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Geochemical and petrological signature of the fertile lithospheric mantle beneath the Viliga Volcanic Field (N-E Siberia) inferred from sp - lherzolite xenolith investigations.

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The Viliga Volcanic Field (VVF) represents Late Neogene olivine melanephelinitic lava eruptions located near the border of the North American and Eurasian plate (northern coast of Okhotsk Sea). The surrounding area is mainly composed by the voluminous calc-alkaline units of the Okhotsk - Chukotka volcanic belt, that represents an extensive Late Cretaceous, subduction – related Andean-style magmatic arc, spanning the entire eastern margin of the Asian continent.

Mantle - xenoliths up to 80cm and augite - megacrysts up to 10cm in diameter were found in VVF and studied. The biggest samples are usually strongly oxidized and were therefore excluded from our studies. Smaller Xenoliths are throughout fresh spinel lherzolites with protogranular textures.

Mineral compositions are typical for fertile lherzolites (Fo 89.9, and spinel cr# 0.08 - 0.21). The whole-rock analyses document a moderate depleted to fertile lithosphere beneath this region (CaO, Al_2O_3 and MgO range between 1.7wt% - 4.1wt%, 1.7wt% - 4.7wt% and 36.7wt% - 43.5wt% respectively). The contents of CaO and Al_2O_3 correlate inversely with MgO forming linear trends and suggest variable degrees of partial melting of the same primitive source. Trace element abundances of the whole-rock confirm the depletion of incompatible elements with proceeding melt extraction. The majority of the studied samples show little evidence for metasomatic enrichment (La/Yb: 0.7 – 1.4). However, there are few samples that, compared to the HREE, have elevated LREE patterns (La/Yb: 1.2 – 3.1). This enrichment and the fact that clinopy-

roxene grains have spongy rims indicates intergranular percolation of metasomatic melt/fluids.

Calculated temperatures and pressures range between 1050˚C – 1160˚C and 15kbar – 21kbar respectively. Ca – diffusion rates in olivine reveal a rapid transport to the surface (2 - 6 days) of these peridotites. Mantle - xenoliths from the Chukotka peninsula have a similar fertile chemical signature, providing also similar P/T ranges. This leads to the conclusion, that the lithospheric mantle beneath Viliga has not been affected by the Late Cretaceous subduction of the paleo – pacific plate.

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