

## GPCP 27-Year Record Shows Regional/Global Trends and Correlation With Temperature

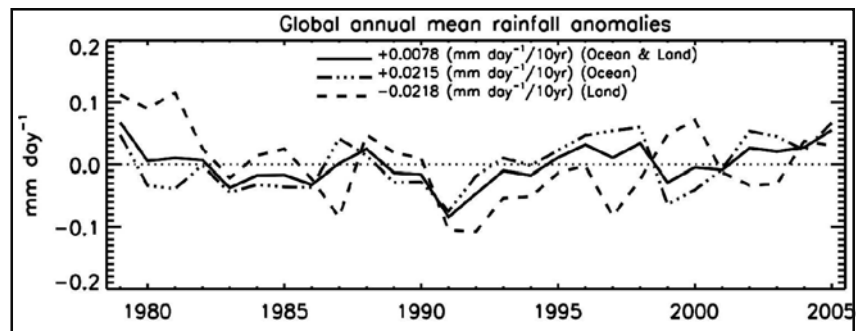
Two recent papers based upon the GEWEX Global Precipitation Climatology Project (GPCP) 27-year data set highlight the strong tropical but weak global trends for increasing precipitation, as well as a correlation with increasing surface temperature. The following abstracts and papers provide more in-depth analyses of the trends and correlations derived from the GPCP data sets.

**Tropical Rainfall Variability on Interannual to-Interdecadal/Longer-time Scales Derived from the GPCP Monthly Product.** Gu, G., R. F. Adler, G. Huffman, and S. Curtis, 2007. *J. Climate*, 20, 4033–4046.

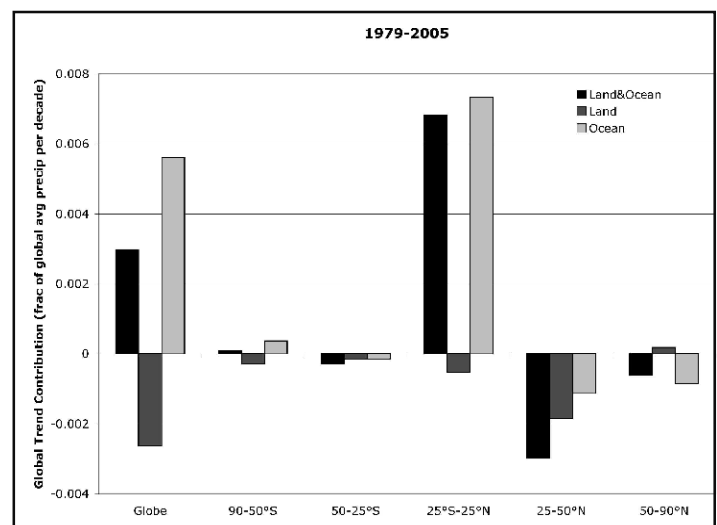
Summary/Abstract: Global and large regional rainfall variations and possible long-term changes are examined using the 27-year (1979–2005) GPCP monthly data set. Emphasis is placed on discriminating among variations due to ENSO, volcanic events, and possible long-term climate changes in the tropics. Although the global linear change of precipitation in the data set is near zero during the time period (top figure), an increase in tropical rainfall is noted in the data set, with a weaker decrease over the Northern Hemisphere middle latitudes. Focusing on the tropics (25S–25N), the data set indicates an upward linear change (0.06 mm day<sup>-1</sup>/decade) and a downward linear change (–0.01 mm day<sup>-1</sup>/decade) over tropical ocean and land, respectively. This corresponds to about a 5.5 percent increase (ocean) and 1 percent decrease (land) during the entire 27-year time period (middle and bottom figure).

**Relationships Between Global Precipitation and Surface Temperature on Interannual and Longer Time Scales (1979–2006).** Adler, R. F., G. Gu, J. Wang, G. J. Huffman, S. Curtis, and D. Bolvin (submitted to *Journal of Geophysical Research-Atmospheres*, June 2008).

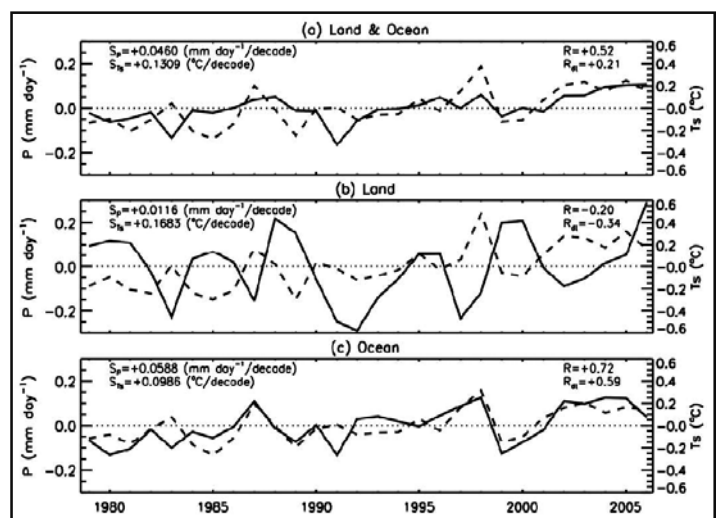
Summary/Abstract: Associations between global and regional precipitation and surface temperature anomalies on interannual and longer time scales are explored for the period of 1979–2006 using the GPCP precipitation product and the National Aeronautics and Space Administration Goddard Institute for Space Studies surface temperature data set. Positive (negative) correlations are generally observed between these two variables over tropical oceans (lands). The El Niño Southern Oscillation (ENSO) is the dominant factor in these interannual, tropical relations. The ratios between the linear changes in zonal mean rainfall and temperature anomalies over the period are estimated. Globally, the calculation results in a 2.3 percent/°C precipitation increase, although the magnitude is sensitive to small errors in the precipitation data set and to the length of record used for the calculation (bottom figure).



Annual mean global rainfall anomalies over ocean, land, and both ocean and land. Also shown are the estimated slopes of the linear fits.



Volume contributions to long-time change/linear fit during 1979–2005.



Tropical (25S–25N) annual mean precipitation (solid lines) and temperature (dashed lines) anomalies.  $S_p$  and  $ST_s$  denote linear changes for precipitation and temperature anomalies, respectively.  $R$  and  $R_d$  represent the correlations between precipitation and temperature anomalies with and without the respective linear changes.