Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

# Evolution of the proto-Izu-Bonin-Mariana arc volcanism: Constraints from statistical analysis on geochemical data of melt inclusions

M. HAMADA[1*], H. IWAMORI[1,2], P. A. BRANDL[3], H. LI[4], I. P. SAVOV[5]

[1]JAMSTEC, Yokosuka, Japan (*mhamada@jamstec.go.jp)
[2]Tokyo Institute of Technology, Japan
[3]GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany
[4]Center of Deep Sea Research, Institute of Oceanography, Chinese Academy of Sciences, China
[5]School of Earth and Environment, University of Leeds, UK

IODP Exp. 351 recovered a unique volcaniclastic sediments deposited immediately after Izu-Bonin-Mariana (IBM) arc initiation at ~52 Ma around Site U1438 at the northwestern margin of the Philippine Sea Plate. In order to unveil the magmatic evolution of the proto-IBM arc, we have analysed major and volatile trace elements (S and Cl) in 339 melt inclusions (MIs) from Unit III of Site U1438, which record the magmatic evolution of the island arc from 40 Ma to 30 Ma. Clinopyroxene- and plagioclase-hosted MIs are diverse in composition and range from low- to high-K basalts through rhyolites. MIs contain up to 3,000 ppm S and up to 12,000 ppm Cl. The MIs were recovered from volcaniclastic sedimentary cores and can be sourced from multiple volcanic centres. In order to better link the MIs with the magmatic evolution of the proto-IBM arc, we performed statistical analyses on MI geochemical data, following to the procedure of Iwamori et al. (2017). MI data can be separated into 6 clusters and their origins can be explained either by (1) changes in the mantle wedge arc magmatic source(s) through time, (2) metasomatism of the mantle wedge arc magmatic source by slab fluids, and (3) brine assimilation of melt. Regarding (1), both tholeiitic magmas and calc-alkaline high-Mg andesite magmas appear to had been coexisting until ~37 Ma, when high-Mg calc-alkaline andesite magmas disappeared and tholeiitic magmas become dominant. Such geochemical shift of MIs at ~37 Ma can be explained by replenishment of the mantle wedge arc magmatic source during the early stages of arc evolution.

Iwamori et al. (2017, G-cubed) doi:10.1002/2016GC006663