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Geochemical and Isotopic Evidence for Lithospheric Heterogeneity and Chemical Fractionation of BeniBousera Ultramafic Massif (Internal Rif, Morocco)

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The evolution of major elements in the rocks in BeniBousera ultramafic massifindicates a fertile lherzolites that showing an enrichment in incompatible major elements (Al, Na, Ti and Ca), associated with other lherzolites are relatively depleted and rich in compatible elements (Ni, Cr and Mg). As well, it clearly shows a complexity in the trace element distribution, suggesting an association of rocks having underwent a high partial melting rate with others having underwent only a weak degree of melt. Which had proposed an history including different episodes of partial melting associated with a local fractional crystallization, all was combined with subsolidus reactions.

The lithospheric signature in this rocks is underlined by an abnormal enrichment in light rare earth elements and by the presence of a high isotopic heterogeneity in Sr and Nd. Such a process is explained by the late injection of "exotic" liquids who's originated from mantle and crustal input "terrigenous sediments".

In some peridotites, the rare earth concentrations and isotopic ratios of Sr and Nd are similar to those of MORBs. They would, therefore, be interpreted as evidence of an old fragment of the asthenosphere emplaced at high depth. Others are depleted in light rare earths and show a high isotopic ratio of Nd and a low isotopic ratio in Sr. Similar to lithosphere-type spinel lherzolite and xenoliths indicating an old piece of "depleted mantle" separated from the convective mantle and added to the subcontinental lithosphere.

As a result, the continental lithospheric mantle, currently represented by the BeniBousera massif, is separated from the asthenosphere and incorporated in the subcontinental lithosphere over a long time ago, accompanied by an old age of isotopic stability of 1.3 MA compared to Depleted Mantle. It has a very heterogeneous structure with vertical as horizontal isotopic zonation depending on the age of the continental lithosphere and late enrichment with exotic liquids.

Keywords: BeniBousera ultrabasic massif, fertile lherzolite, asthenosphere, continental lithospheric mantle, subsolidus reactions, exotic liquids.

Biography:

Zahra Mourabit with a master degree in applied geosciences to mineral and energy resources. During 2 years, she has been trained as a geoscientist in applied fields and that allowed her to enter in the active life of the research and to integrate the world of the environmental entrepreneurship of the exploration and prospecting of the mining. She is a student-researcher in geology at the Faculty of sciences, University of Cadi Ayyad, Morocco. Her work focuses specifically on a petrological study and the isotopic geochemistry of BeniBousera peridotites and crystallophyllian units in the Rif belt north of Morocco. Her thesis aims to clarify the origin and history of emplacement of these units, for general to contribute to the understanding of the geodynamic evolution of the Alboran domain and will allow proposing an orogenic model of Betic-Rif arc.