

Atmospheric Angular Momentum Functions from NCEP Reanalysis Data Sets

Yoshimitsu Masaki[1]; Yuichi Aoyama[2]; Isao Naito[3]

[1] GSI; [2] RASC; [3] Div. of Earth Rotation, National Astronomical Observatory

Earth rotation changes in its orientation and spin rate due to mutual interaction between the solid Earth and fluids on/in the earth, such as atmosphere, ocean, the earth interior, and so on. Among them, atmosphere plays a main role in the change of earth rotation. In order to evaluate atmospheric excitations, AAM functions are widely used. However, AAM functions have different values when we use a different data set (e.g. ECMWF, JMA and NCEP).

We compare two reanalysis data sets calculated by NCEP through evaluation of AAM. Two data sets are: NCEP/NCAR reanalysis data (hereafter, we designate 'Reanalysis-1') and NCEP/DOE Reanalysis-2 data, which is made improvement of the former Reanalysis-1 data. We also compare results from other reanalysis data, ECMWF and JMA.

We use monthly averaged meteorological data (wind, temperature, and geopotential heights) on a 2.5-degree grid and 17 equi-pressure levels, and use 2.5-degree gridded topography data.

We have found some prominent differences between two AAM function series in non-periodic wind terms of Chi-1 or Chi2. A step-shaped bias in Chi-3 time series is observed around 1997.

NCEP reanalysis data are widely used for calculation of AAM functions (Gross et.al.(2003), Gross et.al.(2004)). However, as we observe differences between two NCEP sets, AAM functions calculated only from one data set may have some risks of misinterpretation.