

Preservation of the water concentration of mantle xenoliths in the Ray Pic volcano (FMC)

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The ability of xenoliths to preserve water lithospheric signatures remains an unsolved question for many years. We report water content in olivine and pyroxenes of peridotite xenoliths from Ray Pic volcano (Massif central, France). Xenoliths were sampled from products of an explosive eruption (pyroclastic deposit) and an effusive eruption at five different locations along the 10 km lava flow.

Water content in xenoliths from the lava flow is independent of its location in the lava: ol < 1, opx 190-270 and cpx 430-640 wt. ppm H₂O. Results suggest that the cooling and solidification of the lava had no impact on water content.

The xenoliths from the explosive event have systematically more water: ol 3-12, opx 330-460 and cpx 810-890 wt. ppm H₂O. These values are either comparable with or lower than the values reported previously from the same locality (1). It shows that xenoliths recovered from explosive eruptions have higher water content than the ones from effusive eruptions, but also that water content can be different from one explosive event to another. Conclusion is that water content can rapidly be reset during magma degassing prior to eruption. Degassing controls water content of xenoliths.

Among the xenoliths studied, two have spectral signatures different from others. This different spectral signature has also been reported from other volcanoes (2, 3). The coexisting of different spectral signatures, which have not been erased during degassing, are probably the only OH signatures fully preserved from depth.

¹ Azevedo-Vannson S., et al. *Chemical Geology* **575** 120257 (2021)

² Denis C.M.M. et al. *Lithos* **226** 256-274 (2015)

³ Patkó L. et al. *Chemical Geology* **507** 23-41 (2019)