

## Geophysical insights into tectonic, volcanic, sedimentation, and glacial processes in Indian and Southern Oceans: Preliminary geophysical results of R/V *Hakuho-maru* KH-19-1 cruise

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The seafloor covers more than 70 percent of the solid-earth surface and has been progressively investigated since the 20th century, however most parts have not been explored because of observation difficulties in the ocean. Particularly, the seafloor of the Indian and Southern Oceans are expected to preserve significant records of paleo glacial processes and submarine volcanism as well as continental breakup and seafloor spreading. Here, we show new geophysical dataset just obtained during the R/V *Hakuho-maru* KH-19-1 cruise in early 2019. Underway geophysical mapping as well as multichannel reflection surveys and dredge rock samplings were conducted in this cruise. Specific scientific target area were set to 1) the Southwest Indian Ridge to reveal the seafloor spreading process in the Cenozoic era; 2) Conrad Rise to understand its origin and surrounding magmatism; 3) Del Cano Rise to reveal how it has been formed; 4) off Cape Darnley to reveal relationship between solid-earth processes and presently formed Antarctic bottom water; and 5) Southeast Indian Ridge to reveal the mid-ocean ridge oscillation. Multibeam bathymetry, total and vector magnetic fields, gravity, and sub-bottom profiler data were successfully acquired along the ship tracks which covers Fremantle to Mauritius in leg-1 (2 Jan to 11 Jan 2019) and Mauritius to Fremantle via mentioned target area in leg-2 (16 Jan to 12 Feb 2019). We overview preliminary geophysical results which were combined with previous *Hakuho-maru* cruises of KH-07-04, KH-09-05, KH-10-07, and KH-16-01 and data acquired during Japanese Antarctic Research Expedition by using Japanese icebreaker *Shirase*. Finally, we discuss geophysical insights into tectonic, volcanic, sedimentation, and glacial processes in Indian and Southern Oceans.

Keywords: Indian and Southern Oceans, Solid Earth processes, Marine geophysics, *Hakuho-maru*