

Fe-Ti Metasomatism recorded in Peridotites from Montmaton, French Massif Central

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The French Massif Central (FMC) is well known for its numerous Tertiary-Quaternary-age volcanism bringing mantle-derived xenoliths to the surface. Although many localities have been intensively studied, the volcanic center, Montmaton (southern Aubrac volcanic field) has escaped scrutiny. Here, we present results of a petrologic and geochemical study on five lherzolite xenoliths from this locality.

Olivine compositions range from $X_{\text{Fo}}=0.885-0.903$. Spinel compositions are Al-rich, with $\text{Cr\#} = 0.05-0.15$ and $\text{Fe}^{3+}/\Sigma\text{Fe} = 0.22-0.33$ (Mössbauer spectroscopy). Degrees of partial melting, based upon Cr\# in spinel [1] are low: $F = 3-7\%$. Calculated temperatures (BKN) range from 790-1020°C. Sample Mtm 5 stands out from the rest in that the olivine and orthopyroxene are relatively Fe-rich; clinopyroxene and orthopyroxene are Ti-rich. Modal metasomatism is indicated by the presence of amphibole containing 5.5 wt% TiO_2 . To our knowledge this is the first occurrence of Fe-Ti metasomatism [2] in the subcontinental lithospheric mantle beneath the Massif Central. Calculated $\Delta\log f_{\text{O}_2}$ values are $\text{FMQ}+0.2 - \text{FMQ}+0.8$, which are within the range observed for the FMC as a whole [3]. Sample Mtm 5 records $\Delta\log f_{\text{O}_2} = \text{FMQ}+0.5$, indicating that Fe-Ti metasomatism is relatively oxidised, however other metasomatic agents can be even more oxidizing. Additional geochemical characterisation is underway and will be discussed.

- [1] Batanova et al. (1998). *Geochim Cosmochim Acta*, **62**, 853-866. [2] Menzies & Hawkesworth (1987) *Mantle Metasomatism*. Acad. Press, London, 472pp. [3] Uenver-Thiele et al. (2014) *J Petrol* **55**, 2457-2479