



Rieger-type Periodicities on the Sun and the Earth during Solar Cycles 21 and 22

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New characteristic periods of the magnetic sunspot area time-series have been found in two atmospheric time-series variables: neutron counts and atmospheric electric potential gradient. The data considered comprises two solar cycles (21, 22) and spans from 1978 to 1990. Using a non-linear approach this study reveals the existence of similar and correlated features in sunspot areas as well as neutron counts and atmospheric electric potential gradient, favouring the possibility that the Sun's activity affects the Earth's atmosphere and weather at a time-scale between 150 to 300 days. Moreover, we found five characteristic periods in the sunspot area time-series, four of which are detected in the neutron counts, and three in the atmospheric electric field. These values are consistent with the periods predicted for stationary Rossby waves existing inside the Sun. Surprisingly, this reveals that instabilities on the solar magnetic field caused by Rossby waves in the Sun's interior are indirectly affecting the activity of the Heliosphere, the Earth's atmosphere and weather.