

## **QBO dynamics in a 7-km global climate simulation**

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The quasi-biennial oscillation (QBO) in equatorial stratospheric zonal wind is a fairly predictable component of interannual climate variability, with documented effects on tropical cyclone activity and tropical-extratropical teleconnections. Model experiments suggest the QBO frequency may change with changing climate, however the sign and magnitude of predicted future changes are sensitive to highly uncertain model details. Our understanding of the QBO has evolved considerably over the last half century, but there is still much to learn. For example, there are uncertainties about the relative contribution from different wave populations to the zonal force driving the QBO. Furthermore, generating a QBO in atmospheric general circulation models (GCMs) is not a simple task. There is no singular method for obtaining a QBO in GCMs, and the QBO is extremely sensitive to many model parameters, such as horizontal and vertical resolution. A few models have been able to spontaneously generate a QBO without the use of parameterized gravity waves, but most models still need to rely heavily on them to get a QBO. We have investigated the dynamics of the QBO in the global 7-km GEOS-5 Nature Run. Even with very high horizontal resolution, parameterized gravity wave drag is still necessary to obtain a QBO. The results offer clues about the importance of vertical resolution, and choice of diffusion scheme and dynamical core for producing a QBO in GCMs.