Decadal trends of global precipitation in the recent 30 years

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In this study, the decadal trends of global precipitation are calculated and compared using the CMAP, GPCP and NCEP/NCAR reanalysis monthly precipitation data over the past 30 years from 1979 to 2008. The major results include the followings:

(1) The decadal trend of annually and globally averaged precipitation depends on a decreasing trend for the CMAP data, a flat trend for GPCP data, and an increasing trend for the reanalysis data.

(2) The analysis of horizontal distributions of differences in temporally averaged precipitation between the second (1993–2008) and the first (1979–1993) 15 years shows that the decreasing trend in the CMAP data is associated with the reduction in precipitation over the oceans. The further analysis of difference in zonally averaged precipitation rate reveals the increased precipitation rate in both the Tropics and mid-latitudes. The reduction in precipitation over the oceans is significantly weaker in the GPCP data than in the CMAP data, which shows the flat trend in the global GPCP data. The increasing trend of global precipitation average for the reanalysis data is associated with the increase in precipitation off the equator as well as in the mid-latitudes.

(3) The further analysis of precipitation statistics reveals that the decreasing trend for the CMAP data is associated with the reduction in high precipitation. The flat trend for the global GPCP data corresponds to the offset between the decrease in low precipitation and the increase in high precipitation. The increasing trend for the reanalysis data is related to the increase in high precipitation.