

## Geophysics in the R/V Hakuho-maru 2019-2020 expeditions around the world, 30<sup>th</sup> anniversary

\*Masakazu Fujii<sup>1,2</sup>, Hiroaki Koge<sup>3</sup>, Hiroshi Sato<sup>4</sup>, Kyoko Okino<sup>5</sup>, Chiori Tamura<sup>5</sup>, ZHOU JINYU<sup>5</sup>, Kosuke Inoue<sup>5</sup>

1. National Institute of Polar Research, 2. The Graduate University for Advanced Studies, SOKENDAI, 3. AIST, 4. Senshu University, 5. Atmosphere and Ocean Research Institute, UTokyo

The seafloor covers more than 70 percent of the solid-earth surface, but most parts have not been explored because of observation difficulty. Significant records of submarine volcanism, dynamic erosion, and sedimentation as well as continental breakup and seafloor spreading are preserved in the seafloor. Here, we present new geophysical observations of ocean floors in southern hemisphere including various tectonic settings such as mid-ocean ridges, fracture zones, subduction systems, and continental slope to margin. We conducted underway geophysical mapping during the R/V *Hakuho-maru* cruises of KH-19-6 Leg 1 (Tokyo to Honolulu, October 2019), KH-19-6 Leg 2 (Honolulu to Valparaiso, October –November 2019), KH-19-6 Leg 3 (Valparaiso to Punta Arenas, November –December 2019), KH-19-6 Leg 4 (Punta Arenas to Cape Town, December 2019 –January 2020), and KH-20-1 (Cape Town to Fremantle, January –February 2020). Multibeam bathymetry, sub-bottom profiler, total and vector magnetic fields, and gravity data were widely acquired except exclusive economic zones. Specific scientific target area were set to 1) the Chile Ridge, southern Mid-Atlantic Ridge, and Southeast Indian Ridge to reveal the seafloor spreading process in the Cenozoic era and the mid-ocean ridge oscillation; 2) South Shetland Trench system, West Antarctica, to understand the formation of accretionary prisms and sediment supply from the continent; 3) Vulcan and Bullard Fracture zones to reveal temporal change of mid-ocean ridge volcanism and mantle heterogeneity; 4) Conrad Rise to understand its origin and surrounding magmatism; and 5) off Cape Darnley, East Antarctica, to reveal relationship between solid-earth processes and presently formed Antarctic bottom water. In this presentation, we overview preliminary geophysical results which were combined with previous data obtained during cruises of the R/V *Hakuho-maru*, Icebreaker *Shirase*, and R/V *Mirai* as well as previous compile study (e.g., Quesnel et al., 2009; Ryan et al., 2009) and satellite gravity insight (e.g., Sandwell et al., 2015; Wessel, 2015). Finally, we discuss geophysical insights into tectonic, volcanic, sedimentation, and glacial processes in Pacific, Atlantic, Indian and Southern Oceans.

Keywords: Marine geophysics, R/V Hakuho-maru, Expeditions around the world, Southern Hemisphere