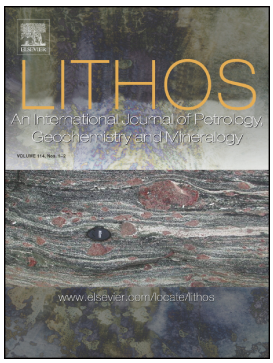

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Refertilized mantle keel below the Southern Alps domain (North-East Italy): Evidence from Marosticano refractory mantle peridotites

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ABSTRACT

The Veneto Volcanic Province (VVP), a Cenozoic magmatic province in northeastern Italy, is one of the widest volcanic areas of the Adria plate. It consists of five main magmatic districts, and its most primitive products commonly host mantle xenoliths. In this study, we present a newly discovered xenolith suite from the Marosticano district that contains peridotites with compositional characteristics of mineral assemblages that provide insight into an unexpected nature of the sub-continental lithospheric mantle (SCLM) of the Adria plate. In contrast to xenoliths from other VVP sites previously studied (i.e., Val d'Adige and Lessini Mts.), Marosticano xenoliths exhibit highly refractory compositions typical of on-craton peridotites. High olivine forsteritic contents (Fo: 91-93) indicate high degrees of partial melting (>25%) that should have been associated with the complete consumption of clinopyroxene. Major and trace element compositions further link these peridotite fragments to early Proterozoic cratonic mantle. The occurrence of clinopyroxene within such rocks suggests Marosticano clinopyroxene testify to a metasomatic legacy. The i) LREE-enrichments of Marosticano clinopyroxene and ii) the dissolved CO_2 mole fractions (up to 1.0) for the inferred clinopyroxene-forming melt are consistent with carbonatite/CO_2-rich silicatic melts as