

Influence of solar wind on surface temperatures and climate teleconnection patterns

ITOH, Kiminori^{1*}

¹Yokohama National University

Correlation maps (spatial distribution of correlation coefficient) for various combinations between surface temperature (Ts) and the aa index (a measure of solar wind strength) as well as climate teleconnection patterns. Stratification based on the QBO (quasi-biennial oscillation at equatorial stratosphere) and sunspot number (SSN) was carried out. Time windows employed were from 10 years (shortest) to 73 years (longest).

Figure 1 shows examples where correlation between January aa and February Ts was examined for the period of 1942-2014. Each condition gave a correlation map with characteristic features. For instance, the map for easterly QBO and large SSN resembles that for the Arctic Oscillation (AO), and that for westerly QBO and middle SSN is similar to that for the Pacific Decadal Oscillation (PDO).

From these observations, we conclude that the influence of the solar wind on the climate is similar to that of teleconnection patterns in magnitude. The close relation between the solar wind and the AO is known well, but relation with other teleconnection patterns was found to be strong as well. The solar wind appears to excite various teleconnection patterns directly or indirectly.

Keywords: solar wind, aa index, teleconnection pattern, surface temperature, QBO

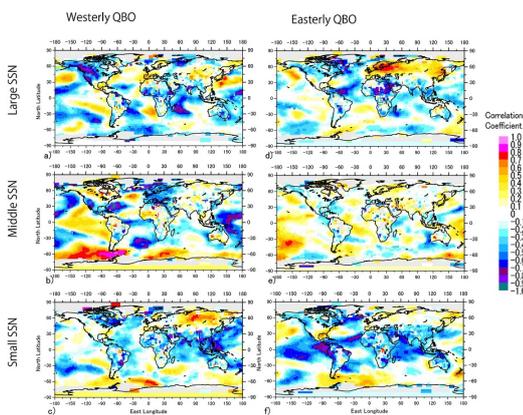


Fig. 1. Correlation maps for the aa index (January) vs. surface temperature (February) for 1942-2014, stratified using QBO phases (westerly or easterly) and sunspot number (Large, Middle, Small).