

Analyzing the influence of the solar wind on climate during 1900-20014 using correlation maps

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We are examining the relation between geomagnetic disturbance indices (aa index, in particular) and surface temperatures as well as teleconnection patterns (Arctic Oscillation, Pacific Decadal Oscillation, etc.) by using correlation maps (spatial distribution of correlation coefficient) to investigate influence of the solar wind on climate.

Stratification based on the phase of the QBO (Quasi-biennial oscillation at equatorial stratosphere) is essentially important, but reliable data are available only after 1942. There is a report, however, showing QBO phases from 1900 which we utilized here although its reliability may not be very high.

We observed also for the period 1900-2014 that the correlation maps for the aa vs Ts are similar to those for the teleconnection pattern indices vs Ts (cf. Fig. 1). Thus, the solar wind appears to influence on the teleconnection patterns (hence on the climate) throughout the period from 1900. In addition, it was observed that the sign of the correlation changed at around 1930 at the *singular spots* where high correlation was persistently observed (high negative correlation at central Pacific regions, for instance).

Keywords: solar wind, temperature, teleconnection pattern, Arctic Oscillation, Pacific Decadal Oscillation

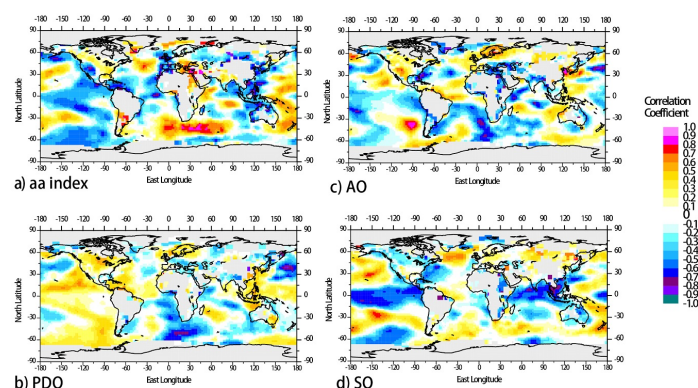


Fig. 1. Correlation maps (1901-1920, January, westerly QBO). a) aa index, b) PDO (Pacific Decadal Oscillation), c) AO (Arctic Oscillation), d) SO (Southern Oscillation).