

Nonlinear signal in reanalysed and modeled geopotential and temperature data

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Nonlinear behavior in daily NCEP/NCAR geopotential and temperature reanalysis data at the 500 hPa pressure level and outputs of suitable general circulation model are compared. Two methods for detection of nonlinearity were employed here: analysis of forecast errors of local linear models in the reconstructed phase space and analysis of divergence of dynamically close trajectories in the same phase space. I measure amount of nonlinearity by deviation of forecast errors of original series from forecast errors of average of its surrogate series, i. e. collection of time series generated from original series, preserving their linear properties, but randomizing their nonlinear structure. Generally, both methods show weak (or non-significant) nonlinearity in the equatorial zones and strong one in the higher latitudes, though amount of nonlinearity and finer details changes with regard of detection method.