

## **Solar signal at regional scale: a study of possible solar impact upon cloud cover and associated climatic parameters in Romania**

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consistent arguments for existing solar influence upon climate at global or hemispherical scale. Solar trademark was identified in pressure fields at tropospheric or stratospheric level, atmospheric circulation pattern, temperature variation or cloud cover, on different timescales. However, these are less clear at regional or local. In our study we try to investigate the solar impact upon the climate parameters on the level of Romanian territory. The ROCADA database (Bîrsan et al., 2014) was used for climate data for Romania. The database covers the 1961-2013 period for 9 climate parameters out of which we will focus on those which may help in understanding the cloud cover response to solar triggers: mean air temperature, maximum air temperature, minimum air temperature, relative humidity, cloud cover, atmospheric pressure, precipitation amount and sunshine duration. The data base is downloadable on a gridded dataset at daily level with a spatial resolution of 0,1 degree. For solar data a couple of proxy solar data were selected from NASA daily database - [omniweb.gsfc.nasa.gov](http://omniweb.gsfc.nasa.gov) - concerning terrestrial magnetic field (BY, BZ), electric field (EF), solar wind speed (SW) or the more classical proxy of sunspots number. Climate Data Operator is used for extracting gridded data and ArcGis 10.3.1 and Qgis software packages for mapping the results. Data were statistically treated in order to eliminate the trend and the effect of seasonality. The results were organized for monthly, seasonal and yearly level. The methodology for detection of the solar signal on climate variables relies on interpreting the correlation maps between climate variables and solar proxies. Also, a composite analysis on the basis of separation of high and low solar activity at monthly level was performed. The main results leads to the idea that the solar signal can be detected primarily in the temporal variation of atmospheric pressure (positive correlation with solar wind speed), soil temperature (negative correlation with BY), cloud cover and precipitation amount (pozitive correlation with BY, respectively BZ). The role of some hemispherical teleconnection indices, as NAO, as intermediate for solar signal is evaluate through wavelet analysis. As well, the spatial distribution of these correlation on the complex romanian territory and possible mechanism wich could explain them will be presented in details.

This research study is being supported by the the research project SOLACE PN-II-ID-PCE-2011-3-0709.