



Solar signals in Southern Hemisphere African climate 1901 to 2003

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The present study intends to contribute to the understanding of solar-climate relations according to climate variability in southern hemisphere Africa during the past 100 years.

The study is based on the monthly HadSLP2 data; sea surface temperature data are taken from the HadISST1.1 dataset and high-resolution precipitation and temperature data are provided by the Climatic Research Unit (CRU). These data have been updated and improved within the Potsdam Institut für Klimafolgenforschung (PIK).

Based on this data, solar signals in the Southern Hemisphere climate system are confined in successive steps by using different statistical methods. Initially s-mode varimax-rotated PCAs have been used to reduce the number of variables. The resulting time coefficients have been further analysed with spectrum and wavelet analyses. Additionally correlation and composite analyses have been performed using total solar irradiance data and sunspot number data.

It can be shown, that tropospheric effects of variable solar activity are concentrated on specific regions: Significant solar signals can be revealed in South African air temperature during the boreal summer, in East African precipitation as well as in precipitation data for northern Namibia / southern Angola. SSTs in the southern equatorial Atlantic and SLP data of the sub-tropical anticyclones in the Atlantic and Indian oceans show significant solar signals.