



Influences of the Tsushima and Oyashio Currents on the circulation and water properties of Otsuchi Bay

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Vertical profiles and bottom temperature and salinity observations were conducted from September 2012 to May 2014 in Otsuchi Bay, one of the rias along the Pacific coast of Japan. Two bottom mounted profilers at the bay mouth opening to the east revealed a mean inflow and outflow in the north and south of the bay, respectively, which was enhanced during summer and early autumn. This inflow/outflow pattern suggests an counterclockwise circulation pattern within the bay which weakens in winter and spring, when the velocity structures become vertically non-uniform. Temperature and salinity profiles beneath the surface layer were mostly categorized as those of the Tsugaru Warm Current (TWC), based on the data recorded by mooring at the bottom of the bay mouth as well as periodic observations with conductivity-temperature-depth profilers within the bay. This is consistent with the inflow/outflow pattern as the TWC intensifies from summer to autumn. However, over the study period cold and fresh waters categorized as those of the Oyashio Current (OY) occasionally intruded into the bay, particularly in winter and spring. During those intrusion periods, the current profiles at the bay mouth totally changed in that inflows then occurred in the north and south of the bay mouth in subsurface layers. The OY intrusions and subsequent low-salinity states observed during the study period terminated within one or two weeks in February and May 2013, and lasted more than one month during March-April 2014. The surface water was fresher in the south of the bay than in the north, indicating the deflection of the river plume due to Coriolis force.