

Temporal variation of the Antarctic Bottom Water revealed by the mooring measurements off the Vincennes Bay

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The newly formed Antarctic Bottom Water (AABW), which is originated from the Vincennes Bay Polynya, has been confirmed off the Vincennes Bay, East Antarctica. In recent years, the T/RV Umitaka-maru hydrographic observations suggests the variety of the AABW off the Vincennes Bay and off the Totten Ice Shelf. In this study, we conducted the mooring observations off the continental slope (Sta. KC6: 64° -59.94' S, 109° -59.52' E, Water depth: 2580m) and the eastern side of the ridge (Sta. KM2: 64° -26.01' S, 106° -59.58' E, Water depth: 2590m) extending north off the Vincennes Bay from January 19th 2019 to January 21st 2020. The mooring system includes RBR Solo3T temperature sensors, SeaBird MicroCAT CTD sensors and Seaguard recording current meters (Sta. KM2 only). The ship-based CTD measurements were also made at the both stations, along 110°E line, off the Vincennes Bay and Off the Dalton Polynya region. At Sta. KM2, temperature and salinity gradually increased from January to the middle of July, and then decreased from the middle of July to late September. From October, temperature and salinity gradually increased again. During winter when temperature and salinity dropped indicating the AABW signal, changes in salinity and potential temperature were about 0.01 and 0.15 °C, respectively. At Sta. KC6, temperature and salinity gradually increased from January to early June, and then decreased from the middle of June. This decreased in temperature and salinity also indicates the AABW signal. However, compared to Sta. KM2, the water temperature change (about 0.1°C) was small, and the minimum water temperature was high. Moreover, salinity was relatively high (annual average difference is about 0.006). For instance, the difference of salinity between Sta. KC6 and Sta. KM in early September was about 0.009. The mooring measurements at Sta. KC6 illustrated the water mass property (salinity = 34.65~34.66) before recruitment of newly formed AABW from the Vincennes Bay Polynya. This result corresponds to relatively high salinity observed by T/RV Umitaka-maru hydrographic observations off the Cape Poinsett in January 2020.

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