles of more than 750 fault planes, slickensides and rotation axes (rotaxes) showed that most of these outcrop scale faults can be related to different tectonic patterns.
Several grouping of sub-horizontal and sub-vertical rotaxes have been observed. The sub-horizontal rotaxes (clearly dominant) are concentrated around the N40 and N170 directions. These concentrations are mainly related to NE–SW and N–S normal fault systems, parallel to the main mountain ranges, indicating an extensional direction ($\sigma 3$) oriented mainly WNW-ESE. Both fault systems border Middle-Upper Pleistocene marine terraces in the western Catanzaro Trough and represent the quaternary faults related to the general uplift of Calabrian Arc. Moreover, the heterogeneous dispersion (non-andersonian faults) of rotaxes could describe a reactivation of pre-existing structures.
The sub-vertical grouping of rotation axes is related to strike slip faults, the structural data analysis appear complex and the results are not very satisfactory; therefore the transcurrent lineaments have been analysed by means of statistical distribution of fault planes and slickensides.
These one show a high concentration of faults along the WNW-ESE direction and SW-dipping planes, these can be related to the main structural and morphological evidences represented by the major left- lateral faults and their antithetic lineaments; these oriented systems have controlled the post-Tortonian evolution of Calabrian Arc.
In the frame of the basin evolution, the right-lateral faults, which are subordinate on respect to left- lateral faults, show a N-S and NW-SE oriented fault systems.
The WNW-ESE oriented faults can be considered responsible for opening of a NW–SE palaeo-strait that connected the Tyrrhenian area to the Ionian Sea during multiphase tectonics until Early Pleistocene. While the NE-SW and N-S fault systems confine and control the western portion of Catanzaro Basin, also named Catanzaro Trough Sub-basin, arranged as a Graben System with conjugate fault located in the offshore of S. Eufemia Gulf.
Keywords: fault planes, slickensides, rotaxes, Calabria arc