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THE ORIGIN OF SEA ICE IN THE SEA OF OKHOTSK (ABSTRACT)

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Isotopic and structural analyses were conducted on ice samples taken from the Sea of Okhotsk. The results suggest that differences found in the texture, sizes and shapes of grains are associated with ice concentration. A sample with fine grain texture was found in a low ice concentration area near an ice edge; perhaps it can be explained by rough oceanic surface conditions favoring the production of frazil ice. Yet, another sample from a high ice concentration area shows larger and more elongated grain structure. If this association between texture and ice concentration holds during the advection from the north, then the textural homogeneity found in the vertical sections of ice samples is interpreted as indicating a small amount of mixing among ice floes . From the high (> 1 ‰) $\delta^{18}O$ and low (< 2 ‰) salinity values with granular texture, the origin of sea ice cannot be traced back to either snow or sea water, nor to a simple mixture of them. This raises a fundamental question as to the exact process by which a floe is formed from frazil ice, snow, and/or seawater spraying. Observations thus point out a need for future field or laboratory experiments to examine the isotopic fractionation under various physical conditions.

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