An Application Study on Near Surface Channels of Hyper-spectral Infrared Sounder

ZHANG Hua[1], JIN Dazhi[2], LI Gang[2]

[1] Numerical Weather Prediction Center, CMA, China, zhangh@cma.gov.cn, [2]College of Mathematics & Physics, Nanjing University of Information Science&Technology, China

Abstract: For the Complexity of land surface, satellite radiation data near surface hasn't been full developed and used. Surface temperature is one of the most serious problems, which come from the inaccurately forecast model. This paper is tried to use one dimensional variational (1DVar) method with the infrared hyper-spectral AIRS observations to adjust the surface temperature. Firstly, a series of simulated experiments were conducted to test the capacity of the method of adjusting the surface temperature. The surface temperature is still able to be adjusted effectively even those errors are included for the surface emissivity, temperature profile, the humidity profile and satellite observations. Then, real cases were tested by 1Dvar. The difference of simulation brightness temperature and the observation brightness temperature of lower channels were decreased as the surface temperature was adjusted. Finally, A Global three dimensional variational assimilation model GRAPES-3Dvar were used to do the 10 day cycle assimilation experiment. The results show that the adjusted temperature improves effectively the analytic fields. The height fields of the lower atmosphere, the middle atmosphere and the upper atmosphere are improved. The humidity fields and the wind fields are also obviously improved in the lower atmosphere.

Keywords: Variational Assimilation, Surface Temperature, Surface Emissivity, GRAPES-3Dvar