



Synchronized trend shift of Sahel rainfall with global oceanic evaporation occurred in the mid-1980s

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Trend shift of Sahel rainfall from decrease to increase occurred in the mid-1980s. This trend shift and its relation to global oceans were investigated by data analyses. We discovered that the Sahel trend shift was synchronized with the trend shift of global oceanic evaporation, with time series like a ‘\’ shape, i.e. from decrease to increase. Land precipitation also tended to have the ‘\’ shaped trend shift except America continents. The trend shift of the oceanic evaporation was mainly in the Southern Hemisphere (SH), extending to the subtropical Northern Hemisphere (NH) including the Pacific, Atlantic, and Indian Ocean. Because the increase of oceanic evaporation strengthens atmospheric moisture transport toward the land, the synchronized trend shifts of the oceanic evaporation with the land precipitation is reasonable. Surface scalar winds over the oceans in the SH had the ‘\’ shaped trend shift. Sea surface temperature (SST) also had the trend shifts in the mid-1980s: a ‘/’ shaped in SH, while ‘\’ shaped in the NH. In spite of the opposite SST trend shift of the NH to the SH, the evaporation trend shift was in the ‘\’ shape in the both hemispheres. Since strong wind promotes evaporation cooling of the SST, the SH wind trend shift strengthened the trend shifts of both SSTs and the evaporation. Because high SST anomalies promote the evaporation, the NH SST trend shift strengthened the evaporation trend shift.