Definitions of Arctic / Antarctic Oscillation

To identify the Arctic and Antarctic Oscillation (AO and AAO), Empirical Orthogonal Function (EOF) was applied to the monthly mean sea level pressure (SLP) anomalies poleward of 20° latitude for the Northern (Southern) Hemisphere. The seasonal cycle has been removed from the monthly mean SLP field. The leading EOF modes capture the maximum amount of explained variance. The ERA-Interim dataset was employed at a horizontal resolution of (lat, lon)=(2.5° × 2.5°) for the period 1979 to 2014. The covariance matrix is used for the EOF analysis. To ensure equal area weighting for the covariance matrix, the gridded data is weighted by the square root of the cosine of latitude.

The loading pattern of AO (AAO) is defined as the first leading mode from the EOF analysis of monthly mean SLP anomalies. Note that year-round monthly mean anomaly data has been used to obtain the loading patterns. Since the AO and AAO have the largest variability during the cold seasaon, the loading patterns primarily capture characteristics of the cold season patterns.

Daily AO (AAO) indices are calculated by projecting the daily SLP anomaly defined as a departure from ERA-Interim's daily SLP climatology, onto the leading EOF mode. Each daily index is normalized by the standard deviation of the corresponding monthly index (1979 – 2014 base period).