

THE MAGMATIC ACTIVITY IN THE SICANO BASIN (SICILY) RELATED TO MESO-CENOZOIC TENSIVE TECTONICS OF THE SOUTHERN CONTINENTAL MARGIN OF THE TETHYS.

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During the Mesozoic the Sicano basin, in western Sicily, represented the the south-west termination of the great Pindos seaway which cut through a large part of the southern continental margin of the Tethys.

From the upper Trias to the Miocene, together with the surrounding areas, it was involved in tensile tectonic activity verifiable in the tectono-sedimentary evolution of the facies and in the characters of the fissural vulcanism. Most of the volcanic products, which had their origin in submarine environments, are intercalated in sedimentary sequences of the margins and the axial zone of the basin. Because many of the samples had been subject to submarine weathering the normal methods of basalt-type characterization became meaningless. Therefore to overcome these difficulties the distribution of some elements like Zr, Y, Nb, Ti and P were studied because they are considered as being immobile during alteration ( J.A.Winchester and P.A.Floyd, 1976;etc.).

Concentrations of other elements were also studied. Mineralogical and petrographic features of the rocks were investigated by the polarising microscope and by means of x-rays. Moreover analyses were carried out by the E.D.A.S., electron microprobe and D.T.A..

Chemical characteristics of the rocks were determined by a combination of X.R.F., emission spectroscopy and A.A. techniques.

Although conclusive evidence has not yet been obtained the results definitely suggest the following model of the relationship between Meso-Cenozoic magmatism and tectonics in the Sicano basin.

During the Trias, in this belt, tensile tectonic activity began in connection with the attempted rifting in the Mediterranean area. This regional activity caused supply ways for the upward moving alkali magma. Deep crustal fractures were thereby produced by means of which the magma rose giving rise to

differentiation processes. In the upper crust the magma became enriched with  $H_2O$  (titaniferous pyroxene was transformed into amphibole) and stopped long enough to sometimes allow for its crystallization.

During the Lower Lias the magma rose up the fractures on the external margin of the basin. This upward rising magma, before giving rise to submarine effusions, passed through carbonatic formations partially assimilating the  $CaCO_3$ .

At the Lias-Dogger boundary, in concurrence with the intensification of the tensile stresses, the supply ways were most probably resumed taking the E-W tectonic directrices. Mainly along the external margin of the basin basaltic outcrops of this period can be found having chemical transition characters that go from alkaline to tholeiitic terms, normally containing carbonatic inclusions. In axial zones magma having a tholeiitic tendency rapidly rose during the paroxysmatic tectonic phases.

From the Cretaceous no volcanites are so far known in the Sicano basin, even though tensile stresses continued although with less intensity.

Another episode of alkaline vulcanism occurred during the Eocene (Lucido et al, in preparation). Furthermore this episode shows many analogies with that of the Lower Lias even in the modalities of the up-rising magma. In fact in both cases the presence of xenoliths, related to differentiated magmatic portions, can be observed. These xenoliths, easily identifiable, are sometimes a few feet long.

Isotopic evidence proves, contrary to what is usually believed, that the calcite inclusions present in these basalts are generally not due to secondary genesis (Longinelli et al, in preparation). The isotopic  $^{18}O/^{16}O$  and  $^{13}C/^{12}C$  ratios indicate that the calcite in the basalts is generally a product of digestion that took place in the upper crust.

Studies are in progress on basaltic rocks of the southern paleomargin of the Tethys in the areas adjacent to the Sicano basin, with the aim of clarifying the relationship between vulcanism and tectonic activity in this part of the Mediterranean Sea.