Spatial patterns of global precipitation in the frequency domain

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This study examines global precipitation patterns during 1901–2014 by using the monthly CRU TS3.23 land precipitation gridded dataset, the European historical reconstruction (1500-2000 AD) of Pauling et al. (2006), and the CMIP5 model outputs. In particular, spatial features of long-term precipitation are explored for each continent, using a novel peak-detection methodology of spectral analysis. This approach estimates the statistical significance of the spectral peaks based on the structure of the spectral continuum, as determined by the autocorrelation structure. To this end, the spatial variability of the lag-one autocorrelation coefficient for the annual time scale, as well as the Hurst coefficient, have been also estimated and a global overview of them is presented.

Pauling, Andreas, et al. "Five hundred years of gridded high-resolution precipitation reconstructions over Europe and the connection to large-scale circulation." Climate Dynamics 26.4 (2006): 387-405.