

## Thermohaline circulation in the Sea of Okhotsk

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Dense Shelf Water (DSW) produced from sea-ice formation on the northern shelves of the Sea of Okhotsk flows out to intermediate depths (200-500m) along the Sakhalin coast and is the densest water mass formed in the North Pacific. This intermediate layer intrusion forms the lower limb of a meridional overturning circulation in the Sea of Okhotsk that is enhanced by strong tidal mixing near the Kuril Islands and closed by a surface wind-driven circulation that returns relatively saline water to the DSW formation regions. This meridional overturning circulation is referred to as the intermediate-layer overturning.

This talk presents results from a series of numerical experiments that investigated the dynamics of this intermediate-layer overturning circulation. The effects of wind, air temperature, Amur River discharge and tidal mixing along the Kuril Island were examined and were all found to influence the overturning. In particular, it was found that stronger wind forcing enhances the DSW intrusion because 1) intensified circulation increases northward salinity flux from the Kuril Islands where saline water upwells from the intermediate layer, and consequently raises background salinity in the northern shelves where DSW forms, and 2) the DSW volume flux from the northern polynyas increases under increased winds. The observed interannual time-scale variability (less than 10 years) of the intermediate-layer overturning is also discussed.

Finally, we examined the material circulation flowing out from the northern shelves of the Sea of Okhotsk. CFC has been considered in particular.