Remelting of Ontong Java Plateau lithosphere

T. HANYU[1]*, M. L. G. TEJADA[1], K. SHIMIZU[1], A. ISHIKAWA[2], J.-I. KIMURA[1], Q. CHANG[1], R. SENDA[1], T. MIYAZAKI[1], K. GOTO[3] AND O. ISHIZUKA[3]

[1]Japan Agency for Marine-Earth Science and Technology, Yokosuka 237-0061, Japan (*correspondence: hanyut@jamstec.go.jp)

[2]The University of Tokyo, Tokyo 153-8902, Japan

[3]Geological Survey of Japan, AIST, Tsukuba 305-8567, Japan

We report the geochemical composition of basalts from Nuugurigia (Tau) Atoll on the Ontong Java Plateau (OJP). This atoll stands on the basement of OJP, and is possibly related to a late-stage volcanism on OJP. Basalts were sampled by dredge haul during R/V Mirai cruise in 2012 from three small volcanic cones on the northeastern ridge of Nuugurigia. Some rocks are pillow basalts with altered glass margin. They are mildly alkalic basalts involving plagioclase with minor olivine (altered) and clinopyroxene.

These basalts have more enriched isotopic signature toward EM1 compared to any rocks from OJP (including those from Solomon Islands). Their isotopic signature is close to, but even more enriched than, that of some basement rocks from Manihiki Plateau (Site 317) [1]. This reinforces the presence of EM1 component from OJP that has been recognized as a major source of Manihiki Plateau [2]. These basalts show unique trace element characteristics. They show mildly enriched pattern in the spidergram with robust Sr positive spike and Zr-Hf negative spike. We confirmed that this was not caused by alteration by comparing trace element abundance of less-, moderately-, and highly-altered parts of rocks with laser-ablation ICP-MS technique. Sr enrichment and Zr-Hf depletion relative to rare earth elements is a feature shared with quartz-bearing garnet pyroxenite found as xenoliths from Solomon Islands [3]. Moreover, such xenoliths show enriched isotopic characteristics; thereby we intepret that the basalts from Nuugurigia is a melting product of the garnet pyroxenite underplating beneath the OJP lithosphere.

Ishikawa et al. [3] suggested that the quartz-bearing garnet pyroxenite was delaminated granulitic lower crust from Rodinia supercontinent. Such lower crustal material would have been transported upwards by a mantle plume, stored beneath the OJP lithosphere, and then recently melted to form a late-stage volcano on OJP.

[1] Hoernle et al. (2010) *GCA* **74**, 7196-7219. [2] Tejada et al. (2013) *EPSL* **377-378**, 84-96. [3] Ishikawa et al. (2007) *EPSL* **259**, 134-148.