Can the anticyclonic eddy trap and amplify near-inertial waves in the Arctic Ocean?

*Eun Yae Son¹, Yusuke Kawaguchi², Jae-Hun Park¹, Ho Kyung Ha¹

1. Inha University, 2. JAMSTEC

The hydrographic data obtained by the Ice-Tethered Profiler with Velocity (ITP-V) were utilized to reveal the eddy-internal wave interaction in the Canada Basin, Arctic. The ITP-V is an autonomous drifting instrument that collects profiles of hydrographic data and velocity concurrently in depths of 10-250 m at 3-hr interval. The observation using the ITP-V, installed on the multi-year sea ice, was operated for 9 months from August 2014. We focus on a specific event in mid-October, when a near-surface anticyclonic eddy was observed in depths of 50-100 m. The anticyclonic eddy showed vertically stretched isopycnals with anomalously warm water in its core. It is noted that the near-inertial internal waves were trapped and amplified near the bottom of the eddy, where the horizontal and vertical wave lengths were approximately 10 km and 60 m, respectively. The parameterized turbulent diffusivity (Gregg, 1989) reached up to 10⁻⁵ m ²/s near the bottom of the eddy while the background diffusivity was around 10⁻⁷ m²/s. Our results demonstrate that near-inertial waves can be trapped and amplified within the anticyclonic eddy in the Arctic and can enhance the ocean mixing like mid latitudes.

Keywords: Near-inertial internal waves, anticyclonic eddy, fine-scale parameterization, Canada Basin