Latitude Dependency of the Sun–Climate Relation for the Mid-latitudes

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By applying Pearson correlation and multitaper methods the surface air temperature and flare index as a proxy data for solar sources of climate-forcing, we investigated the signature of these variables on the mid-latitudes of the Northern Hemisphere surface air temperature and its latitudinal dependencies. We used surface air temperature data for the 25–50 degree longitude and 30–70 degree latitudinal zone, including Turkey, Finland, Romania, Ukraine, Cyprus, Israel, Lithuania, and European part of Russia. We considered the parameters temperature and flare index data for the period ranging from January 1975 to the end of December 2005, which covers almost three solar cycles, namely 21st, 22nd, and 23rd. We found some significant correlations between solar activity and surface air temperature for individual cycles (22 and 23) and for some zones. The most pronounced power peaks found by multitaper method are around 1.2, 1.7 and 2.5 years which were reported earlier for some solar activity indicators. These results support the suggestion that signature of solar activity effect exists on surface air temperature of mid-latitudes where we studied, as depends on the latitude.