



Impact of planetary wave reflection on blocking formation and cold spells over Eurasia in December 2012

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In a previous study (Kodera et al., JGR 2013) we showed that a reflection of planetary wave packet propagating upward from Eurasia, produces a development of a ridge over the North Pacific, which leads to a formation of blocking there. In the present study, we will show that the influence of the planetary wave reflection on blocking is not limited around the North Pacific region but extends all over the Eurasian continent.

In early December 2012, severe cold spells occurred over a wide area of Eurasian continent due to a formation of blockings. A blocking first formed over East Siberia, and the subsequent blockings are developed over West Asia and Europe. The formation of these blockings were related to the upward and eastward propagation of planetary wave packet originating from the Eurasian sector. The first blocking formation over East Siberia, in particular, formed due to a trapping of larger wavenumber components in the troposphere. Whereas, the subsequent West Asian and North Atlantic blockings were related to a reflection of zonal wavenumber 1 component in the middle stratosphere. Then, the zonal wavenumber 1 component amplified through an interference between reflected and upward propagating waves.