



The role of the stratosphere-troposphere coupling in extended-range dynamical predictions

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It is now well known that in winter mid-latitudes statistically significant correlations can be found between the stratospheric circulation and surface weather parameters when the stratosphere leads with 5-60 days. This coupling promises a potential for increased skill of extended-range forecasts in the mid-latitudinal region where such skills are notoriously small or even non-existent.

We analyse the stratosphere-troposphere coupling in ECMWFs new dynamical seasonal prediction model (system 3). With this system re-forecasts are available for 25 years starting in 1980. We investigate the connection between the stratospheric vortex (at 10 and 50 hPa) and both the large scale surface circulation (AO, NAO indices) and local surface parameters such as temperature and wind. The results are compared to simple statistical models.

We find that the dynamical prediction model does include the stratosphere-troposphere coupling. However, this coupling is too strong compared to observations. The exaggerated strength of the coupling seems to be related to a strong overestimation of the stratospheric decorrelation time in the dynamical model.

The dynamical model has more skill in the stratosphere than the statistical model for lead times up to 50 days. In the troposphere the dynamical model and the statistical model have comparable (but small) skills on lead times longer than 15 days.