First Finding of Picrobasaltic Melts on Iturup Island, Kurile Island Arc

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Basaltic magmatism occurs extensively in the Kurile island arc, but more magnesian magmas (picrobasalts) were not previously reported. The subvolcanic picrobasaltic massif of Ksenolitnaya Cove, Iturup Island, contains xenoliths of olivine with rare clinopyroxene crystals. Primary melt inclusions were found in olivine from both the xenoliths and their host rock. The inclusions are surrounded by decrepitation haloes. Melting of daughter phases in the melt inclusions was observed at 1170-1225°C. The inclusions in the xenoliths and rock have similar compositions with low SiO_2 (up to 45 wt %) and high MgO (up to 12 wt %), CaO (up to 17.5 wt %), H2O (≥1 wt %), F (up to 0.3 wt %) and P2O5 (up to 0.4 wt %). A comparison of the whole-rock compositions of basic volcanics from the Kurile island arc and the obtained data for melt inclusions suggests that extremely primitive mantle melts with very high CaO contents were trapped in the inclusions. The similarity of major- and trace-element characteristics and temperatures of olivine-hosted melt inclusions from the picrobasalts and xenoliths suggests a cumulate origin of the latter during the crystallization of a primary mantle melt in a magma chamber.

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Strontium isotopes map fluid flow in a natural CO_2 Reservoir, Green River, Utah, USA

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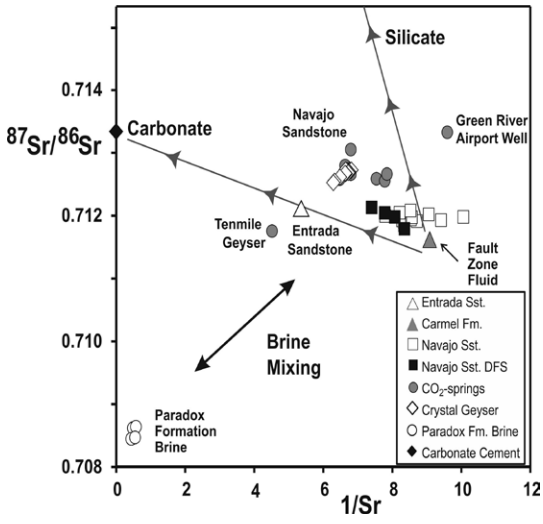
Strontium isotopes offer a powerful constraint in the study of subsurface fluids and are used here to map fluid transport in a natural CO_2 reservoir adjacent to a cold water CO_2-geyser and a CO_2-leaking extensional fault at Little Grand Wash, at Green River in Utah.

The strontium isotopic ratios with associated chemical data in this sequence of porous sandstone layers with intervening caprocks are used to constrain the CO_2-charged fluid sources, fluid-fluid mixing and mineral reactions caused by CO_2 migration within the fault damage zone. Carbonate and silicate fractions have been analysed in Wingate, Kayenta, Navajo and Entrada sandstones, gypsum rich layers, the low permeable Carmel caprocks and shale bands within the Entrada Sandstone. The mixing trends from deep brine, sandstone reservoirs and shale-rich cap-rock are well illustrated by 1/Sr versus $^{87}Sr/^{86}Sr$ ratios. The mineralogical changes enhance the sealing properties of cap-rocks for underground storage.



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