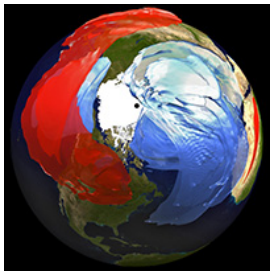

Contribution ID: **10** Type: **Oral presentation**

Stratospheric impacts of a source-based parameterization of gravity waves generated by flow imbalance

Thursday, 21 November 2019 11:45 (30 minutes)

The representation of the effects of mesoscale gravity waves (GWs) on the stratospheric circulation is a major source of uncertainty in general circulation models. Due to insufficient understanding of the generating mechanisms of GWs from frontal systems and flow imbalances, these are typically simplified in parameterizations by emitting GWs from a spatially-temporally uniform source at some tropospheric level.
In this presentation we will introduce a nonorographic GW parameterization that adapts a simple theory on spontaneous adjustment to emit GWs whose amplitudes are determined by grid-scale dynamics. For the parameterized vertical momentum flux, we will show that both the spatial distribution in the lower stratosphere and its temporal intermittency agree well with observations and/or GW-resolving global simulations. Some of the impacts of this parameterization on the simulated middle atmosphere are: 1) an improved equatorward tilt with height of the stratospheric jet in the Southern Hemisphere, a strongly alleviated Antarctic cold pole bias, and a considerably improved timing of the stratospheric final warming; 2) the parameterized GW drag has now a stronger seasonal cycle tied to that in their sources, leading to improvements in the seasonality of the Brewer-Dobson circulation; and 3) different to previous schemes, the emitted GW stress can respond to changes in climate.

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