Estimates of REE distribution in the hydrothermal ore forming fluid of the Iul'tin and Svetloe deposits

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Two Sn-W deposits, Svetloe and Iul'tin (Chukotka Penninsula, Russia) take place within the Iul'tin ore district. Both deposits belong to the cassiterite-quartz formation, are confined to an intersection of deep-seated faults, have spatial and genetical relation to the Upper Cretaceous graniti magmatism and show similar sequences and composition of mineral assemblages.

REE content in single grains of fluorite, wolframite and scheelite was measured by ICP-MS at the Element-2 instrument. REE concentrations in the hydrothermal fluid were obtained based on the distribution coefficients of mineral/fluid [1].

REE content in Svetloe and Iul'tin wolframites allows to suggest that for the wolframites the fluid was magmatic one. This magmatic fluid was enriched by Sm, Gd, Tb, Dy and was characterized by Eu minimum. Regularities of REE spectra changes indicate the presence of two generations of fluorite in the deposits. For the first fluorite generation the fluid is magmatic one, its composition corresponds to the wolframite magmatic fluid. For the second fluorite generation the fluid is exogenous, the Eu minimum is absent or indistinct, these fluorites are enriched in light REE.

The content of the REE were determined in fluid inclusions using aqueous extracts from quartz. This method showes lower REE concentrations that calculated ones based on mineral composition, but the regularities of REE spectra changes also correspond to the presence of two fluids sourses (exogenic and magmatic).

The evolution of fluid was calculated based on thermodynamical model of ore deposition for Iul'tin deposit. Modeling demonstrated that the REE content changes due to both mixing of two different fluids and minerals (wolframite and fluorite) deposition.

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Primary and secondary biogenic aerosols

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Biogenic aerosols comprise primary biological particles (PBAP) such as bacteria, spores and pollen emitted from the Earth surface as well as secondary organic matter (SOA) formed by reaction and condensation of gaseous precursors in the atmosphere. PBAP are essential for the spread of organisms in the biosphere, and numerous studies have suggested that PBAP and SOA can be important for atmospheric processes, including the formation of clouds and precipitation.

The sources and diversity, atmospheric abundance and transport, physicochemical properties and transformation of biogenic aerosols, including their activity as cloud condensation and ice nuclei (CCN, IN), however, are not yet well characterized. Thus, their actual influence on the evolution, present state and future development of the Earth system, the hydrological cycle and other biogeochemical cycles is not yet well constrained. General perspectives and recent advances shall be outlined and discussed.

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