

Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

THE DISTRIBUTION OF GLACIAL MELTWATER IN THE AMUNDSEN SEA, ANTARCTICA, REVEALED BY EXCESS HELIUM AND NEON

INTAE KIM^{1*}, DOSHIK HAHM¹, TAE SIEK RHEE¹, TAE WAN KIM¹, CHANG-SIN KIM¹, SANGHOON LEE¹

¹Division of Polar Ocean Environment, Korea Polar Research Institute (KOPRI), Incheon 406-840, Republic of Korea
(*correspondence: ikim@kopri.re.kr)

The light noble gases, helium (He) and neon (Ne), dissolved in seawater can be useful tracers of freshwater added by the glacier melting since the air bubbles trapped in glacial ice dissolve in seawater, resulting in supersaturation. To investigate the distributions of glacier meltwater (GMW) in the Amundsen Sea, Antarctica, we measured the two noble gases, He and Ne, in the water column of the Amundsen Sea in 2011 and 2012. The measured saturation anomalies of He and Ne (ΔHe and ΔNe) ($\Delta C = (C/C_{\text{eq}} - 1) \times 100\%$, where He_{eq} and Ne_{eq} are at equilibrium with the atmosphere) were in the range of 3 – 35% and 2 – 12% ($n > 80$), respectively, near the Dotson- and Getz Ice Shelves (DIS and GIS). The calculated GMW fraction in seawater, based on the excess ΔHe , in DIS, GIS and Dotson trough (DT) regions, were 0.4 – 2.0%, 0.4 – 0.8%, and 0.4 – 1.2%, respectively. Along the DT, the largest GMW fractions (up to 1.2%) were observed in 400 – 500 m depth where the warm Circumpolar Deep Water (CDW) melts the base of the ice shelves along DT in 2011. This large extent of GMW were even appeared nearly 300 km away from the ice shelves, suggesting that GMW can be transported more than several hundred kilometers offshore. Near the ice shelves, the GMW fraction was substantially higher in DIS than those in GIS and the largest (up to 2.0%) of GMW were observed in the western part of DIS. In 2012, the GMW fractions decreased up to 30 – 40% in DIS and GIS, respectively, indicating distinct temporal variability in glacial melting compared to 2011. Our results imply that ΔHe and ΔNe are sensitive GMW tracers with high spatio-temporal resolutions.