Geophysical Research Abstracts, Vol. 8, 03862, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03862

Pliocene to Quaternary tectono-sedimentary evolution of the Crati basin, northern Calabria, Italy

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The tectono-stratigraphic evolution of extensional basins can be considered as a result of the complex interplay between tectonic-driven subsidence, sea level changes and sediment supply. Those elements allow having information about both the stratigraphic architecture and the tectonic evolution of sedimentary basins, but they can be also used in order to analyze their regional role in a larger structural domain.

The Crati Basin (CB) is an L-shaped basin located in the inner part of the northern Calabrian Arc, southern Italy, filled by Miocene to Pleistocene sediments thickening toward north, and considered as a back-arc basin. In the southern part, the Coastal Range Horst and the Sila massif border the CB. In the northernmost part, the basin shifts in an E-W direction and is bordered to the north by the Mt. Pollino southern escarpment, which morphologically marks the Pollino Fault System. It allowed the creation of the accommodation space for the deposition of a very thick Pliocene-Pleistocene sedimentary succession. Our analyses, based on field mapping, geomorphological, sedimentological and structural investigations, documented the role exerted by tectonics in the sedimentary evolution and facies association development. In particular, we surveyed an E-W striking strip map in the southern sector of the basin thought representative of the general architecture of the basin.

The early Pliocene corresponds with an important tectonic change in the studied area. Field evidences, in fact, testify an evolution from a complex contractional setting to an extensional deformation. N-S striking newly formed high-angle normal faults represent the evidence of this new tectonic regime and can be probably related to the Tyrrhenian spreading. Those faults lead the Pliocene-Pleistocene paleogeography of the basin and control both its geometry and tectono-sedimentary evolution. As the re-

sult of the fault activity, the CB exhibits a clear asymmetry testified by a depocentral area strongly shifted along it eastern border. The general architecture of the basin can be considered like an half graben which depicts a very gentle and large rollover fold. The master fault of the half graben is represented by a not outcropping N-S striking west-facing normal fault located at foot hill of the Sila Mount and characterized by a strong syn-sedimentary activity since middle Pleistocene.

Using a geo-statistical approach, we analyzed throw distribution in the studied strip map. Field evidences and geometric relationships between E-facing and W-facing faults allowed us to distinguish a consistent variation of slip rate since early-middle Pliocene and middle Pleistocene.

Those observations demonstrated that, although the cumulative extensional rate is constant since 3.5 Ma, from 700 ka the extensional deformation shifts toward the central part of the basin, mainly concentrated along the master fault of the CB.

Finally, we compared and discussed our results with the regional uplift, distinguishing the role and contribute of the tectonics in the area.