

VARIATION IN THE SEA ICE COVERAGE OF THE SEA OF
OKHOTSK SEA AND THE SOUTHWARD EXTENSION OF THE
COASTAL OYASHIO CURRENT (ABSTRACT)

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Interactions between the atmosphere, ocean, and sea ice in the Far East region have been studied by analyzing the 5-day average data of air temperature, surface pressure, coastal sea level, and sea ice coverage of the Sea of Okhotsk in the period 1978-1990. In the discussion of sea ice formation, increment of sea ice coverage every 5 days is used instead of sea ice extent; special attention is paid to the "fetch effect" of the cold air.

As is expected, the increment of sea ice coverage is found to increase with decreasing temperature in general. However, while the air temperatures at Abashiri and Wakkanai become minimal in late January to early February, the maximum increment of sea ice coverage is found in the period from late December to early January. This suggests that sea ice formation is not solely governed by refrigeration by cold air. Inspection of the extension process of sea ice coverage in the Sea of Okhotsk suggests that fetch, travel distance of the cold air over the open water from the continent or from the end of the sea ice field, plays a very important role in sea ice formation. On comparing the wind direction of surface geostrophic wind with the increment of sea ice coverage, it is found that more open water is frozen by westerly winds than by northern or northeasterly winds. It is also found that in unusually cold winters with prevailing northwesterly winds, the Oyashio region extends far southward being driven by the pressure gradient due to the sea level difference along the stream.

It is concluded that the prevailing northern or northwesterly winds driven by the Siberian High and Aleutian Low cause cold winters with much snow in Japan, extensive Oyashio Current, and small coverage of sea ice in the Sea of Okhotsk. On the other hand, prevailing westerly winds cause warm winters with little snow in Japan, weak Oyashio Current and extensive sea ice coverage in the Sea of Okhotsk.

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