

Comparing the Influence of Sunspot Activity and Geomagnetic Activity on Winter Surface Climate

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We compare here the effect of geomagnetic activity (using the aa index) and sunspot activity on surface climate using sea level pressure dataset from Hadley centre during northern winter. Previous studies using the multiple linear regression method have mainly limited to using sunspots as a solar activity predictor. Both the solar related variables, the aa index and sunspots, indicate robust positive influence around Aleutian Low. We find that geomagnetic activity is a better predictor than sunspot activity (or other solar variables like TSI and UV that are closely related to sunspots), in terms of capturing variability of regional surface climate features around mid to polar latitude of northern hemisphere. The combined influence of geomagnetic activity and Quasi Biannual Oscillation (QBO) produces a particularly strong response, much stronger than the combined influence of sunspots and QBO, which was mostly used in previous studies so far. Our results provide a useful way for improving the prediction of winter weather at middle to high latitudes of the northern hemisphere.