

Distribution of helium isotopes along 47°N of the subarctic North Pacific

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We collected water samples at stations along a transect (160°E-150°W) at 47°N during the 2017 Japanese GEOTRACES cruise in the subarctic North Pacific. Among the trace elements of interest were helium isotopes in seawater. In this area of the Pacific, helium isotopic data are very sparse and additional observations are necessary. Helium isotopes have been widely used to trace hydrothermal vent and mantle fluids from their sources. Due to its inertness, helium acts as a good tracer for physical processes especially in the deep ocean. Using a noble gas mass spectrometer, we were able to accurately determine the helium isotope concentrations and the resultant ratios. A pronounced excess ^3He gradient was observed from the surface to the mixed layer (400m and 600m) at all stations and shoaling of higher excess ^3He in the mixed layer could be seen around 160°-170°E. Our data show a maximum of excess ^3He (%) of 18-20% at depths of 2000 - 2500m with an apparent plume moving to the west. Higher excess ^3He (%) than previous measurements, though very limited, was observed close to the seafloor. In addition to He analysis, we have a plan to analyse tritium concentration to estimate seawater age. It may be useful to investigate water circulation in the intermediate layer.