



## **IMPACT OF THE NORTHWEST PACIFIC MARGINAL SEAS ON NORTH PACIFIC WATER MASSES**

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The three marginal seas of the northwest Pacific have very different impacts on North Pacific water mass formation, primarily because of differences in salinity which is mainly a function of proximity to the subtropical gyre. The other major difference is the depth of sills separating these seas from the North Pacific. The Japan Sea is the farthest south and has the shallowest sills. The Japan Sea forms the densest waters by far in the North Pacific, but the very shallow sills prevent its direct impact on the North Pacific. Its greater function for the North Pacific water masses is as a conduit for high salinity subtropical water, which after modification through cooling and freshening in the Japan Sea, enters both the Okhotsk Sea and the Pacific region just south of Hokkaido.

The Okhotsk Sea is much more connected than the Japan Sea to the Pacific Ocean, through the numerous Kuril straits that allow exchange to mid-depth. Dense waters formed on the northwestern Okhotsk Sea shelf as a result of brine rejection are the nucleus of new North Pacific Intermediate Water (NPIW). This fresh water mass is denser than waters formed similarly in the Bering Sea because of the saline inflow from the Japan Sea. Large tidal currents mix the new NPIW with Pacific waters within the Okhotsk Sea and much more strongly within the Kuril Straits. It is estimated that about half of the meridional freshwater transport in the subtropical North Pacific is carried by the process of North Pacific Intermediate Water formation, as opposed to heat, where NPIW formation carries less than 20%.