Geophysical Research Abstracts
Vol. 15, EGU2013-3921, 2013
EGU General Assembly 2013

A NAO-ENSO-based seasonal prediction model for East Asian summer monsoon

Jianping Li (1), Zhiwei Wu (2), Juan Feng (1), Fei Zheng (1), Hanlie Xu (1), Bin Wang (3), and Fei-Fei Jin (3)

(1) LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences, LASG, Beijing, China (ljp@lasg.iap.ac.cn, 86 10 82995172), (2) Key Laboratory of Meteorological Disaster of Ministry of Education, Nanjing University of Information Science and Technology, Nanjing, China, (3) Department of Meteorology and IPRC, University of Hawaii at Manoa, Honolulu, Hawaii, USA.

The observational analysis shows that the relationship between the preceding winter El Niño–Southern Oscillation (ENSO) and the following East Asian summer monsoon (EASM) in the past 60 years is strengthened. Both the observational and numerical evidences demonstrate that spring North Atlantic Oscillation (NAO) may exert significant influences on the enhancement of the EASM–ENSO relationship. Anomalous spring NAO may cause a tripole SSTA pattern in North Atlantic which can persist into ensuring summer from spring. In summer, the tripole SSTA impacts EASM through two pathways. One is the tripole SSTA pattern excites the Atlantic-Eurasian (AEA) teleconnection which is a distinct Rossby wave train prevailing over the Atlantic and northern Eurasia. As a result, the blocking highs over the Ural Mountain and the Okhotsk Sea can be modulated. Another is it can force a simple Gill-Matsuno-type quadrupole response over western Pacific, consequently, the linkage between the western Pacific subtropical high (WPSH) and ENSO is enhanced. The co-effects of the two teleconnection patterns help to strengthen (or weaken) the subtropical Meiyu-Baiu-Changma front, the primary rain-bearing system of the EASM. As such, spring NAO is tied to the strengthened connection between ENSO and the EASM. Then we may establish a NAO-ENSO-based seasonal prediction model for EASM. The hindcast experiments show a good performances of this prediction model for EASM. The NAO-ENSO-based model is employed to make seasonal prediction for EASM strength and summer rainfall over middle reach of Yangtze river in 2012, and the results show a good performance of the approach, implying the model could be a useful tool for seasonal prediction of EASM.