

Mantle xenoliths from Marosticano area (Northern Italy): a comparison with Veneto Volcanic Province lithospheric mantle

Valentina Brombin, Costanza Bonadiman, and Massimo Coltorti
University of Ferrara, Physics and Earth Sciences, Italy (brmvnt@unife.it)

The Tertiary Magmatic Province of Veneto, known as Veneto Volcanic Province (VVP), in the North-East of Italy, represents the most important volcanic district of Adria Plate. It is composed by five volcanic bodies: Val d'Adige, Marosticano, Mts. Lessini, Berici Hills and Euganean Hills. Most of the volcanic products are relatively undifferentiated lavas and range in composition from nephelinites to tholeiites. Often VVP nephelinites and basanites carry mantle xenoliths (mainly harzburgites and lherzolite).

This study reports petrological comparison between Marosticano xenoliths (new outcrop) and xenoliths from the Lessinean and Val d'Adige areas already studied by many Authors (Siena & Coltorti 1989; Beccaluva et al., 2001, Gasperini et al., 2006).

Mineral major elements analyses show that the Marosticano lherzolites and harzburgites reflect "more restitic" composition than the mantle domain beneath the other VVP districts (Lessini Mts. and Val d'Adige). In fact, olivine and pyroxene of Marosticano xenoliths have the highest mg# values of the entire district (Marosticano → 90-93; literature → 86-92). At comparable mg# (45-85 wt%) Marosticano spinels tend to be higher in Cr₂O₃ (23-44 wt%) contents with respect to the other VVP sp (7-25 wt%). It is worth noting that, Ni contents of Marosticano olivines in both harzburgites and lherzolites are higher (2650-3620 ppm) than those of the Lessinean xenoliths (1500- 3450 ppm), and similar to that of Val d'Adige lherzolites (3000-3500 ppm), approaching the contents of Archean cratonic mantle (Kelemen, 1998). In turn, Lessinean olivines properly fall in the Ni-mg# Phanerozoic field.

At fixed pressure of 15 kbar, the equilibration temperature of Marosticano xenoliths are similar (Brey & Köhler: 920-1120°C) to those of Lessini (O'Neill & Wall: 990-1110°C; Beccaluva et al., 2007), but higher than those of Val d'Adige (Wells: 909-956°C; Gasperini et al., 2006). Finally, Marosticano mantle fragment show similar relatively high redox conditions ($\Delta \log fO_2$: +1.2 to -0.7, Ballhaus, 1991) to Lessinean and Val d'Adige xenoliths which may indicate a local oxidation of the mantle below this portion of VVP.

References

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