



## Summer extreme precipitation in eastern China: mechanisms and impacts

Qiang Zhang (1), Yongjie Zheng (2), Vijay P Singh (3), Ming Luo (4), and Zhenghui Xie (5)

(1) Key Laboratory of Environmental Change and Natural Disaster, Ministry of Education, Beijing Normal University, Beijing 100875, China (zhangq68@bnu.edu.cn), (2) Department of Water Resources and Environment, Sun Yat-sen University, Guangzhou 510275, China (zhengyj8@mail2.sysu.edu.cn), (3) Department of Biological and Agricultural Engineering and Zachry Department of Civil Engineering, Texas A&M University, College Station, Texas, USA (vsingh@tamu.edu), (4) Department of Water Resources and Environment, Sun Yat-sen University, Guangzhou 510275, China (luom38@mail.sysu.edu.cn), (5) State Key Laboratory of Numerical Modeling for Atmospheric Sciences & Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China (zxie@lasg.iap.ac.cn)

changes and the related mechanisms are of great significance for regional management of water resources and agricultural irrigation. In this study, the impacts of western north Pacific subtropical high (WNPSH) on precipitation changes in eastern China and the underlying processes are investigated. The results indicate that the strength and location of WNPSH are in close relations with the changes of summer precipitation in eastern China, and their influences vary across both space and time. In particular, WNPSH exerts remarkable impacts on precipitation in June and July in Jiang-Huai region and precipitation in June in South China such as the Pearl River basin. The inter-annual variations of WNPSH exhibits significant correlations with water vapor flux in East Asia and, and the variations of the location and direction of west flank of WNPSH is well corroborated that influences of East Asia summer monsoon on precipitation in eastern China. The westward extension of WNPSH tends to move the East Asian summer monsoon west and thus increasing water vapor flux in East Asia, which greatly benefits the occurrence of Meiyu regimes in Jiang-huai region. Besides, analysis results also show that the westward extension of WNPSH drives tropical cyclones southwards so as to increase the occurrence of extreme precipitation in South China. This study helps to bridge the knowledge gap in the relationship between WNPSH, tropical cyclones, summer precipitation events in eastern China.