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The spinel peridotites mantle xenoliths of Waw En-Namus volcano, Southern Libya

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Southern Libya has been affected by widespread extensional movements and igneous activity (mainly basic and alkaline) since Jurassic times (Guiraud et al. 2005). Moreover, paleomagnetic data, suggest that the drifting of the African plate during the last 100 Ma has been very limited, thus allowing for the keeping the contact with the deeper mantle. Starting from these premises, the peridotite xenoliths, hosted in nephelinitic basalts from the Waw En-Namus volcano and investigated in comparison with those from Gharyan area (Beccaluva et al., 2007), could shed a light on the evolution of the Libyan sub-continental lithospheric mantle and on the geodynamic events that affected it over time. The mineral phases of such xenoliths, as well as few glassy veins, were studied in order to determine major and trace elements compositions.
Three types of olivines, orthopyroxenes, clinopyroxenes, and spinels were recognized (magmatic, peridotitic and related to melt-peridotite reactions), as well as the presence of Na, K and ultra-potassic (UK) glasses.
The investigated glasses, selected among those which apparently have been not (or scarcely) modified in their composition by peridotite-melt reactions, show higher La/Yb and Zr/Hf ratios with respect to Waw En-Namus lavas implying the involvements of slightly different mantle sources. Moreover, the presence of UK glasses (characterized by a strong Pb positive anomaly) suggest the involvement, as source, of a lithospheric or sub-lithospheric component.
The mantle phases indicate a moment of basaltic extraction starting from a depleted (DMM-like) condition followed by a recent metasomatism. In the apparently not metasomatized ones, Th/Yb and Ta/Yb ratios suggest that ancient metasomatic events, which probably occurred during the Pan-African cycle, played a role in their history. In comparison, the metasomatized mineral phases, according with the recent geophysical data (Begg et al., 2009), mainly suggest relationships with the continuous asthenospheric upwelling.

Beccaluva, L., Bianchini G., Ellam, R.M., Marzola, M., Oun, K.M., Siena, F., Stuart, F.M. (2008). 253–277 in: Coltorti, M., & Grégoire, M., (eds.). Geol. Soc. Lond. Spec. Publ. 293.
Begg, G.C., Griffin, W.L., Natapov, L.M., O'Reilly S.Y., Grand, S.P., Hronsky, J.M.A., Djomani, Y.P., Swain, C.J., Deen, T., Bowden, P. (2009). Geosphere, 5, 23-50.
Guiraud, R., Bosworth, W., Thierry, J., Delplanque, A. (2005). Journal of African Earth Sciences, 43, 83-143.