

# **A SENSITIVITY STUDY ON THE DENSE SHELF WATER FORMATION IN THE OKHOTSK SEA**

You-ichiro SASAJIMA, Hiroyasu HASUMI , Tomohiro NAKAMURA  
Center for Climate System Research, University of Tokyo  
5-1-5, Kashiwanoha Kashiwa-shi, Chiba, Japan  
[sasajima@ccsr.u-tokyo.ac.jp](mailto:sasajima@ccsr.u-tokyo.ac.jp)

A series of sensitivity experiments on the dense shelf water (DSW) formation in the Okhotsk Sea is performed with an ocean general circulation model coupled with a sea ice model. For well resolving coastal polynya where the DSW is formed, horizontal resolution of the model is set to 3 – 7 km in the northern shore of the Okhotsk Sea. Changes in SSS and a DSW production rate by tidal mixing in the Kuril Straits are qualitatively similar to those found in earlier numerical studies (Nakamura et al., 2006; Matsuda, 2008). The production rate also increases due to intensification of wind stress in the Okhotsk Sea as mentioned by Matsuda (2008). Unlike the interpretation of Matsuda (2008), this increasing of the DSW production is caused by enhancement of brine rejection in the coastal polynya widened by the intensified wind. Rivers runoff used to force the model is much larger than the observed (Perry et al., 1996) in the Okhotsk Sea, then it is anticipated that the density of the DSW becomes unrealistically small due to the excess of the runoff in the model. The DSW production rate and abyssal density significantly increase by removing the runoff in the Okhotsk Sea except the Amur River. The annual mean of the abyssal density in the northwestern shelf region becomes larger than  $26.85 \sigma_0$  with all these effects included, while it is  $26.52 \sigma_0$  without these effects.