

Modification of the subducting plate by petit-spot volcanism: Impregnation of CO₂-rich melt from the asthenosphere

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Petit-spot is the definitive evidence for partial melting in the asthenosphere caused by Carbon dioxide (CO₂) [1]. Recent our studies [1, 2, 3, 4] identified two types of eruption process of CO₂-rich silicate melt from asthenosphere due to petit-spot volcanism, which corresponds to differences of the stress field of oceanic lithosphere. On the concavely flexed region, CO₂-rich melt reacts [2] and equilibrates [1] with ambient peridotite in the lower lithosphere before eruption. In contrast, on the convexly flexed region, CO₂-rich melt erupts directly from the asthenosphere [3]. Our results [3, 4] suggest that majority of petit-spot volcanoes in the western North Pacific correspond to the former type of process. We thus consider that petit-spot volcanism provides insights into understanding the nature of pre-subduction modification of oceanic lithosphere.

In this presentation, we review geochemical and geochronological variation of petit-spot lava and xenocryst therein from the western North Pacific, to discuss reaction processes between CO₂-rich melt and oceanic lithosphere.

References

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