

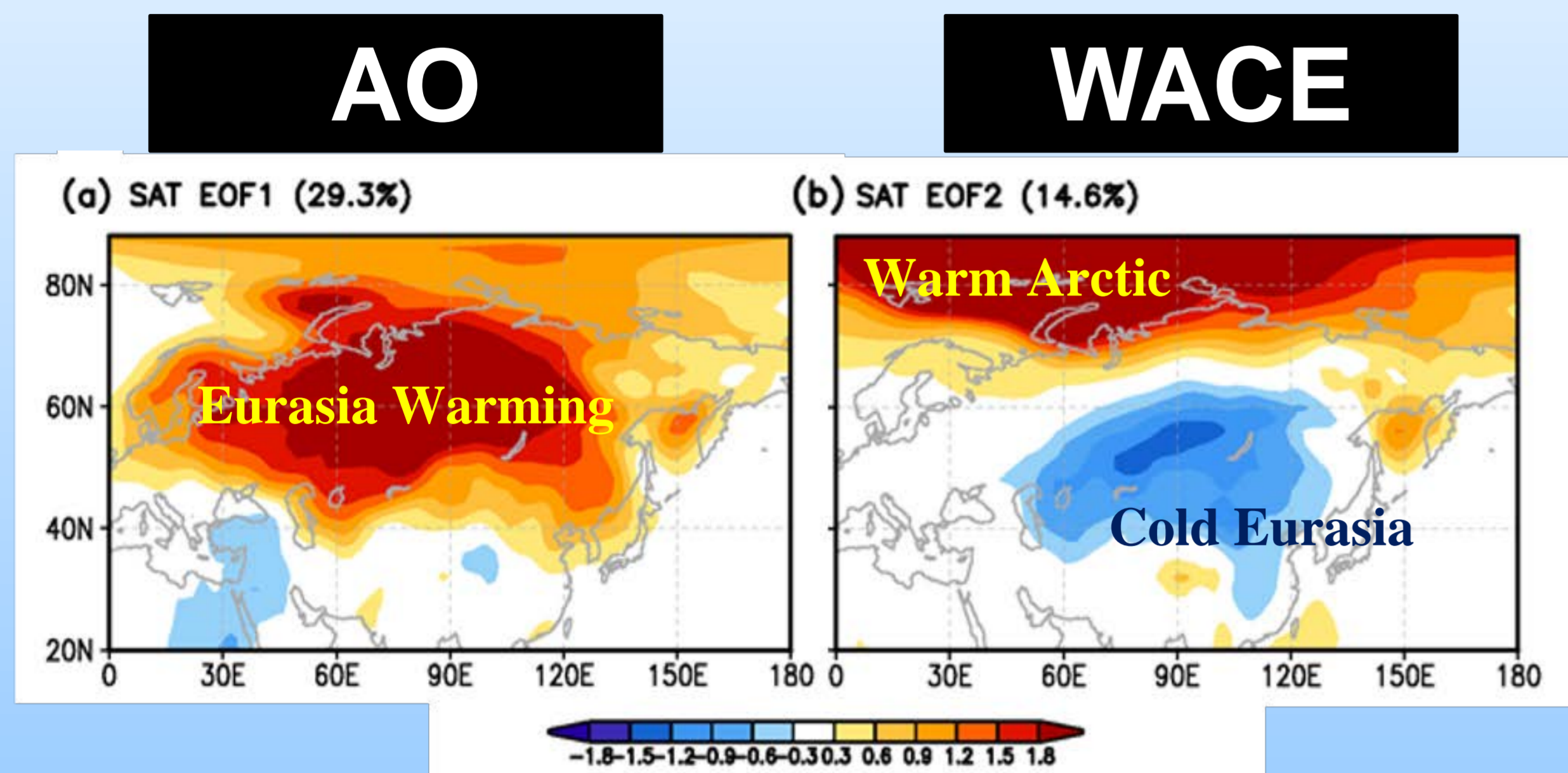
North Atlantic origin of interdecadal variability of WACE pattern

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1. Motivation

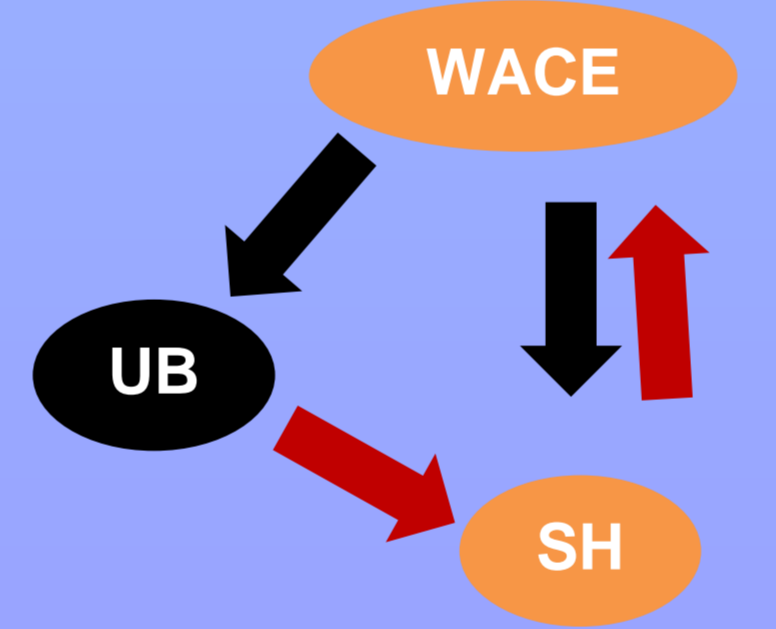
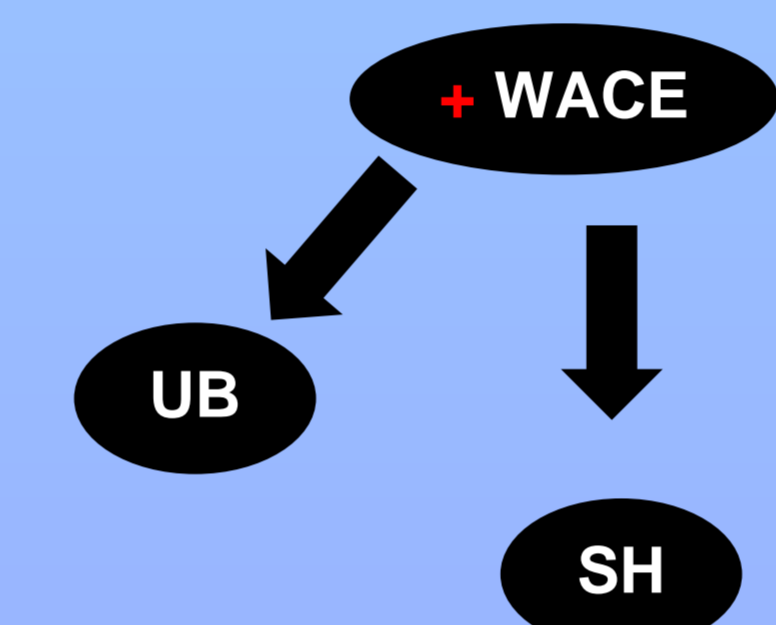
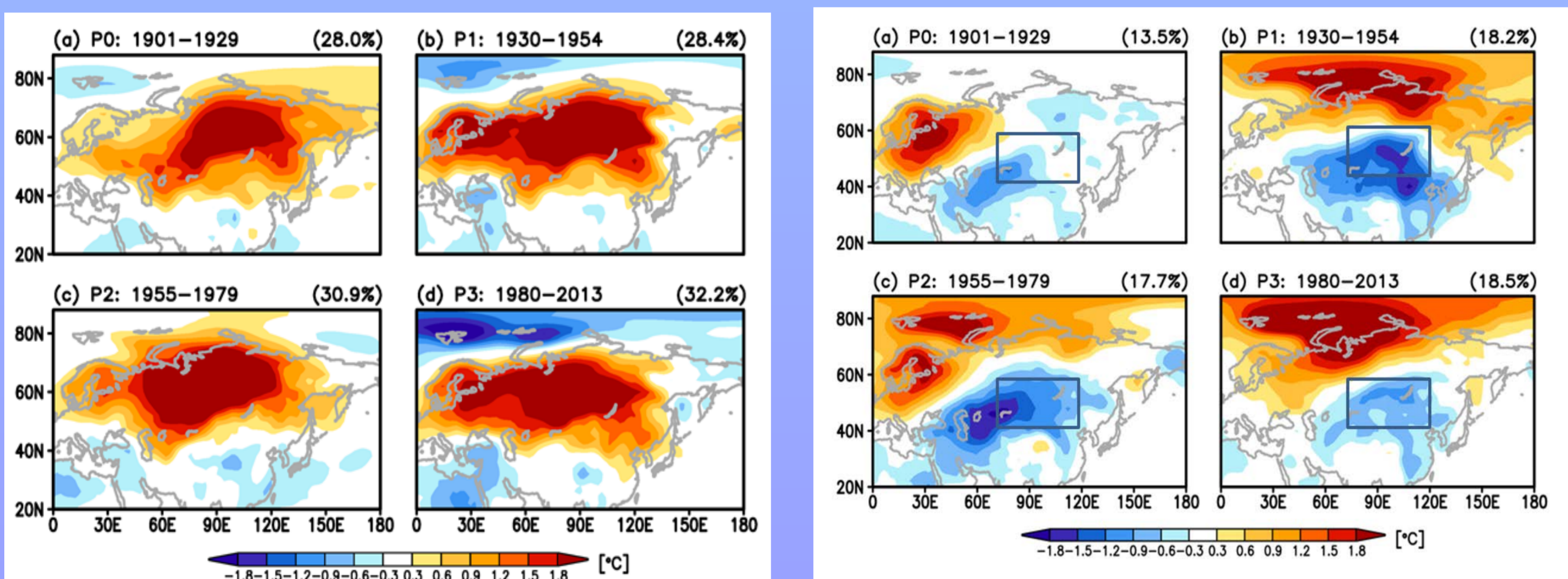
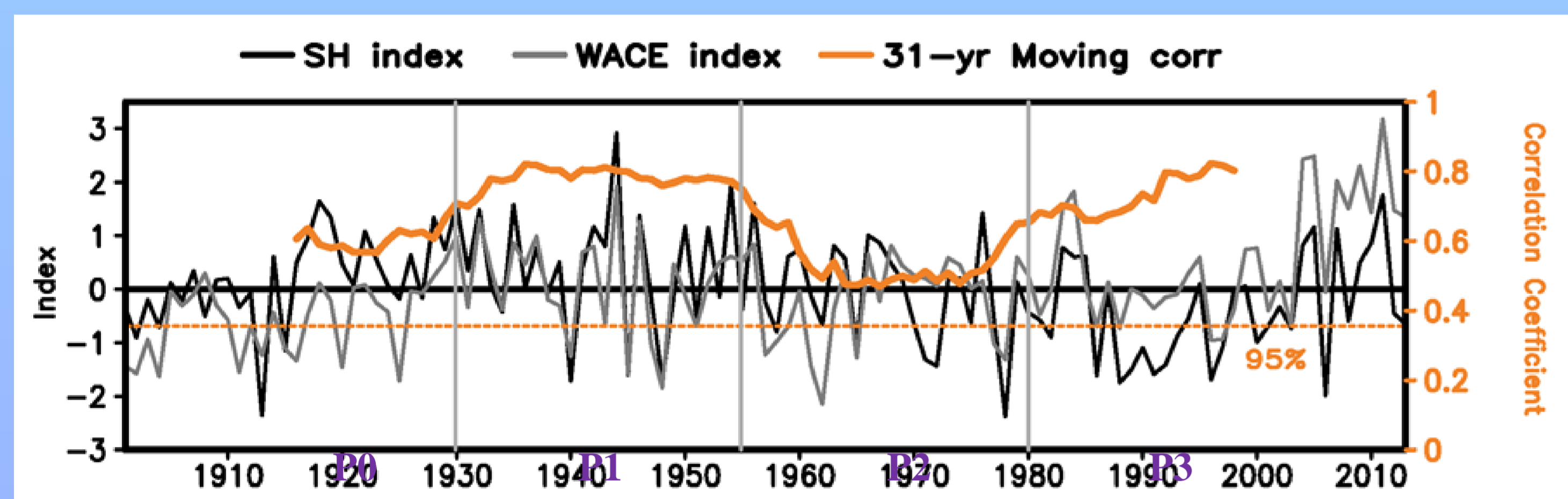


In this study, we try to investigate long-term variability of WACE pattern and its origin in order to understand its mechanism.

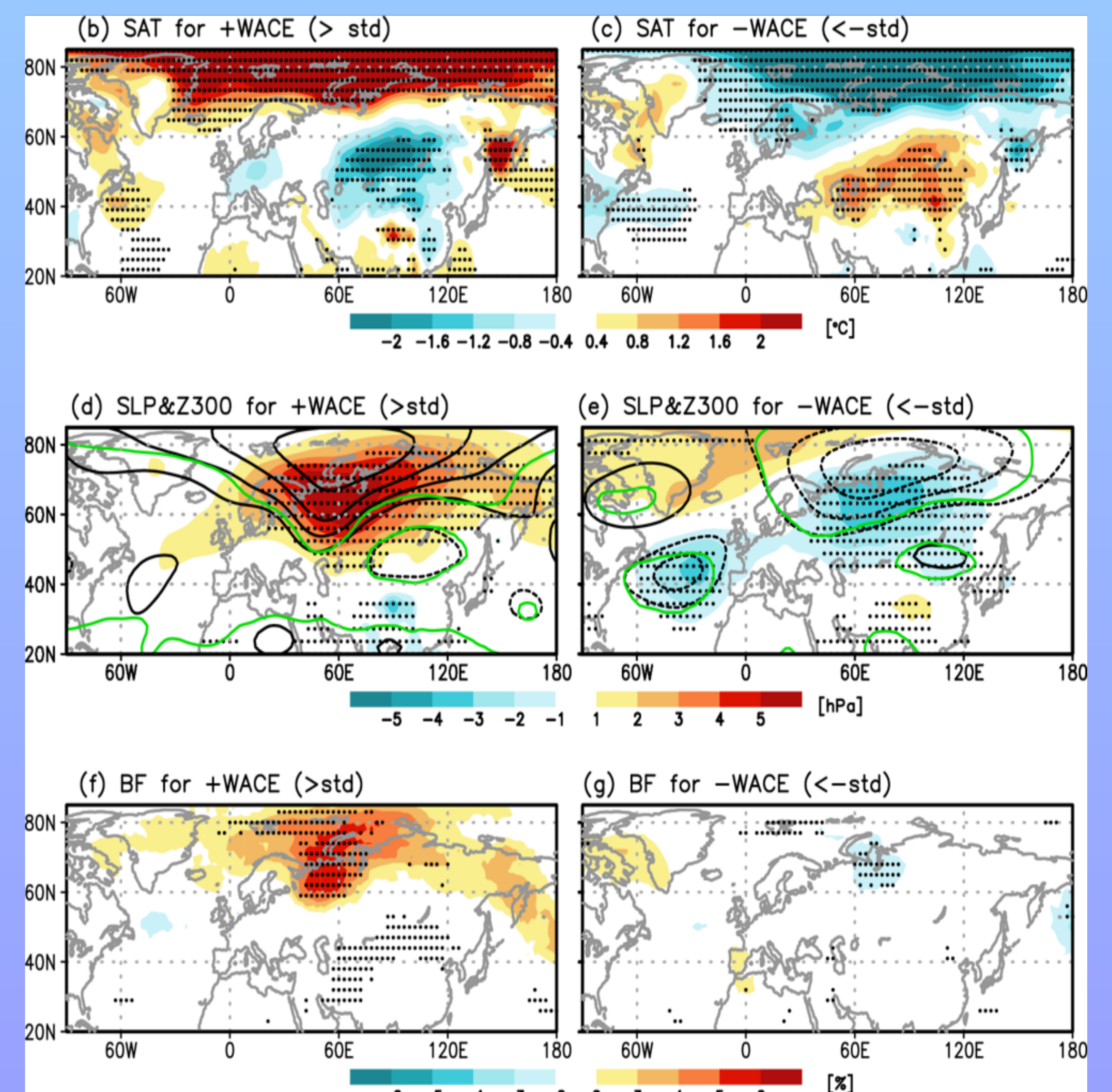
2. Data & Method

- ▶ NOAA-CIRES T 20 Century Reanalysis (20CR) version 2c during 1901-2013
- ▶ Blocking detection (Dunn-Sigouin et al., 2013)
It starts by identifying a contiguous area of blocking anomalies, as in the DG index, and then a reversal of the meridional gradient of geopotential height is evaluated about southward direction of the blocking anomaly maximum, as in the TM index.
- ▶ Blocking frequency
ratio of blocked days to the total number of wintertime days (unit: %)

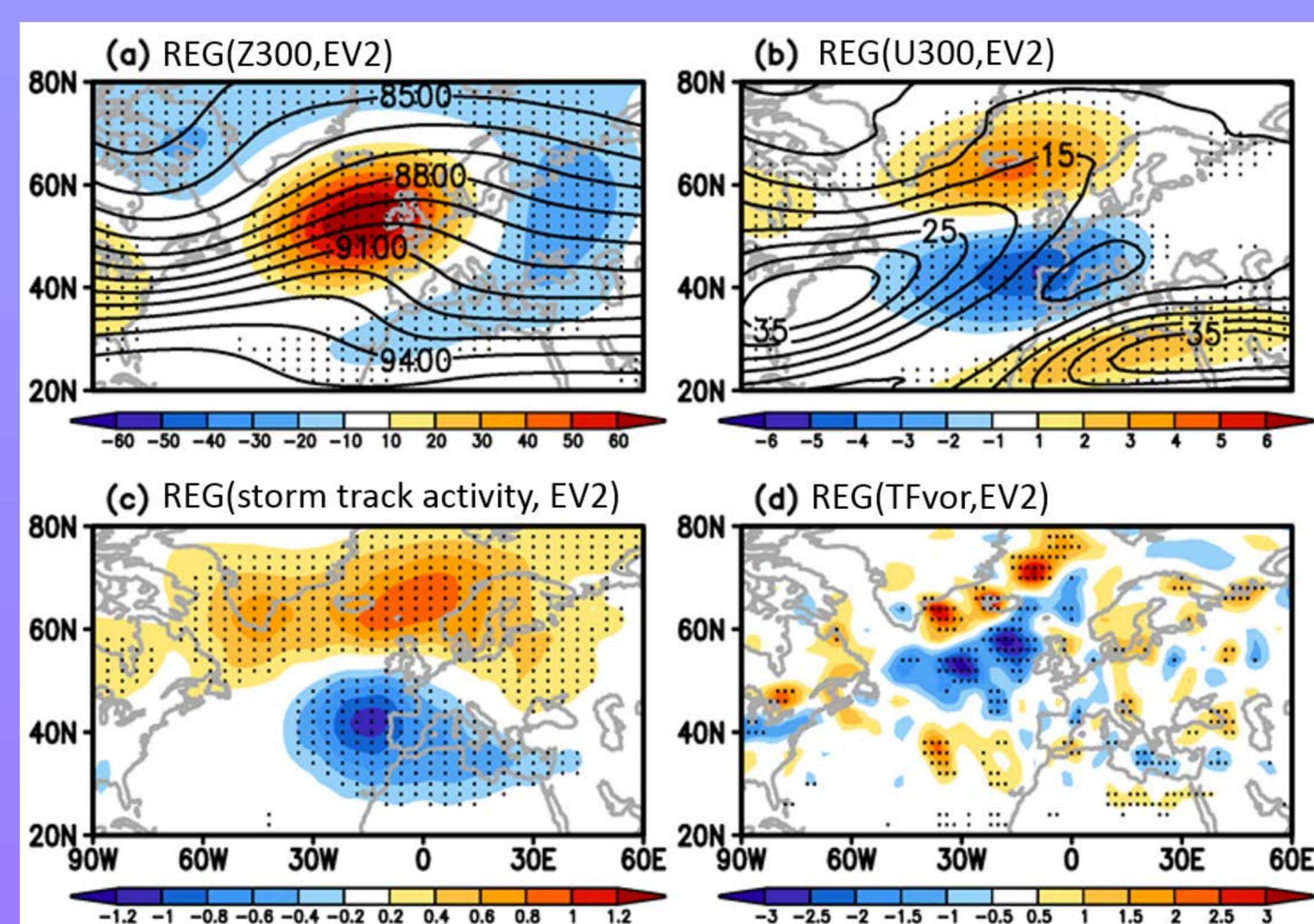
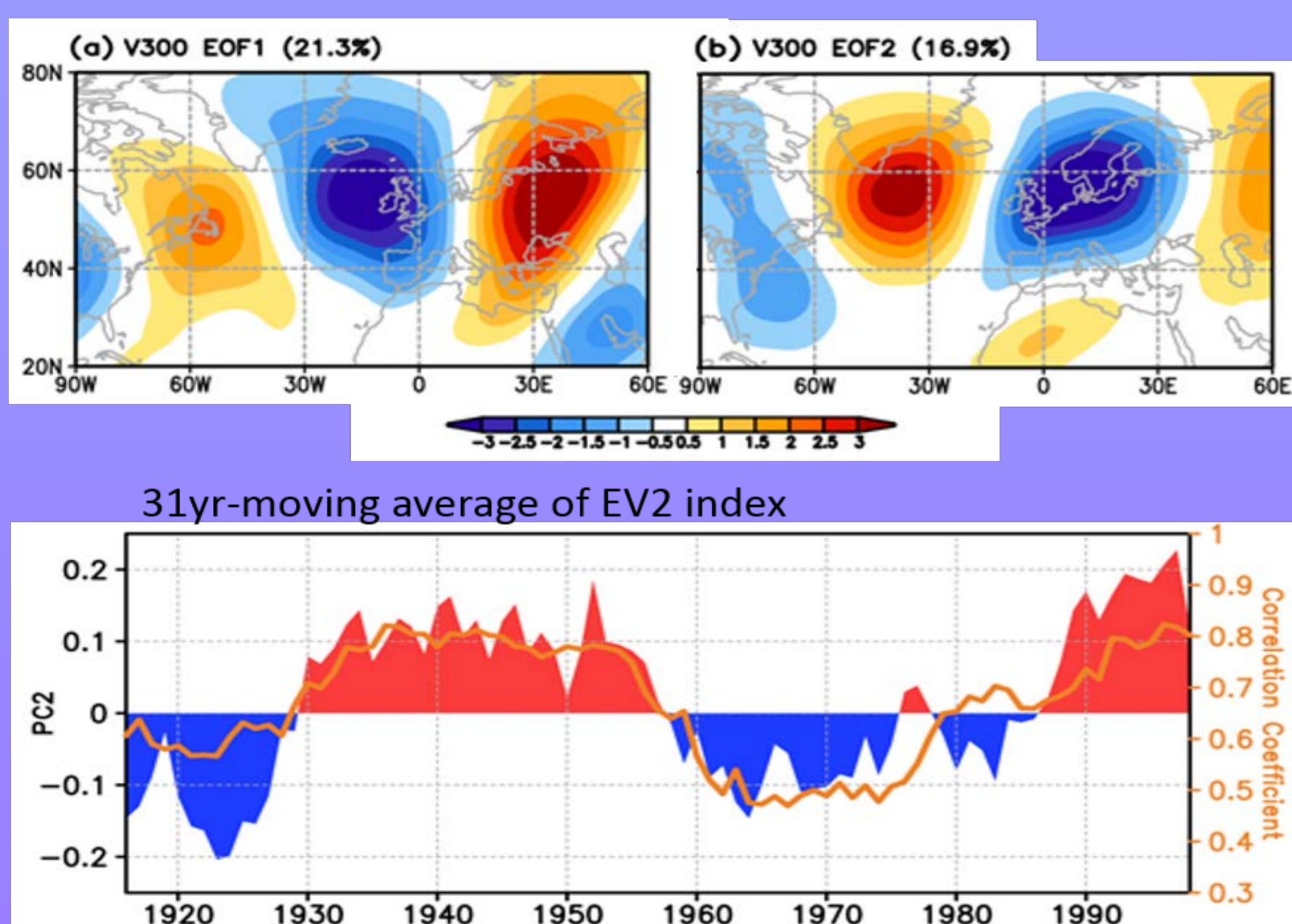
3. Results



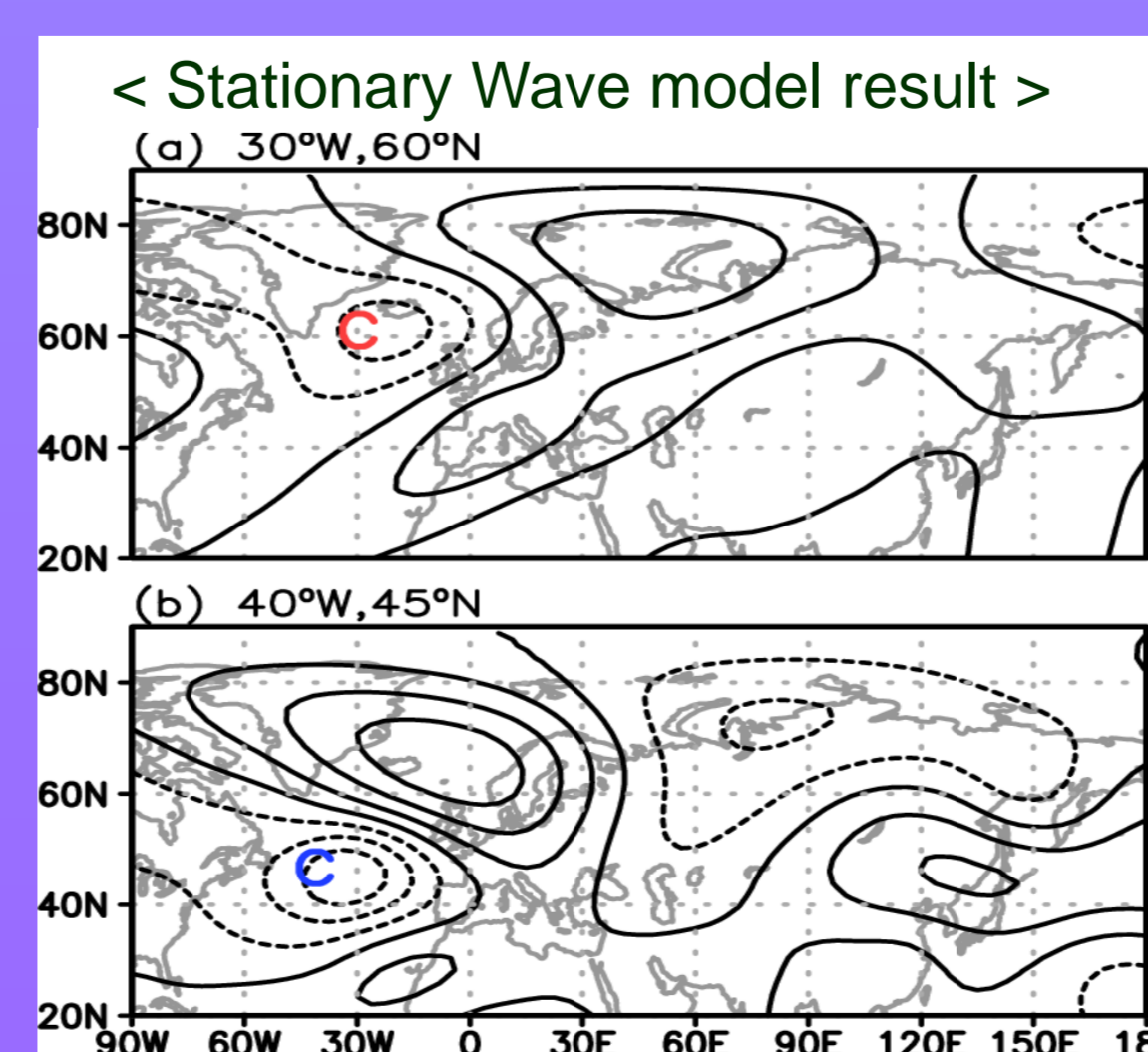
Positive feedback induces WACE-SH strong coupling



4. Internal atmospheric mode leads to interdecadal changes in the North Atlantic and Eurasia



- ▶ TOP. (a) The first and (b) second EOF mode of wintertime 300hPa meridional wind (V300) for Atlantic domain (90°W-60°E, 20°N-80°N).
- ▶ BOTTOM. 31-yr moving average of the EV2 index (shading). The orange-colored line depicts 31-year moving correlation coefficients between the SH and WACE indices.



Changes in atmospheric circulation (V300 PC2)

- ▶ Interdecadal fluctuation of continental trough
- ▶ Resultant strengthening of baroclinicity
- ▶ Changes in transient vorticity flux con/div
- ▶ Leading to downstream wave development
- ▶ Existence of anticyclonic flow over Ural
- ▶ More frequent blocking occurrence
- ▶ Intensified SH
- ▶ more enhanced Warm Arctic – Cold Eurasia