Geophysical Research Abstracts
Vol. 20, EGU2018-10205, 2018
EGU General Assembly 2018

Multifractal detrended fluctuation analysis of observational and reanalysis daily temperature time series over Greece

Nikolaos Kalamaras, Kostas Philippopoulos, Chris G. Tzanis, and Despina Deligiorgi

Section of Environmental Physics and Meteorology, Department of Physics, National and Kapodistrian University of Athens, Greece(chtzanis@phys.uoa.gr)

Nonlinear natural processes in the atmosphere interact in a complex way at different time and space scales and thus, linear analysis methods are, in general, insufficient for the study of climatic time series. Multifractal Detrended Fluctuation Analysis (MF-DFA) is used to characterize the scaling properties of geophysical data and through the multifractal spectrum it reveals the variations in their fractal structure. In this study, the MF-DFA is applied to mean daily temperature time series over Greece to observational data from meteorological stations and to the ERA-Interim reanalysis dataset. In both cases the multifractal spectrum characteristics (i.e. dominant Hurst exponent, spectrum width, spectra asymmetry and truncation type) are examined and their spatial distributions are assessed. Furthermore, the intercorrelations of the main multifractal spectrum characteristics are analyzed for defining geographical areas with similar levels of multifractal complexity. The results are compared to examine whether the scaling behavior of temperature observations is reproduced correctly by the ERA-Interim reanalysis dataset.