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Solar and geomagnetic forcing of climate changes during the instrumental period in Romania

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The climate is influenced by various forcing factors, the main ones being solar, geomagnetic, volcanism and greenhouse gases. We analyze the influence of solar and geomagnetic activities on the climatic variations in Romania, in the context of European and global data. Long-term trends in solar and geomagnetic activities inferred from the sunspot number and aa index time-series are compared to the long-term variations of mean temperature and precipitation over the study area. The discussion is based on yearly and monthly means of the temperature and precipitation recorded at 14 stations in Romania in the instrumental period (1850 - present). The comparison at interdecadal and centennial time-scales of solar and geomagnetic parameters with the mean temperature shows positive correlation coefficients, while the comparison with the mean precipitation shows negative correlation coefficients. The correlation of climatic parameters seems to be stronger in case of geomagnetic activity than in case of solar activity. The relationship with the most important source of climatic variability over Romania, the North Atlantic Oscillation (NAO), is addressed as well.