

## Climatological temperature records: persistence at asymptotic time-scales

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We study the temperature records obtained from a historical simulation (with greenhouse gas, solar, and volcanic forcing) performed with the global coupled general circulation model ECHO-G for the years 1000-1990. Applying Detrended Fluctuation Analysis (DFA) we quantify the long-term behavior with respect to asymptotic correlations.

As comparison, we also analyze a 1000-year control run with constant external forcings. We consider daily data as well as their biannual averages in order to suppress 2-year oscillations appearing in the model records for some sites near the equator. In the case of the historical simulation we find that most continental sites have correlation exponents  $\gamma$  between 0.8 and 0.6., which substantially confirms earlier studies of (considerably shorter) instrumental data. In the control run the long-term correlations are less pronounced and show a more pronounced latitude dependence, visible also at continental sites. Where available, we compare with instrumental records.

In addition, we have analyzed six recently reconstructed records of the Northern Hemisphere temperatures and found that all are governed by long-term persistence, even on millennial scale such as in the case of the Moberg et al. 2005 record (years 1-1979).