Regularities of mantle structure beneath Siberian craton

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Comparison of thermal structure and layering reconstructed with OPx, Cpx, Gar and Sp thermobarometry (>20000 PT points) and geochemical features of minerals (LAM ICP MS) for >35 kimberlite pipes of Siberia reveal coinsidence mantle columns layering 11 major units uder most of kimbelite fields pipes despite on variations in geochemistry. Vend –Proterozoic ages of layers from bootom (Specius et al, 2004) suggests growth of craton keel in Precamprian in heated and less vicoous mantle. Plum events breaking the subducting slabs and coupling them to lithospher possibly accompanied with rising of partly hydrated peridotite diapirs and thinking of thick eclogites lenses. Lower horizons heated to 1400°C (65-60 rbar) in each kimberlite fields vary in lithology but generally largest pipes have thick dunites layaers in the basement serving as magma conduit. Upper 3-4 inits irregular heated harzburgite and lerzolities layers upper are close to 35mv/m^2. Despite on depletion peridotites reval the LILE enrichment due to reactions with continental subduction-related melt-fluids. Pyroxenite lens near 40 kbars results from dehydration of subducted peridotites (Kogiso ea, 2002) and hydrous melting. HFSE enrichment suggest Amph melting. Garnet facies ~30- 40 kbars is slighly depleted and subjected to Na metasomatism. Peridotites in Ga-Sp facies 18-30 kbars (minimum in hydorous peridotite solidus) oten show heating to SEAG the signs of basaltic related melt regeneration and diapiric ascend. Minerals show correlating behavior of compositions including ilmenites trends trasing the developing of protokimberlite feading sytems.

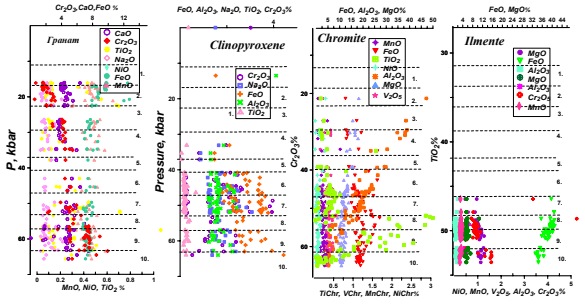

Figure 1. P-variations of minerals in mantle beneath Nurbinskaya kimberlite pipe.

Geochemistry of the Tinaquillo Peridotite Massif, Venezuela

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The Tinaquillo orogenic spinel peridotite massif in northern Venezuela is a fragment of lithospheric mantle emplaced into the Caribbean belt during the late Cretaceous. The massif consists of fresh, unserpentinized harzburgite grading into lherzolite, and has numerous hydrous and pyroxenite veins cutting through it. Seven peridoitites and three amphibole-rich veins have been investigated for major and trace element concentrations, and Sr-Nd-Pb-Hf isotopic compositions. The peridotites have geochemical characteristics of residues after moderate degrees of partial melting (estimated to be 8 to 16%) from a homogeneous primitive mantle. In addition, they have strong light rare earth element (REE)-depleted to spoon-shaped REE patterns, but flat heavy REE (La/Yb at 0.04-0.55 times primitive mantle). The $(La/Yb)_N$ ratios increase with the refractoriness of the peridotites, reflecting secondary metasomatism, which is a common feature of the sub-continental lithospheric mantle xenoliths world-wide. A primitive mantle-normalized spider diagram for the peridotites reveals an overall depletion in the highly incompatible elements relative to less incompatible ones, but moderate enrichments in the strongly incompatible elements (Ba, Th, U), without depletion in Nb and Ta relative to La.

The peridotites have isotopic compositions of $^{87}Sr/^{86}Sr$ = 0.70277-0.71044, $^{143}Nd/^{144}Nd$ = 0.513095-0.514000, $^{206}Pb/^{204}Pb$ = 19.00-19.15, $^{208}Pb/^{204}Pb$ = 38.18-38.75, and $^{176}Hf/^{177}Hf$ = 0.282692-0.284703. The Nd, Pb and Hf isotopic signatures show ranges that overlap with present-day mid-ocean ridge basalts (MORB) but also extending to more depleted compositions. The unusually radiogenic Sr for some samples appears to be the result of pervasive infiltration by seawater at some stage in the massif's history. The Sr, Nd, Pb and Hf isotopic signatures of the veins ($^{87}Sr/^{86}Sr$ = 0.70231-0.70256, $^{143}Nd/^{144}Nd$ = 0.513052-0.513289, $^{206}Pb/^{204}Pb$ = 18.30-18.52, $^{208}Pb/^{204}Pb$ = 37.66-37.87, $^{176}Hf/^{177}Hf$ = 0.282988-0.283303) are similar to the Pacific and Atlantic MORB; lack of the highly radiogenic Sr component in the veins indicates its addition to the peridotites prior to vein emplacement. The Lu-Hf data yield an errorchron suggesting a Phanerozoic age for stabilization of this piece of the lithosphere. Collectively, the data suggest an abyssal origin for the peridotites and emplacement of the veins from a depleted source relatively late in the massif's history.