



On the response of the European climate to solar/geomagnetic long-term activity

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The response of the European climate to the long-term solar/geomagnetic activity is investigated by using surface air temperature and solar/geomagnetic indices. A set of 21 time series of air temperature measured at European stations between 1900 and 2006, and 4 European and 14 Romanian stations with 150 year long records were used. Strong and coherent solar signals have been found at Schwabe and Hale solar cycles timescales, with peak to trough amplitudes of several degrees, and, respectively of 0.6-0.8 °C. Interdecadal and centennial trends as defined by 11- and respectively 22-year running averages of the annual mean time series significantly differ from corresponding trends in solar/geomagnetic activity, indicating the presence of temperature variations at the 30-40 year timescale possibly related to the internal dynamics of the atmosphere system. Results show a similar temporal behaviour at all analysed stations with amplitude differences that can be understood in terms of large-scale atmospheric circulation patterns influenced by the solar/geomagnetic forcing at the corresponding timescales, but with local intensity differences.