



Equatorial winds and sudden stratospheric warmings

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A full troposphere-stratosphere-mesosphere global circulation model is used in a set of idealised experiments to investigate the sensitivity of the Northern Hemisphere winter stratospheric flow to equatorial zonal winds. Idealised semiannual oscillation (SAO) and quasi-biennial oscillation (QBO) variability is introduced via the relaxation of the equatorial winds over different height regions. The impact of this imposed variability over different height regions on the simulated variability of Northern Hemisphere polar stratospheric temperatures is assessed, with particular attention to the impact on the timing of sudden warmings. The model shows significant sensitivity to variability in the upper equatorial stratosphere, the imposition of SAO and QBO like variability in this region advances the timing of mid winter sudden warmings by about one month with respect to the control. Perturbations to the lower equatorial stratosphere are mainly found to influence early winter polar variability. These results suggest that it is important to pay attention to the capability of models to simulate realistic variability in the upper equatorial stratosphere.