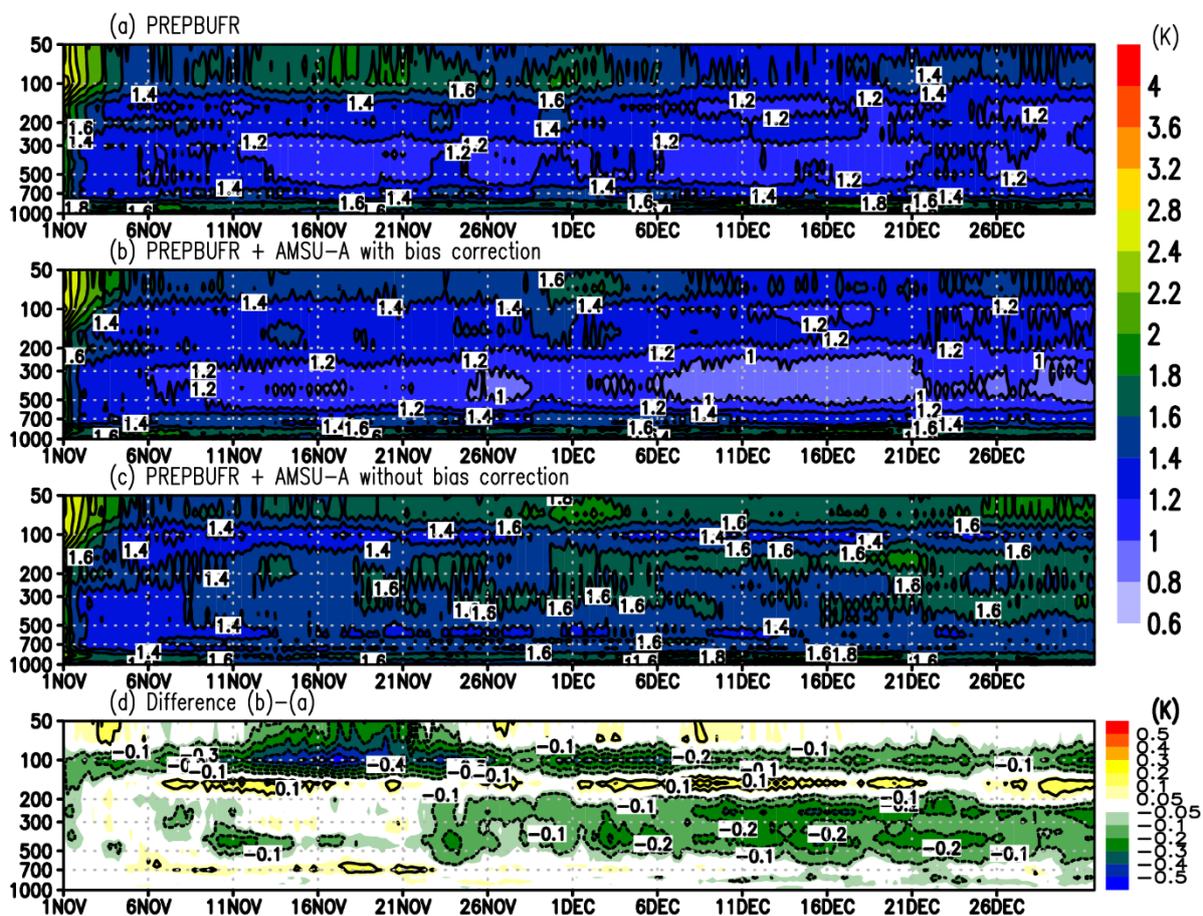Figure 1. Time series of the globally-averaged root mean square differences (RMSD) for temperature (K) relative to the ERA-Interim for the experiments (a) with PREPBUFR only, (b, c) with additional AMSU-A with and without bias corrections, respectively. (d) shows the difference between (a) and (b), with negative values corresponding to the advantage by assimilating the AMSU-A radiances. The horizontal and vertical axes represent the date and pressure level, respectively.

- This study developed an observation operator to assimilate the Advanced Microwave Sounding Unit-A (AMSU-A) brightness temperature observations with the Nonhydrostatic Icosahedral Atmospheric Model (NICAM)-based Local Ensemble Transform Kalman Filter (LETKF) using the radiative transfer model RTTOV (Radiative Transfer for the TOVS (TIROS Operational Vertical Sounder)) version 11.1.

- An adaptive bias correction method was applied for both airmass and scan biases, or the biases originating from the atmospheric state and scan position.

- Comparing the two experiments with and without the AMSU-A radiances, we find that the adaptive bias correction methods work appropriately, and that the analysis is significantly improved by assimilating the AMSU-A radiances (Fig. 1).