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Kelvin and Rossby gravity wave packets in the lower stratosphere of some high-top CMIP5 models

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We analyse the stratospheric Kelvin and Rossby-gravity wave packets with periods of a few days in nine high-top (i.e. with stratosphere) models of the fifth Coupled Model Intercomparison Project (CMIP5). These models simulate realistic aspects of these waves, and represent them better than the tropospheric convectively coupled waves analyzed in previous studies.
There is nevertheless a large spread among the models, and those with a Quasi-biennial Oscillation (QBO) produce larger amplitude waves than the models without a QBO. For the Rossby-gravity waves this is explained by the fact that models without a QBO never have positive zonal mean zonal winds in the lower stratosphe
re, a situation that is favorable to the propagation of Rossby-gravity waves. For the Kelvin waves, larger amplitudes in the presence of a QBO is counter intuitive because Kelvin waves are expected to have larger amplitude when the zonal mean zonal wind is negative, and this is always satisfied in models without a QBO. We attribute the larger amplitude to the fact that models tuned to have a QBO require finer vertical resolution in the stratosphere.
We also find that models with large precipitation variability tend to produce larger amplitude waves. However, the effect is not as pronounced as was found in previous studies. In fact, even models with weak precipitation variability still have quite realistic stratospheric waves, indicating either that (i) other sources can be significant or that (ii) the dynamical filtering mitigates the differences in the sources between models.