



DENITRIFICATION IN THE WELL-OXYGENATED NORTHWESTERN PACIFIC MARGINAL SEAS

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The northwest North Pacific has a large-scale deficit of nitrate relative to phosphate (low N^*), of the same spatial and numerical scale as the eastern tropical N^* deficit. This signal has clear origins in the sediments of the northwestern Okhotsk Sea, based on hydrographic surveys in recent years, which show elevated nitrite and decreased N^* , nitrate and oxygen. Indeed, low N^* is a reliable indicator of waters of Okhotsk shelf origin. While the Bering Sea also shows indications of denitrification, the intensity and geographical coverage is more limited than in the Okhotsk Sea. Additionally, the Okhotsk Sea northern shelf is the source of intermediate water for the North Pacific. Thus the Okhotsk Sea is the most important source of the denitrification signal in the northwest Pacific.

The Japan Sea, which is much more isolated from the North Pacific, also shows evidence of denitrification throughout the sea despite its large oxygen content, with the most extreme signatures in the turbulent bottom boundary layer at about 1200 m depth in the southwestern basin, and to depths of about 300 m along the margins of the basin. In these regions, measured nitrite is non-zero. Because all of the waters deeper than 200 meters originate within the Japan Sea, nitrogen and oxygen budgets can be assessed. The oxygen minimum within the Japan Sea is co-located with the largest denitrification signal, suggesting the importance of sedimentary consumption of oxygen.