EMS Annual Meeting Abstracts
Vol. 16, EMS2019-844, 2019

How do correlation maps capture the shift of Northern Hemisphere teleconnections during the 20th century?

Vladimír Piskala (1) and Radan Huth (1,2)

(1) Charles University, Faculty of Science, Prague 2, Czech Republic (vladimir.piskala@natur.cuni.cz), (2) Institute of Atmospheric Physics, Czech Academy of Sciences, Prague, Czech Republic

Centres of low-frequency modes of variability have slightly changed their geographical position during the 20th century as studies before showed. Our aim is to find out if the shift of modes is also captured in correlation maps which describes the connectivity of distant places. We employed 500 hPa winter (DJF) monthly mean geopotential heights of two long-term reanalyses: ERA 20C and 20CRv2. At first, we detected modes of variability using the moving orthogonally rotated PCA of 40-year periods with a one-year step. Results of PCA indicate a slight eastward shift of NAO during the century and significantly weaker PNA with a smaller extent of centres during the late 19th century. However, observed changes are too big to describe real changes in circulation. Then, we chose the grid points for which the correlation maps were calculated. We detected geographical averages of grid points with the highest and the lowest values in centres of modes through all of the 40-year periods. The correlation maps for the position of geographical averages were calculated in all 40-year periods separately as well as for the period which covers the whole 20th century. We suppose that even changes shown in correlation maps for 20CRv2 could be a combination of real changes in circulation during the century and changes driven by the variable quality of analysed dataset due to the low amount of assimilated observations during the late 19th and early 20th century. Therefore, the comparison with more reanalyses would help to recognize real changes in circulation over the northern hemisphere.