

Evidence of change in the solar cycle period over temperature records at La Plata meteorological station, Argentina

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The Meteorological Station at La Plata city (Lat: $-34^{\circ}.93$, Long: $302^{\circ}.04$) is located in the center of the South Atlantic Geomagnetic Anomaly, place where the Total Intensity (F) of Geomagnetic Field reaches its smaller values at ground levels, comparatively with equatorials values. This Station stores an extended and homogeneous series of temperature records from 1944 to now. The daily thermal amplitude, determined as the maximum value minus the minimum value in local time, was averaged in intervals of 27 days according to the Carrington Number. The Sunspot time series, generated likewise from the averaged daily sunspot numbers in function of Carrington Number, was used to determine the temporal intervals each two consecutive solar cycles, 18-19, 19-20, 20-21, 21-22, and 22-to now, respectively. The changes produced in these intervals over the sunspot series and in the averaged thermal amplitudes series was determined. Results shows that the signals detected in the sunspot series, represented by the tendencies in each solar cycle of 22 years, are in oposition. Growing tendencies in the increase of sunspot number each two consecutive intervals are related to decreasing tendencies of the mean values of averaged thermal amplitude. The changes found in the averaged thermal amplitude are the followings: from 1944.36 yr. to 1964.76 yr. (18th and 19th cycles): 0.8°C , from 1954.41 yr. to 1975.99 yr. (19th and 20th cycles): -1.0°C , from 1964.76 yr. to 1986.05 yr. (20th and 21st cycles): 0.4°C , from 1975.99 yr. to 1996.77 yr. (21st and 22nd cycles): 0°C and finally, from 1986.05 yr. to now (22nd cycle and nearly the end of 23rd cycle): -1.0°C .

It is conclude that the signals produced in the Sun observed by means of the sunspot number regulate the behavior of the average thermal amplitude tendency at La Plata city, proving that the Sun-Earth coupling in great magnetic anomalies regions like the South Atlantic Geomagnetic Anomaly could play a preponderant role relating to the energetic input in other solar radiation ranges like particulate, UV and X radiations respectively. The same analysis was realized in a proving method for global indices of geomagnetic activity as the Dst and ap indices, whose behaviors in large time periods greater than two consecutive solar periods reveals a response in correlation with the solar cycle tendency. This processes will be validate more adequately in near future from studies, observations and models for variation and cuasi periodical processes in

the Sun, the solar wind, Earth magnetic Field and and atmosphere.