## Nonlinear saturation of stationary planetary waves in the boreal stratosphere

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The analysis of the UK Met Office data shows a strong interannual variability of stationary planetary wave (SPW) amplitudes during winter months in the boreal stratosphere. Using a numerical model of the general circulation, the stratospheric response to an increase of the SPW amplitudes at the lower boundary is investigated. The results obtained show that nonlinear wave-wave and wave-mean flow interactions lead to the saturation of the SPW1 (planetary wave with zonal wave number one) in the stratosphere. Further increase of the SPW1 forcing at the lower boundary cased a substantial change of the mean flow in the lower stratosphere that restricts the vertical propagation of this wave into the stratosphere. In result the SPW1 amplitude in the upper stratosphere and mesosphere becomes even smaller in comparison with the case of a weak forcing. The analysis of the SPW2 sensitivity to an increase of the lower boundary forcing shows that in this case the stratospheric response is approximately linear at least for the realistic (observed) SPW2 amplitudes. A possible application of the results obtained to the problems of the sudden stratospheric warmings, stratospheric vacillations, and tropospheric dynamics is discussed.