



Differences in the Silk Road Pattern and Its Relationship to the North Atlantic Oscillation between Early and Late Summers

Xiaowei Hong (1,2), Riyu Lu (1), Shuanglin Li (1,3)

(1) Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China (xiaowei.h@163.com), (2) Key Laboratory of Meteorological, Ministry of Education, Nanjing University of Information Science & Technology, (3) Department of Atmospheric Science, School of Environmental Studies, China University of Geosciences

The Silk Road Pattern (SRP) is an upper-tropospheric teleconnection pattern along the Asian westerly jet in summer on the interannual time scale, and it exerts great influences on the climate of the Eurasian continent. The midlatitude wave patterns, including the SRP, are strongly constrained by the basic flow. It is well known that the basic state changes remarkably in different periods during summer, and we may expect that the SRP would behave differently under changes of the basic flow during different periods of summer. However, Most previous studies explored the summer-mean SRP as a whole directly, assuming that the SRP changes little throughout the whole summer.

Our research indicate that the SRP exhibits considerable distinctions between early and late summers (i.e. 1 June–9 July and 10 July–31 August, respectively). The SRP is stronger and more geographically fixed in late summer in comparison with its counterpart in early summer. Furthermore, the SRP is closely connected with the summer North Atlantic Oscillation (SNAO) in late summer, but not in early summer. This closer connection in late summer is manifested clearly in the leading mode of uppertropospheric meridional wind anomalies over the North Atlantic–Eurasian continent domain. The intensified SNAO–SRP relationship in late summer can be explained by the subseasonal change of the SNAO: albeit being a seesaw pattern common in both early and late summers, there is a shift of this pattern toward the northwest–southeast one in late summer from a north–south one in early summer. The southeastern pole of SNAO in late summer extends into the Eurasian continent, and efficiently triggers the SRP to propagate along the Asian jet. By contrast, the south pole of SNAO in early summer is confined over the North Atlantic and is thus less effective to trigger the SRP propagation.