

RECENT FAULTING IN NORTHERN CALABRIAN ARC

E.MOUSSAT^{*}, G.MASCLE^{**}, J.ANGELIER^{***}^{*} *Laboratoire de Géodynamique sous-Marine, Villefranche/Mer*^{**} *Institut Dolomieu, Université de Grenoble*^{***} *Département de Géotectonique, Université Paris VI*

Abstract : An analysis of recent tectonic and microtectonic structures has been done in neogene and basement outcrops of Northern Calabria. Automatic methods already described elsewhere have been used for the graphic determination and computation of the orientation of the principal tectonic stresses. This study enables us to characterize a Plio-Quaternary extensional phase interrupted by two short compressional events at the end of the Lower Pliocene and in the middle Pleistocene.

The mean direction of the computed minimum stresses which can be related to the Plio-Quaternary extensional phase is N145°E. The low values (average: 0.24) of the ratio $\Phi = (S_{Int} - S_{Min}) / (S_{Max} - S_{Min})$ that partly describes the shape of the stress ellipsoid show that the minimum and intermediate stresses can easily permute. This result is in fair agreement with field data sets. Directions of extension from N 15° E to N 100° E have been determined, being often nearly perpendicular to the regional extension axis whereas they are sometimes rather perpendicular to regional structural trends. In such cases, it is likely that heterogeneities within the structure and morphology of the basement modify the orientation of stresses.

We interpret these occurrences of northeastward extension within a regional pattern of NW-SE extension as related to local and momentaneous variations of the regional stress field due to the low value of the ratio Φ , rather than independent tectonic phases. These variations may be related to slight longitudinal dilatation of the arc during its southeastward migration.

During this main extensional phase, a first compressional event has occurred. It is characterized by NNW-SSE to NS folds and numerous strike-slip faults. This event is the effect of the middle Pliocene compressive phase that has been already described in front of the Apennines. Azimuthal distributions of dextral and sinistral strike-slip faults in preneogene formations and basement, are the same as those observed in Tortonian-Messinian formations, particularly in the vicinity of the same structures. It means likely that these strike-slip faults are partly due to the same tectonic phase. The mean direction of the maximum stress determined in both formations is N70°E. Preliminary graphic determination data from lower Pliocene of the Bradanic trough and from the Upper Tortonian of the San Arcangelo basin confirms this NE-SW orientation (C.AUROUX et al., this volume). These results show a noticeable rotation of the stress axes related to the one measured in Sicily and Southern Calabria.

A modest second compressive event, also recognized in the San Arcangelo Basin (C.AUROUX et al.), occurred during the middle Pleistocene. Measures obtained on the Southern side of the Pollino Horst correspond to a compressive axis trending N 30° E.

During these compressional events, the direction of the horizontal minimum tectonic stress remained approximately the same as that of the main regional extensional phase (NW-SE).

The same processing has been applied to focal mechanisms of superficial earthquakes already published. The results are in agreement with the field data and confirms that the present-day tectonic activity in Northern Calabria is a continuation of the Plio-Quaternary tectonic phase, the main process of which is the southeastward extension. The intermediate stress axis has a direction close to the maximum stress axis determined in the Sicilian-Tunisian region. This point suggests that the present-day direction of extension is related to the orientation of the compression in the African foreland.

