Geophysical Research Abstracts
Vol. 20, EGU2018-18778-1, 2018
EGU General Assembly 2018

Water masses of the southern Philippine Sea observed in late fall of 2017

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Southern Philippine Sea as a part of tropical western North Pacific has a role of crossroads to exchange water masses formed in mid to high latitude of northern and southern hemisphere through the low latitude western boundary currents. To classify the water masses and address its movement, an investigation cruise was performed in November 20 to December 2, 2017. Besides temperature and salinity, oxygen was observed as an auxiliary variable. Water masses were vertically identified as follows: tropical surface water, North Pacific Subtropical Water (NPSW), North Pacific Intermediate Water (NPIW), Antarctic Intermediate Water (AAIW) and deep water. High salinity (> 35.0 psu) NPSW was shown in the region of North Equatorial Current (NEC) north of 11°N along 131°E section and the west of 128.5°E along 6.5°N and 8°N near Mindanao. It implies that NEC bifurcates to Kuroshio and Mindanao Current (MC) at Mindanao coast and the MC transport the high salinity NPSW to the south. The NPIW and AAIW occupied below the NPSW were characterized by salinity and oxygen minimum layer. The oxygen minimum layer (OML) was divided into the upper OML and the lower OML by local oxygen maximum layer extended to 13°N. The core of local oxygen maximum layer existed in depth of 300–700 m of 128–129.5°E along 6.5°N section where is near the southern Mindanao coast. This suggests that New Guinea Coastal Under Current flows to the north through the equator and affects characteristics of water mass in the tropical western North Pacific Ocean.