Melt inclusions as a record of the early magmatic history of the Izu-Bonin-Mariana island arc

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IODP Expedition 351 Izu-Bonin-Mariana (IBM) Arc Origins sucessfully cored more than 1,600 m of sediments and the underlying oceanic igneous basement in the Amami Sankaku Basin, in the northwest Philippine Sea. The volcaniclastic sediments and the basement have formed by magmatic processes related to IBM arc inception some 50 Ma ago and subsequent evolution of the Kyushu-Palau-Ridge, a remnant part of the presently active Izu-Bonin-Mariana island arc. Fresh magmatic crystals recovered throughout the whole arc-shed volcaniclastic sequence contain a high number of pristine melt inclusions that provide important insights into the composition of primitive melts, magmatic differentiation and evolution of island arcs.

Here we present the first major element analyses of these melt inclusions along with selected volatile (Cl, S, H_2O) and trace element data plus preliminary data for stable isotopes (S, O). Melt inclusions (predominantly hosted in clino-pyroxene) cover the full range of magmatic rocks from high-Mg (basaltic) andesite and basalt to rhyolite with different suites belonging to either the low-K or medium-K rock series. More interestingly, these chemical differences are not random but systematic with the volcaniclastics shed shortly after arc inception hosting melt inclusions more similar to high-Mg andesites, whereas melts erupted at a later stage of IBM development are overall more evolved (lower MgO) but also interestingly tend to a slightly more basaltic composition.

This observations is in agreement with recent models of hydrous melting of a highly depleted mantle wedge at the early stage after arc inception and subsequent re-fertilisation of the mantle wedge by infiltrating fluids and/or sediment melts released from the subducting slab [1]. However, (stable isotope) work is in progress to further confirm these observations and to test recent models of magmatism during arc inception.

[1] Umino, Kitamura, Kanayama, Tamura, Sakamoto, Ishizuka & Arai (2015) *Geology* **43**, 151–154.