Delaminated Lithospheric Mantle and exotic metasomatism beneath East Russia

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In the back-arc environment of Far East Russia, mantle xenoliths from Sikhote-Alin(KO) and Primorie (SV), Far East Russia are fertile spinel lherzolites with amphibole, phlogopite armalcolite, fassaite and röhnite in some of the studied samples. Though samples from both localities are fertile there is a systematic difference in their fertility. The KO samples have mg# varying from 0.891 to 0.899 and are slightly more fertile than the SV samples that have mg# ranging from 0.898 to 0.904. The cpx REE confirm this trend as the $(La/Yb)_N$ in KO samples range from 0.10 to 1.00 and in SV samples from 0.15 to 1.73.

The clinopyroxene Sr and Nd isotopic ratios range from 0.702599 to 0.703567 and 0.512915 to 513153, repectively, resembling Pacific MORB isotopic ratios.

En route breakdown of diseminated amphibole produces second generation of cpx and olivine and traces of glass as well fassaite and röhnite indicating crystallization at very shallow depths. Melt pockets consisting of Ca-rich glass plagioclase rutile, ilmenite and armalcolite suggest introduction of small amount of an unusual Ti-Ca-rich anhydrous silicate melt at mantle depths.

The lithospheric mantle beneath the studied area represents the residue after partial melting of up to 5% of a primitive mantle. Despite the fact that the studied area experienced several subducting episodes, the lithospheric mantle appears to be unaffected from the upwelling fluids/melts of the subducted slab(s). Since there is no indication for plume activity, and/or evidence for refertilization, it is likely that the lithospheric mantle has been delaminated as the result of tectonic events (lithospheric attenuation, inverse tectonic) associated with the subduction processes and that the studied spinel lherzolites represent upwelling asthenosphere.

Resilience Biomimcry model for natural disturbance scenarios

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Mobile links are 'keystone' organisms that move among habitats and provide essential ecosystem functions such as pollination, seed dispersal, or nutrient translocation. After disturbance, some ecosytem functions may become disrupted or may disappear altogether. Much like similar habitats joined by corridors, the mobile links connect areas that may be widely separated spatially or temporally. Species strategies and interactions must be reconfigured after disturbance based on residual organisms and any altered environmental constraints. Reassemblage of organisms might be based on an ecological memory that contributes and leads to the recovery of the affected area. This ecological memory is the complex network of species and their relations with each other and the environment.

Based on the renewal cycle of Holling, we developed a biomimicry resilience model that identifies recovery strategies inspired by opportunistic species colonization, their accumulation and storage of resources and the reorganization phases to a new stability.

We studied and characterized which interactions take place within and between disturbed and undisturbed areas that facilitate proliferation, regeneration and nutrient translocation. The resilience model also considered limitations such as distance from source areas, availability of dispersal agents and suitability of the disturbed environment.

This resilience model was created to help understand natural recovery processes that can be emulated after disturbances and applied to human community disaster planning.

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