

Assimilation of SSMIS Imager Channels in the JMA's Global 4D-Var Data Assimilation System

Takumu Egawa

Numerical Prediction Division, Japan Meteorological Agency

E-mail: egawa@met.kishou.go.jp

The Japan Meteorological Agency (JMA) started to assimilate clear radiance data from the DMSP-F13/14/15/SSM/I, TRMM/TMI and Aqua/AMSR-E spaceborne microwave imagers in the operational global 4D-Var data assimilation system with a variational bias correction scheme in May 2006. The assimilated channels were four vertically polarized channels of SSM/I and the corresponding channels of TMI and AMSR-E (Sato 2007).

The SSMIS on board DMSP-F16/17 is the successor to the SSM/I series. Figure 1 shows statistics for the O-B (the observed brightness temperature minus the calculated brightness temperature from the background). The quality of the SSMIS imager channels is comparable to that of SSM/I after air-mass bias correction.

Experiments for an impact study were performed using JMA's low-resolution global data assimilation system (TL319L60) and forecast model. The assimilated channels were 19V, 22V, 37V and 92V. The horizontally polarized channels were not used, as the vertical polarized channels contain almost the same information under the current standard for assimilation of surface emissivity. The wind speed Jacobian is not considered in the radiative transfer model. In our experiments, SSMIS imager channels had a positive impact on the analysis fields for 850-hPa temperature and water vapor, while the impact on forecasts for 500-hPa geopotential height was neutral.

In line with these results, JMA started using SSMIS imager radiance data on board DMSP-F16 and F17 in operational global 4D-Var analysis from March 2009.

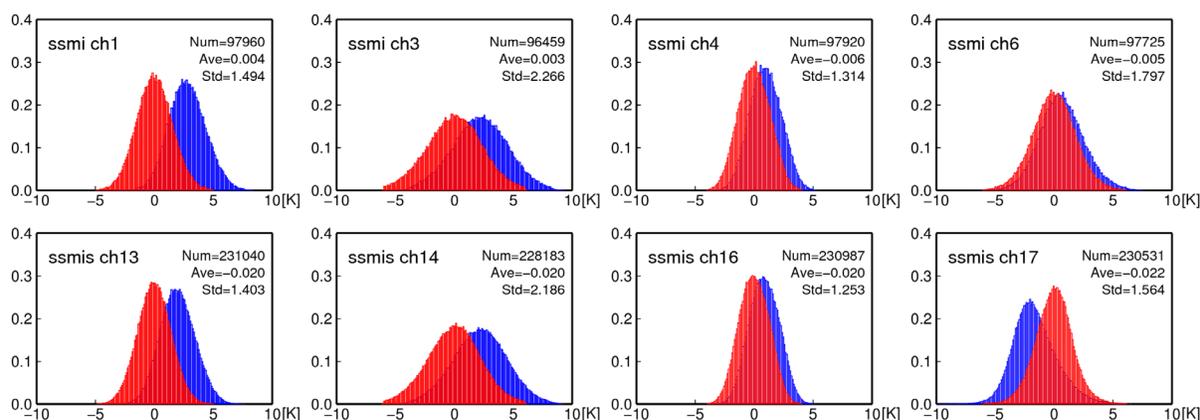


Figure 1. O-B statistics for DMSP-F13/SSM/I (ch. 1, 3, 4, 6) and DMSP-F16/17/SSMIS (ch. 13, 14, 16, 17).

The red histogram areas are for after air-mass bias correction, and the blue ones are for before.

References

Sato, Y., 2007: Introduction of spaceborne microwave imager radiance data into the JMA global data assimilation system, *CAS/JSC WGNE Res. Activ. Atmos. Oceanic Modell.*, **37**, 01.17 – 18.