



## **Development of Ural blocking associated with stratosphere, and Eurasian extreme cold episode in 2012**

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High-pressure system centered over Ural Mt.area, so called Ural blocking, had been developed in the mid of January 2012 and became extreme High anomaly in early February. We investigate the climatic anomalies and its related mechanisms for the extreme European cold winter in 2012. It is found that both anomalously low monthly mean temperature and more extreme cold days occurred over Eurasian region. This cold condition can be associated with the anomalously developed Ural blocking, which is the lowest one for the past 33 years. It is shown that the development of Ural blocking in January is closely associated with the downward control of the stratosphere, implying the involvement of stratospheric processes in this cold period. The precursor signal in the troposphere before the weakening of polar vortex has been found and it is again related with the earlier development signature of Ural blocking. Therefore, we suggest that development of Ural blocking in January and associated downstream horizontal wave propagation to Pacific provides favorable condition for upward propagation of Rossby wave that breaks polar vortex. The weakened polar vortex reinforces the Ural blocking.