

Impact of radiosonde data over the Arctic ice on forecasting winter extreme weather over mid latitude

Kazutoshi Sato (1), Jun Inoue (1,2,3), Akira Yamazaki (2), Joo-hong Kim (4), Marion Maturilli (5), Klaus Dethloff (5), and Stephen Hudson (6)

(1) National Institute of Polar Research, Tachikawa, Japan (kazutoshi.sato.0127@gmail.com), (2) Japan Agency for Marine-Earth Science and Technology, (3) The Graduate University for Advanced Studies, (4) Korea Polar Research Institute, (5) Alfred Wegener Institute, (6) Norwegian Polar Institute

In February 2015, the Arctic air outbreak caused extreme cold events and heavy snowfall over the mid latitude, in particular over the North America. During the winter, special radiosonde observations were made on the Norwegian RV Lance around the north of Svalbard under the N-ICE2015 project. We investigated the impact of the radiosonde data on forecasting of a cold extreme event over the eastern North America using the AFES-LETKF experimental ensemble reanalysis version2 (ALERA2) data set. ALERA2 was used as the reference reanalysis (CTL) while the observing-system experiment (OSE) assimilated the same observational data set, except for the radiosonde data obtained by the RV Lance. Using these two reanalysis data as initial values, ensemble forecasting experiments were conducted. Comparing these ensemble forecasts, there were large differences in the position and depth of a predicted tropopause polar vortex. The CTL forecast well predicted the southward intrusion of the polar vortex which pushed a cold air over the eastern North America from the Canadian Archipelago. In the OSE forecast, in contrast, the trough associated with southward intrusion of the polar vortex was weak, which prevented a cold outbreak from Arctic. This result suggested that the radiosonde observations over the central Arctic would improve the skill of weather forecasts during winter.