Nature of metasomatizing agents in suprasubduction and intraplate settings as deduced by glass and amphibole geochemistry

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Glasses and amphiboles in spinel peridotite mantle xenoliths hosted in calc-alkaline s.l. magmas from the subduction-related Western margin of Pacific Plate (Kamchatcka, Japan, Philippine) are compared with glasses and amphiboles in spinel peridotite entrained in alkaline basalts from several intra-plate localities (Cape Verde, Antarctica, Gran Comore, Lessini). At comparable SiO2, subduction-related glasses, especially those from Kamchatcka, are characterized by lower alkalies contents than glasses from intra-plate settings. As a consequence the former tend to be more SiO2-saturated, as also evidenced by the widespread presence of secondary orthopyroxene in xenoliths from suprasubduction setting. Subduction-related glasses have Na2O content similar to carbonatite-metasomatised intra-plate glasses, but the latter presents consistently higher CaO and Nb abundances. Subduction-related glasses have also lower Rb, Ba, Zr, Ti and HREE contents than alkali-silicate intra-plate glasses, bearing analogies with slab-derived melt. Irrespective of textural positions, amphiboles in mantle xenoliths from intra-plate settings present much higher Nb and, to a lesser extent, Zr and Ti contents than amphiboles found in xenoliths from suprasubduction setting. Similar indications, although less robust for crystallographic and statistical reasons, can be found for clinopyroxene and orthopyroxene. These data strongly suggest that metasomatizing agents in the mantle wedge above a subduction zone are richer in SiO2 and depleted in Nb, Zr and Ti with respect to fluids migrating in intra-plate setting. The presence of accessory phases such as rutile and zircon in the downgoing slab, retaining HFSE during dehydration and/or melting and producing HFSE-depleted fluids seems to account for the observed geochemical features. The commonly observed occurrence of “plume-related” alkaline magmatism in the back-arc setting which follows in a time span of few to ten millions of years a subduction process will be also addressed in the light of the above reported data.

New SHRIMP ages from the Permo-Triassic boundary at Meishan

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Determination of the age of the Permo-Triassic boundary has been a test case for zircon geochronology in the presence of pervasive Pb loss and inheritance. SHRIMP ages are presented for zircons for five volcanic ashes from the global stratotype at Meishan, China, and compared with previous zircon ages for these beds. Subtle inheritance and Pb loss have been detected and screened in most Meishan zircons. No significant age differences are detected here between Bed 17 through Bed 36, so the Permo-Triassuc boundary at Meishan is estimated as their mean age at 251.6 ± 0.2 Ma. This agrees with Bowring *et al*. (1998) but it is *ca.* 0.5% younger than Mundil *et al.* (2004). Rather than hidden Pb loss, the difference may be due to interlaboratory bias, which remains to be assessed by comparison of standards analyses.

References

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