Comparison of Japanese 25-year Reanalysis with Observational data including CEOP

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Japan Meteorological Agency (JMA) has been conducting the Japanese 25-year Re-Analysis project (JRA-25) as a joint research project with the Central Research Institute of Electric Power Industry (CRIEPI) of Japan since April 2001 （http://www.jreap.org） . Production of JRA-25 will be completed in spring 2006. JRA-25 has been produced in international cooperation with observational data contributors in the world. We wish to give special thanks to NCEP, ECMWF, NCDC and NCAR for their contributions. From March 2006 onward, JMA will start quasi-real-time JMA CDAS with the same system as that for JRA-25. These datasets will be available for CEOP community soon after the completion.

The global forecast model used for JRA-25 has the resolution of spectral T106 and 40 vertical layers of the top level at 0.4hPa, and the data assimilation scheme is 3DVAR system with the land surface assimilation system. These are the low-resolution version of the JMA's operational numerical models.

JRA-25 introduced some new historical observational data which had not been used in the other reanalyses. One is Wind retrieval data surrounding tropical cyclones (TC), which are provided by Dr. Mike Fiorino of LLNL/USA, is assimilated. These data brought more precise position and intensity of tropical cyclones in the analyses.

Quality of JRA-25 has been examined comparing with various observational datasets including CEOP datasets. From the comparison with CMAP, GPCP and SYNOP, JRA-25 has advantages in the performance of precipitation inter-annually and climatologically. Assimilated soil wetness is checked with the Illinois root-depth observation (Hollinger et al., 1994). The serious droughts in 1988 and 1999 are well reproduced in JRA-25.

Seasonal changes in surface temperature, humidity and precipitation and various components of surface radiation fluxes for JRA-25 are compared in the period from October 2002 through September 2003 with those variables observed at Lindenberg, Eastern Siberian Tundra (Tundra) and Chao-Phraya River (Chao) contributing to CEOP. The comparison gives additional evaluation for the JRA-25. The JRA-25 precipitation tends to be relatively consistent with the CEOP precipitation at Lindenberg, but not with the one at Chao in the daily basis comparison.

The comparison makes it clear that the downward short-wave/long-wave radiation fluxes at surface for JRA-25 are globally (common among the three points) larger/smaller than the CEOP observation. This fact indicates low or middle-level cloud amounts tend not to be lacked over land in JMA model simulation. As surface albedo in winter-time is affected by both snow cover and snow albedo, the comparison of winter-time surface albedo between JRA-25 and CEOP gives different results between Lindenberg and Tundra If assuming full snow coverage in the model grid and the real observation point, Tundra observation of surface albedo indicates lower snow albedo of JMA model.