

Tectonics and Volcanic Edifices in a Collisional Zone of the Neogenic Massif of Siroua (Moroccan Atlas) – Combined Effects of a Local Transform and the Panafrican Suture Zone

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The Late Miocene – Early Pliocene Siroua strato-volcano is made of particular hyperalkaline rocks. It lies between the High-Atlas and the Anti-Atlas, in a collisional zone related to the continental subduction of the African plate under the Moroccan Meseta. Our field observations and analyses of SPOT, Landsat-MSS, and DEM (digital elevation model) imagery have permitted mapping of faults, joints, and volcanic edifices. The elongate shape of volcanoes and linear clusters of adjacent edifices, together with their relationships with faults, show that magma ascent was favored by tectonic crustal scale open fractures, essentially tension fractures, tail-cracks, and open faults. These fractures, together with other nonvolcanic, narrow, NNE-striking troughs, provide valuable information on the regional deformation since the Late Miocene. The shortening–extension type strain, which is responsible for the open fractures, is situated near the Azdem transform, a zone of active faults striking NNE, parallel to the convergence trend. The transform links two segments of the “Accident Sud- Atlasique,” which constitute the border between the Moroccan Meseta and the African plate. The magma seems to originate from the lithospheric mantle, but asthenospheric material had previously migrated upward along the Panafrican suture zone. This mixed magma finally was transferred to the surface as a result of the onset of the open fractures prior to fault motions. The Siroua volcanic activity results from the conjunction of (1) a Panafrican suture zone and (2) a zone of open fractures due to “strike-slip” strain near a local transform inside the area of collision.