Stratospheric predictors of weather anomalies in Eurasia

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Intensive investigations of the stratosphere-troposphere coupling (Arctic Oscillation) resulted in a possibility to use the stratospheric parameters for the extended-range forecast (longer 10 days in the future) of extreme weather events [Thompson et al.2002], [Baldwin et al.2003a]. This possibility is based on the much longer life time of disturbances in the lowermost stratosphere (10-30 days) than that in troposphere (3-7 days) [Baldwin et al.2003b] and a downward signal propagation from the stratosphere to troposphere [Baldwin and Dunkerton,1999].

Jadin [2004,2005] first proposed to use the total ozone data for the empirical statistical predictions (on $\sim$ the month onward) of the abnormal cold/warm winters in the distinct regions of Russia during the wintertime. It was shown that the total ozone variations in the key point westward of England in January can be a good predictor for the surface temperature changes in the western Siberia and Rostov region of Russia in February. The other stratospheric predictors were indicated for the extended-range forecast of abnormal surface temperature changes in Eurasia [Jadin,2006]. Results of these predictions appear to be confirmed for the mild winter 2005 and anomaously cold winter 2006 in Russia and Europe. Possible physical mechanisms ("wave hypothesis" [Jadin,2001] and "atmospheric bridge" [Honda et al.2001]) for the understanding of relations between the interannual and decadal variations of the stratosphere-troposphere coupling, ozone and dipole-like sea surface temperature (SST) anomalies in the North Pacific and North Atlantic are discussed.

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