

Comparison of large-scale global land precipitation from multisatellite and reanalysis products with gauge-based GPCP data sets

Satya Prakash, R. M. Gairola and A. K. Mitra

Abstract

Reliable information of land precipitation along with other atmospheric variables is crucial for monsoon studies, ecosystem modelling, crop modelling and numerous other applications. In this paper, three multisatellite and three reanalysis precipitation products, namely Global Precipitation Climatology Project (GPCP), Climate Prediction Center Mapping of Precipitation (CMAP1 and CMAP2), European Center for Medium Range Weather Forecasts Reanalysis-Interim (ERA-I) and National Center for Environmental Prediction (NCEP1 and NCEP2), are compared with the recent version of gauge-based gridded Global Precipitation Climatology Centre (GPCC) data sets over the global land region. The analysis is done at monthly scale and at 2.5° latitude \times 2.5° longitude resolution for a 25-year (1986–2010) period. Large-scale prominent features of precipitation and its variability are qualitatively represented by all the precipitation products. However, the magnitudes considerably differ among themselves. Among the six precipitation products, GPCP performs better than the others when compared to the gridded GPCC data sets. Among the three reanalysis precipitation products, ERA-I is better than NCEP1 and NCEP2 in general. Even though NCEP2 is improved over NCEP1 over the mid-latitudes, NCEP2 has more serious problem over the orographic regions than that of NCEP1. Moreover, all the precipitation estimates exhibit similar kind of interannual variability over the global and tropical land regions. Additionally, the comparison is done for the six global monsoon regions for the regional analysis which shows that all the precipitation estimates exhibit similar kind of interannual variability in the seasonal monsoon precipitation. However, there are some regional differences among these precipitation products in the representation of monsoon variability.