



## **Responses of the East Asian Jet Stream to the North Pacific Subtropical Front in Spring**

Leying Zhang

Nanjing University of Information Science and Technology, College of Atmospheric Science, Nanjing, China  
(zhangleying@nuist.edu.cn)

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Leying Zhang, Haiming Xu, Ning Shi, Jiechun Deng

College of Atmospheric Science, Nanjing University of Information Science & Technology, Nanjing 210044

Abstract

This study concerns atmospheric responses to the North Pacific Subtropical Front (NPSTF) in boreal spring over the period 1982–2014. Statistical results show that a strong NPSTF in spring can significantly enhance the East Asian jet stream (EAJS). Both transient eddy activity and the atmospheric heat source play important roles in this process. The enhanced atmospheric temperature gradient due to a strong NPSTF increases atmospheric baroclinicity, resulting in an intensification of transient eddy and convection activities. On the one hand, the enhanced transient eddy activities can excite an anomalous cyclonic circulation with a quasi-barotropic structure in the troposphere to the north of the NPSTF. Accordingly, the related westerly wind anomalies around 30°N can intensify the component of the EAJS over the Northeast Pacific. On the other hand, an enhanced atmospheric heat source over the NPSTF, which is related to increased rainfall, acts to excite an anomalous cyclonic circulation system in the troposphere to the northwest of the NPSTF, which can explain the enhanced component of the EAJS over the Northwest Pacific. The two mechanisms may combine to enhance the EAJS.