Scientists reveal fluid-rock interactions at a shallow subduction zone in the Mariana forearc

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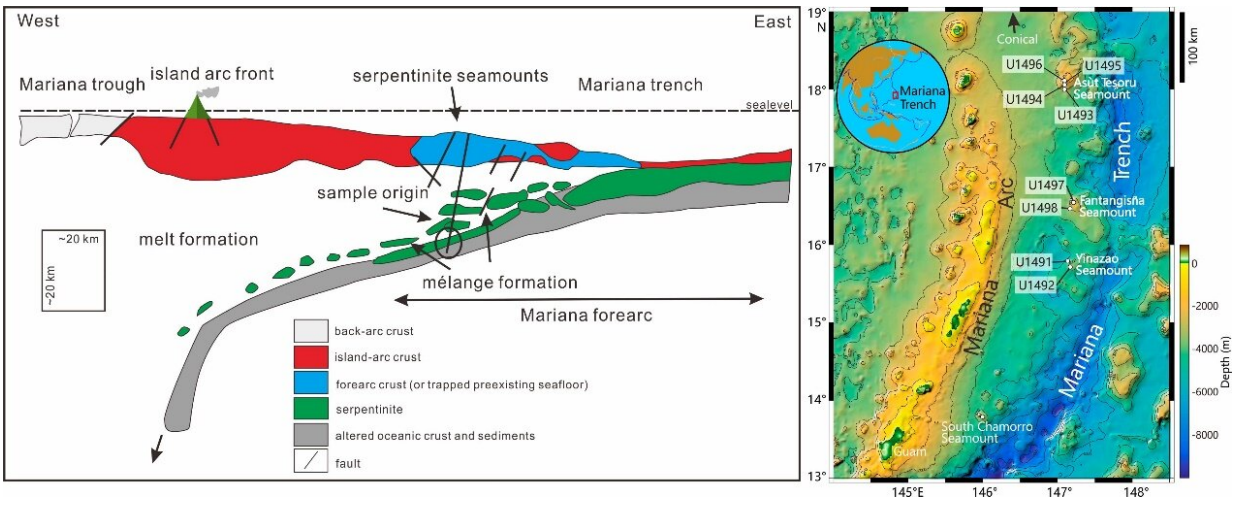

Schematic plot illustrating the cross section of typical settings for serpentinite mud volcanoes in Mariana forearc. Credit: IOCAS

A research team led by Prof. Sun Weidong from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) has revealed the fluid-rock interactions at a shallow subduction zone in the Mariana forearc.

The study was published in *Lithos* on May 13. It is a combined study of petrography, mineral chemistry, and B isotopes in the metabasite rocks

recovered from Fantangisna and Asut Tesoru Seamounts during the recent International Ocean Discovery Program (IODP) Expedition 366.

The main objectives are to reveal the processes of dehydration and fluid-rock interactions in the Mariana forearc zone and to contribute to an overall understanding of the B cycle in the shallow subduction zone.

Subduction zones have a crucial role in mediating global element cycling and maintaining the Earth's geochemical mass balances. Fluid pathways may also exist within the forearc and play an important role in the element cycling and geochemical mass balance at subduction zones.

The researchers found that the metabasites from Fantangisna and Asut Tesoru Seamounts consisted mainly of low-temperature alteration minerals, corresponding to zeolite- to prehnite-pumpellyite-facies metamorphism. The metamorphic minerals are enriched in fluid mobile elements (e.g., B, As, Sb, Pb), thus fixing the B concentrations of the subducted oceanic crust during shallow subduction (