Using the adjoint-based forecast sensitivity to observations (FSO), the contribution of observation to the forecasts is evaluated by using the adjoint-based method in a global modeling and analysis system. In this study, the forecast trajectory during August 2012, and the forecast errors using the modified error covariance were evaluated in the observation space.

The forecasts using the reduced AMSU-A observation error covariance show better results compared to the forecast errors before adjusting AMSU-A observation error covariance. The contribution of observation to the 24 hr forecast was the largest, and followed by the SONDE, AIRCRAFT, and IASI. The contribution of ATOVS AMSU-A to the global forecast was the largest, and followed by the SONDE, AIRCRAFT, and IASI. The contribution of ATOVS AMSU-A was reduced in the experiment (ADJ_COV experiment). The forecasts using the reduced AMSU-A observation error covariance show better results compared to the operational forecasts (CTL experiment) in the observation space.

**EXPERIMENTAL DESIGN**

- Schematic of forecast sensitivity to observations in the KMA UM-4DVAR system.

**RESULTS**

- Time-averaged statistics stratified by each observation type and AMSU-A channel in the globe

**CONCLUSION**

- Using the adjoint-based forecast sensitivity to observations (FSO), the contribution of observation to the forecast can be investigated. As a result of investigating the contribution of observation to the 24 hr forecast using the KMA UM-4DVAR model, the contribution of ATOVS AMSU-A to the global forecast was the largest, and followed by the SONDE, AIRCRAFT, and IASI. The contribution of ATOVS AMSU-A was reduced in the experiment (ADJ_COV experiment). The forecasts using the reduced AMSU-A observation error covariance show better results compared to the operational forecasts (CTL experiment) in the observation space.

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