



Influence of upper stratosphere and mesosphere on the stratosphere/troposphere coupling

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In the winter mid- and high latitudes there is a substantial coupling between the stratosphere and the troposphere. This coupling has the form of a downward propagation of anomalies with a time-scale of 10-60 days. The physical mechanism involves upward propagating planetary waves originating in the troposphere and it is still unclear to what extent the stratosphere is active in controlling the downward propagation.

The purpose of this paper is to investigate the influence of the upper stratosphere and mesosphere on the statistics of the stratosphere/troposphere coupling. A batch of perpetual January experiments with the AGCM ARPEGE has been calculated. This batch includes experiments where the uppermost model levels - above a threshold level that varies between 1 and 10 hPa - have been restrained, either by applying a strong damping or by forcing constant conditions.

We conclude that restraining the upper model atmosphere has profound consequences on the stratosphere/troposphere coupling. In particular we find that the delay between the stratosphere and the troposphere gets shorter when the threshold altitude decreases. The influence on the AO/NAO and tropospheric time-scales are also investigated.