

## Additional Arctic observations improved forecast skill of a typhoon over midlatitude

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In summer and autumn 2016, a remarkable meandering of the jet stream occurred over the Northern Hemisphere. During August, the special radiosonde observations were made on the German RV Polarstern, Korean RV Araon and Russian land station Baranova although these data were not sent to the Global Telecommunication System. The impact of the additional radiosonde data on forecasting the atmospheric circulations over the Arctic and beyond, in particular a case of typhoon1610 (LIONROCK) over East Asia, was investigated using the AFES-LETKF data assimilation system and its ensemble reanalysis data set (ALERA2). We used the ALERA2 as the reference reanalysis (CTL) and the observing-system experiment (OSE) reanalysis in which the same observational data set was assimilated, including the radiosonde data obtained by the RVs and land station. Using these CTL and OSE reanalysis data as initial values, ensemble forecasting experiments were conducted as the CTL and OSE forecasts, respectively. Comparing these ensemble forecasts, there were large differences in the position of the predicted typhoon over Japan. The OSE forecast well predicted the northward movement of the typhoon which is controlled by a trough with strong wind at the upper level. In the CTL forecast, in contrast, the more southward shift of the trough was found over west of Japan, which caused failure of predicting of the typhoon position. Moreover, it is found that forecasting the trough was affected by the special observations in the Arctic regions. This result suggested that the radiosonde observations over the Arctic would improve the skill of weather forecasts at midlatitude during summer.

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