

Abstract

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Regional Climate Interaction with the Solar and Geomagnetic Activity

In this study we investigate the effects of solar-geomagnetic activity on the annual surface air temperature anomalies recorded in Egypt. The temperature of Egypt is divided into two main zones, north of Egypt NE (Mediterranean coastal), and south of Egypt SE (Upper Egypt) on the Nile river. Statistical analyses are applied to the solar-geomagnetic activity indices; the temperature of each zone examined to find a solar signature in the current climatic warming. Our results reveal a slight warming trend for the whole record on both NE and SE, but sequences of warming and cooling with different trends have been observed. Significant high warming trend are detected on SE higher than NE at the last three decades. Negative correlations between solar-geomagnetic activity indices and SE at lag (1-3 yrs) were observed. In addition it was found that the solar indices are more effective on the relation (geomagnetic activity –NE), while geomagnetic indices have small effect on the correlation between solar activity and both NE and SE. Regarding the periodicities of the series, several cycles have been identified, with periods of about 30, (20-25), 11yr and (2-3) years. These may indicate that there is solar activity effect on local temperature.