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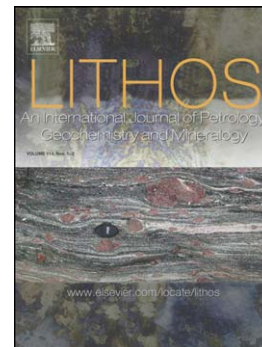
Experimental constraints on mantle metasomatism caused by silicate and carbonate melts

Fernanda Gervasoni, Stephan Klemme, Arno Rohrbach, Tobias Grützner

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**Title:** Experimental constraints on mantle metasomatism caused by silicate and carbonate melts

**Authors:** Fernanda Gervasoni\*<sup>1</sup>; Stephan Klemme<sup>1</sup>; Arno Rohrbach<sup>1</sup>; Tobias Grützner<sup>1</sup>, Jasper Berndt<sup>1</sup>

<sup>1</sup>Institut für Mineralogie, Westfälische Wilhelms-Universität, Corrensstrasse 24, 48149 Münster

\*Corresponding author: gervasoni.fe@uni-muenster.de

**Abstract:**

Metasomatic processes are responsible for many of the heterogeneities found in the upper mantle. To better understand the metasomatism in the lithospheric mantle and to illustrate the differences between metasomatism caused by hydrous silicate and carbonate-rich melts, we performed various interaction experiments: (1) Reactions between hydrous eclogite-derived melts and peridotite at 2.2-2.5 GPa and 900-1000°C reproduce the metasomatism in the mantle wedge above subduction zones. (2) Reactions between carbonate-rich melts and peridotite at 2.5 GPa and 1050-1000° C, and at 6 GPa and 1200-1250°C simulate metasomatism of carbonatite and ultramafic silicate-carbonate melts in different regions of cratonic lithosphere. Our experimental results show that partial melting of hydrous eclogite produces hydrous Si- and Al-rich melts that react with peridotite and form bi-mineralic assemblages of Al-rich orthopyroxene and Mg-rich amphibole. We also found that carbonate-rich melts with different compositions react with peridotite and form new metasomatic wehrlitic mineral assemblages. Metasomatic reactions caused by Ca-rich

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