

# Quasi-biennial oscillation in a warming climate, part 1: Overview & metrics

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The quasi-biennial oscillation (QBO) is the primary mode of variability of the tropical lower stratosphere. As the QBO is forced by a spectrum of waves from tropical convection as well as vertical advection, it is likely to change in a warming climate. Here we present changes to the QBO from experiments with doubled and quadrupled CO<sub>2</sub> concentrations and sea surface temperatures increased by 2 K and 4 K, respectively (Experiments 3 and 4 from the Quasi-biennial Oscillation initiative (QBOi), Butchart et. al. 2018). We will report a considerable spread in the projected QBO metrics among general circulation models in a warming climate, with some models reporting a QBO period of 14 months and some models losing the oscillation completely. Much of the spread in the QBO projections comes from the uncertainty in the representation of parameterized gravity waves in general circulation models. We will discuss differences in projections of the QBO in warming climate for models with fixed vs variable gravity wave source parameterizations.

Key words: quasi-biennial oscillation, climate change, gravity waves, QBOi

## References

Butchart N. et al. 2018, *Geosci. Model. Dev.*, **11**, 1009-1032, doi:10.5194/gmd-11-1009-2018