Geophysical Research Abstracts, Vol. 8, 02060, 2006
SRef-ID:

Surface temperature assimilation impact on reanalysis air temperature and the surface energy budget

M. Bosilovich, J. Radakovich, R. Todling, A. da Silva and F. Verter
Global Modeling and Assimilation Office, NASA Goddard Space Flight Center

Surface temperature from the International Satellite Cloud Comparison Project (ISCCP) is assimilated into a three dimensional land-atmosphere data assimilations system. Here, we validate one month of analysis for many regions of the globe. The timeframe of investigation is July-Sept 2001, coinciding with the Coordinated Enhanced Observing Period (CEOP) first intensive period. ISCCP Ts and the background model produce analysis increments of surface temperature. These are accumulated into daily and diurnal bias increments. The bias increments are then used a forcing on the background model's surface energy budget. By including the correction as a flux, the surface energy budget iterates the linearized terms of the system of equations, thereby adjusting the sensible heat, latent heat and longwave radiative fluxes. In comparison with station air temperature, inclusion of the Ts assimilation reduces the bias of the surface air temperature. However, the daily bias correction was not able to adequately correct biases in the amplitude of the air temperature. Diurnal bias correction (maintaining a bias estimate for each 3 hourly period of the diurnal cycle) did show a significant improvement of the amplitude of near surface air temperature. Comparison of the surface energy budget at CEOP in-situ reference sites shows reduced biases of sensible heat flux and upwelling long wave radiation. The latent heat flux bias was either not affected or in some cases, enhanced. From these results, we hypothesize that further improvement in the coupled land-atmosphere assimilated surface energy budget may be realized with multivariate assimilation, including cloud and soil moisture observations.