

## Statistical analysis on the relationship between solar and geomagnetic activities and the Arctic Oscillation

# Reiko Fujita[1]; Hiroshi Tanaka[2]

[1] Environmental Sciences, Univ. Tsukuba; [2] CCS, Univ. Tsukuba

The purpose of this study is to analyze the possible impact of solar activity and geomagnetic activity upon the Arctic Oscillation (AO) as the external forcing. Maximum and minimum periods are defined for the solar flux density at 10.7cm wavelength (F10.7) and amplitude antipodal index (aa index). In each period, the monthly mean of barotropic height anomaly, zonal-mean wind anomaly and zonal-mean temperature anomaly are calculated and the difference between the maximum and minimum period are analyzed. It is investigated which has more considerable impact on AO in the short term, F10.7 or aa index.

As a result, the structure of AO is found in winter when the anomaly composite is analyzed for each month. Significance test shows that the aa index has wider significant area than that of F10.7. According to zonal-mean temperature anomaly, a heating area is found in the lower stratosphere for both indices. But in the case of aa index, the characteristic temperature variation area is found in the vicinity of 1 hPa. There is a possibility such that the upper atmospheric differences in temperature can be a trigger of the excitation of the AO in the lower atmosphere. It is considered that the aa index representing the variation of geomagnetic activity, which is attributed to the fact of charged particles from the sun, especially proton, can be another forcing of the excitation of the AO.