

Concerning North Pacific Intermediate Water

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CTD and hydrographic data from a group of closely spaced stations which bracket the Kuril Islands in the northwestern Pacific is used to show that the lowest salinity, most highly-oxygenated, North Pacific water at densities of 26.8 to 27.6 σ_{θ} originates in the Okhotsk Sea. Using historical hydrographic data from the entire northwest Pacific, it is shown that the highest outcrop density is between 26.7 and 26.8 σ_{θ} and occurs off the coast of Hokkaido, with a possible region of similar densities in the southern Okhotsk. It is then shown that salinity and oxygen on various isopycnals denser than 26.7 σ_{θ} is consistent with a source of low salinity water under the sea ice in the northwest Okhotsk Sea (Kitani, 1973). Localized vertical mixing in Bussol' Strait produces low salinity and high oxygen on isopycnals between 27.1 and 27.6 σ_{θ} . It is shown that this low salinity source can account for most of the low salinity signal in the North Pacific at these densities. Therefore, "NPIW" acquires its characteristics in the Okhotsk Sea, although it is not differentiated in any way from water in nearby isopycnals in the subpolar gyre.

As Hasunuma (1978) showed, the subtropical salinity minimum NPIW actually originates by an overrun of subpolar water by the Kuroshio, in the mixed water region off Japan. It is hypothesized that the density at which the overrun occurs is set by the winter outcropping density off Hokkaido. The subsequent evolution of NPIW downstream from this "source" is governed primarily by lateral diffusion.