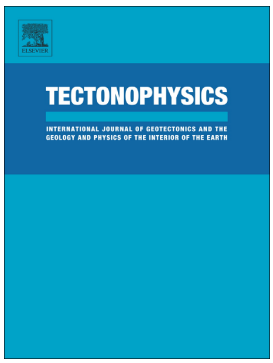

Insights on the seismotectonics of the western part of northern Calabria (southern Italy) by integrated geological and geophysical data: Coexistence of shallow extensional and deep strike-slip kinematics

L. Ferranti, G. Milano, M. Pierro

PII:	S0040-1951(17)30396-7
DOI:	doi:10.1016/j.tecto.2017.09.020
Reference:	TECTO 127633
To appear in:	*Tectonophysics*
Received date:	15 July 2017
Revised date:	22 September 2017
Accepted date:	23 September 2017

Please cite this article as: L. Ferranti, G. Milano, M. Pierro , Insights on the seismotectonics of the western part of northern Calabria (southern Italy) by integrated geological and geophysical data: Coexistence of shallow extensional and deep strike-slip kinematics. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Tecto(2017), doi:10.1016/j.tecto.2017.09.020

Insights on the seismotectonics of the western part of northern Calabria (southern Italy) by integrated geological and geophysical data: coexistence of shallow extensional and deep strike-slip kinematics

L. Ferranti 1*, G. Milano2, M. Pierro1

1Dipartimento di Scienze della Terra, delle Risorse e dell'Ambiente, Università Federico II, Napoli, Italy.

2Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, Napoli, Italy

** CRUST, Centro inteRUniversitario per l'analisi Sismotettonica Tridimensionale con applicazioni territoriali.*

Abstract

We assess the seismotectonics of the western part of the border area between the Southern Apennines and Calabrian Arc, centered on the Mercure extensional basin, by integrating recent seismicity with a reconstruction of the structural frame from surface to deep crust. The analysis of low-magnitude ($M_L \leq 3.5$) events occurred in the area during 2013-2017, when evaluated in the context of the structural model, has revealed an unexpected complexity of seismotectonics processes. Hypocentral distribution and kinematics allow separating these events into three groups. Focal mechanisms of the shallower (<9 km) set of events show extensional kinematics. These results are consistent with the last kinematic event recorded on outcropping faults, and with the typical depth and kinematics of normal faulting earthquakes in the axial part of southern Italy. By contrast, intermediate (˜9-17 km) and deep (˜17-23 km) events have fault plane solutions characterized by strike- to reverse-oblique slip, but they differ from each other in the orientation of the principal axes. The intermediate events have P axes with a NE-SW trend, which is at odds with the NW-SE trend recorded by strike-slip earthquakes affecting the Apulia foreland plate in the eastern part of southern Italy. The intermediate events are interpreted to reflect reactivation of faults in the Apulia unit involved in thrust uplift, and appears aligned along an ˜WNW-ESE trending deep crustal, possibly lithospheric boundary. Instead, deep events beneath the basin, which have P-axis with a NW-SE trend, hint to the activity of a deep overthrust of the Tyrrhenian back-arc basin crust over the continental crust of the Apulia margin, or alternatively, to a tear fault in the underthrust Apulia plate. Results of this work suggest that extensional faulting, as believed so far, does not solely characterizes the seismotectonics of the axial part of the Southern Apennines.

Key Words: Seismotectonics, Crustal structure, Mercure Basin area, Southern Apennines, Italy.

1. Introduction