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On the climate impacts from the 1/f behavior of the solar incident flux

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The climate system behaves differently in various wavelength bands of the solar radiation. Therefore, climate components will show different responses to the scaling behavior of the solar radiation, which has been recently suggested. In this context, Varotsos et al., (2015) by employing spectral, Haar and Detrended Fluctuation analyses, suggested that the fluctuations of the solar incident flux around the Planck's law, over a wide range of wavelengths in ultraviolet and visible spectrum, obey the 1/f scaling behavior. Furthermore, the scaling intermittency of these solar incident flux fluctuations was found to be very high for scales 10–20 nm up to 500 nm and low for smaller scales. We hereby present analyses of the observed variability of various atmospheric parameters that are sensitive to specific wavelength bands of the solar radiation. The results obtained show that the scaling in these atmospheric parameters resembles well to the above mentioned scaling behavior of the solar radiation.

Keywords: Scaling, Nonlinear variability, Climate system, Solar radiation

Reference

Varotsos, C.A., Lovejoy, S., Sarlis, N.V., Tzanis, C.G., and Efstathiou, M.N.: On the scaling of the solar incident flux, Atmos. Chem. Phys., 15, 7301–7306, 2015.