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## Impact of SST changes on snowfall over the Sea of Japan side, using a regional climate model

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Climate changes can have significant influence on snowfall, particularly over the regions where a seasonal mean temperature is almost equivalent to zero degrees. On the Sea of Japan side, northwesterly winds of the Asian winter monsoon from the Siberian High bring heavy snows. The region is probably considered as one of the snowiest regions on Earth. However, few regional projections have been conducted over the Sea of Japan side. Here, our final goal of this study is the future projection of snowfall over the Sea of Japan side, using dynamical downscaling method. Snow over the Sea of Japan side can be affected by two major factors. One is the activity of northeasterly winds of the Asian winter monsoon, whereas the other is sensible and latent fluxes from the Sea of Japan, which are mainly associated with the sea surface temperature (SST). To understand the effect of SST on snowfall over the Sea of Japan side, we conducted numerical experiments, using a regional climate model. We used a high-resolution model to calculate a realistic distribution of precipitation (including snowfall), which is strongly related to complex terrain. The Advanced Research Weather Research and Forecasting (WRF) modeling system, which was developed at the National Center for Atmospheric Research (NCAR), was chosen for this purpose. The horizontal grid increment of the coarse domain was 25 km, and that of the two-way nested domain was 5 km. The calculation period was for one month of January 2006 when very heavy snow event on the Sea of Japan side. Before downscaling of the projected future climate, the control experiment (CTL) driven by reanalysis dataset was conducted in this study. In addition, two sensitivity experiments were conducted to understand impacts of SST changes. The experiment is same as CTL except that SST over the whole domain is 1 K (2 K) warmer than CTL, which is referred as SST1K (SST2K). Preliminary results show that CTL could simulate spatial distribution of precipitation, compared with surface observations, although the number of observations was limited. To improve performance of the simulation, the higher-spatial-resolution simulation may be necessary. In addition, the SST1K and SST2K calculated more precipitation over the Sea of Japan side, compared with CTL. SST1K and SST2K showed that the increases in snowfall were calculated over the relatively high mountainous areas where monthly mean temperature at surface was colder than about 275 K. The effect of SST changes over the Sea of Japan in the other month should be the subject of further study.