

Volcanism related to plate-tectonics in the Western and Eastern Mediterranean.

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Abstract: K-Ar dating and magmatic identification of volcanism and plutonism around the Mediterranean, during the Neogene in the western area, and the Mesozoic and the Cenozoic in the eastern area, have been used to produce an evolutive model in terms of global tectonics.

Résumé: Des données nouvelles d'ordre géochimique et géochronologique (K-Ar) obtenues sur le magmatisme néogène péri-méditerranéen occidental permettent de différencier trois types d'association: calco-alkaline, alcaline, d'anatexie crustale. La géochronologie met en évidence un diachronisme magmatique, chaque association caractérisant un stade de l'évolution tectonique de l'ère méditerranéenne.

Une synthèse bibliographique de données de même ordre est faite sur le magmatisme de Méditerranée orientale du Mésozoïque et du Cénozoïque. L'évolution de cette zone est envisagée (réduction de la Téthys, ouverture et fermeture d'une proto-Méditerranée) liée au jeu des plaques européenne, africaine.

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I. Western Mediterranean. New geochronological (K-Ar) and petrochemical data carried on French, Sardinian, North African and Spanish Neogene magmatism, have been used to produce a complete evolutive model of this area. In terms of global tectonics, this magmatism describes the evolution of a subduction of the African plate beneath the European one. The fragmentation of the European plate age (Sardinia) and of the small Kabylo - Betic "plate" upon the subduction zone creates small marginal basins, i.e. Provençal Basin and North African Basin. The Tyrrhenian Basin was created probably in two stages, between the Oligocene and Middle Miocene (first stage) due to the Apennine and Africa subduction, with the appearance of a calc.alkaline volcanism. The second stage is a spreading: tholeiitic basalts in abyssal plain and a very young volcanic arc (shoshonitic) in Eolian. Calc.alkaline volcanism in Sardinia shows a large time extension between 29 my in the SW (Cixerri) and 13 my. Young alkaline volcanism appears between 3.2 my and subpresent times. On the North African edge, magmatism appears diachronically. In Algeria (except near Oran) the calc.alkaline climax is between 16 and 9 my with a strong plutonism. In Tunisia, between 13 and 7 my, the last products being alkaline, in Galite in two stages, at 14 and 10 my. In Morocco and near Oran, the volcanism is younger and highly potassic, between 10 and 5 my (except Ras Tarf around 12 my). Here, an age and potash gradient appears from the coast to the inland. In Spain, from Cabo de Gata to Murcia, products de-

crease in age from 17 to 6 my. Alkaline products are young and scarce in Morocco (near the coast) and Spain around 2.6 my. On the European plate, the long alkaline activity spreads from 20 my to subpresent times.

II. Eastern Mediterranean. A synthesis is made from recent bibliographic data about the age and nature of magmatism, in the eastern area. These results are compared with the Mesozoic and Cenozoic plate tectonics evolution, presented in the session by Biju - Duval et al.

-Volcanism around the Black Sea supports the idea of the Tethys subduction under the European margin, with the creation of a marginal basin, i.e. the Black Sea. Dating of calc.alkaline volcanism is related to this phenomenon, between 150 and 40 my.

-The opening of the Eastern proto-Mediterranean up to the Cretaceous (Triassic pillow-lavas and Cretaceous ophiolites) was accompanied by an alkaline volcanism on the Arabo-African plate (180 - 120 my). After the closing of the sea and collision between the Arabic, the Anatolian, and the European platforms (late Cretaceous), a new volcanism pattern appeared. Calc.alkaline volcanism in the Aegean Sea (Eocene to Miocene in the north, and Plio Quaternary in the south) is related, at least the latter, to the subduction south of the new Aegean plate (fragment of the Apulian plate).

-Since the Cretaceous, two stages of calc.alkaline magmatism are observed in the Pannonian region. First (bananitic plutonic rocks, 70 my) the extension of which is found until Bulgaria, in the Rhodope massif; second, during the Miocene, a strong andesitic and rhyolitic volcanism surrounds the Carpathian Basin, with an apparent migration from west to east, between 21.7 my in Czechoslovakia and 4.9 my in Romania. A last basaltic activity transects this volcanism between 3.9 and 1 my.