EMS Annual Meeting Abstracts
Vol. 12, EMS2015-180-1, 2015
15th EMS / 12th ECAM

Predictability of daily temperature series determined by maximal Lyapunov exponent

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In this presentation, measures of predictability of daily data are investigated, using the ERA-40 reanalysis time series of mean daily temperature from the 500 hPa level. Several approaches to the quantification of atmospheric predictability are investigated, based on the computation of maximal Lyapunov exponent and its modifications: In particular, nonlinear Lyapunov exponent introduced by Li & Ding (2011) is calculated and compared to the results from the traditional algorithm by Rosenstein et al. (1993). Attention is paid to the estimation of the time of saturation of distance of trajectories originally close in the phase space and variation of the results regarding different forms of phase space reconstruction. Results are presented in the form global geographical distributions of different descriptors of predictability depending on the method of calculation and their relation to other statistical characteristics (such as interdiurnal variability) is discussed.

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