Understanding of whole history of Antarctic ice sheet, sea ice, and bottom water based on core-seismic integrated investigation from Antarctic continental shelf to deep sea floor

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On the shelf slope from the continental shelf of Antarctica, there are characteristic seafloor topographic features and sediments potentially influenced by the Antarctic ice sheet and the Antarctic bottom water. Gully-like submarine valleys have remarkably observed on the shelf edge off the coast of Cape Darnley, where the Antarctic bottom water is presently formed, by using marine geophysical methods such as multibeam echo sounding, sub-bottom profiling, and multichannel seismic reflection surveys. Our latest survey during the R/V Hakuho-maru KH-19-1 cruise in the early 2019 completed obtaining new exciting data which clearly shows complex submarine channels from shallow to deep seafloor and surrounding sedimentations. Although these up-to-date observations in unexplored area provided new clues for understanding origin and formation of Antarctic bottom water, currently obtained detailed seafloor topography and submarine geological structures have been essentially limited because of insufficient spatial coverage. This is mainly because of the difficulty to explore Antarctic continental shelf where sea ice and iceberg exist. Integrated promotion of marine geophysical and geological investigations as well as sediment coring in this area will allow us to develop a new science for revealing the relationship between Antarctica and Earth history which has not been clarified in the past research.

Keywords: Antarctic, Southern Ocean, sea ice, Antarctic bottom water, submarine channel, seismic reflection survey

