



Importance of extensional tectonics in Comorean archipelago magmatism: the case of Mayotte Island (Mozambique Channel, Indian Ocean)

D. Debeuf (1), **P. Bachelery** (1), O. Sigmarsson (2)

(1) Laboratoire des Sciences de la Terre, Univ. Reunion, Saint Denis, Reunion Island, France,

(2) Lab. Magmas et Volcans, CNRS, 5 rue Kessler, 63038 Clermont-Ferrand, France.

(bachel@univ-reunion.fr)

The island of Mayotte is the oldest (about 15 My old) of the four islands constituting the Comores archipelago situated in the Mozambique Channel. Little is known about its geological structure or its volcanism. Here we present results from a reconnaissance mapping as well as the petrology and geochemistry of the main lava sequences.

A digital elevation model (DEM) allows identifying three principal volcanic complexes and an NW-SE trending extensional structure interpreted as a tilted block in the NW part of the Mayotte Island. The age of this block is estimated as Plio-Quaternary and continues seaward into the Mozambique Channel (Mougenot et al., 1989). The three volcanic complexes have different petrographical and geochemical characteristics and define two magma suites. The generally younger lavas of the North and Northeast complexes comprise a moderately under-saturated magma suite whereas the older lavas of the South complex are of a strongly under-saturated suite. The two magma suites can be explained by variable degree of melting of a homogeneous mantle source, as reflected in variations of incompatible elemental ratios (Nb/Zr, Ta/Zr, La/Zr, Th/Zr) in lavas having constant Nd isotope ratios. The more strongly under-saturated suite represents a smaller melt fraction than the moderately under-saturated suite.

Strontium and neodymium isotope ratios of the lavas from Mayotte ($^{87}\text{Sr}/^{86}\text{Sr}$: 0.70317 - 0.70383; $^{143}\text{Nd}/^{144}\text{Nd}$: 0.51272 - 0.51290) fall in the range of those from the other Comores Islands. Increasing $^{143}\text{Nd}/^{144}\text{Nd}$ in the Mayotte lavas with age is

observed and is rather common of oceanic islands related to a mantle plume. The moderately under-saturated recent lavas of the Northeast complex are likely to represent higher degree of melting than the older lavas of the South complex. Such an increase in melting could be related to the extensive tectonic identified on the island.

Mayotte Island, and most likely the other islands of the Comores archipelago, thus appears to represent an atypical example of hot spot volcanism influenced by extensive tectonics. The tectonics extending from East Africa to Madagascar since the Miocene is likely to have had an important control on the volcanism and magma generation at the Comores archipelago.