Nudging QBO zonal winds in climate models, a test case for the assimilation of winds in the tropical stratosphere.

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Brief Abstract:

The quasi-biennial oscillation (QBO) is the dominant large-scale dynamical mode of the tropical stratosphere with known effects on the distribution of ozone and other tracers. Still the simulation of the QBO in climate models or chemistry climate models is a persistent problem, so that the assimilation of the QBO in zonal wind seems to be an attractive way to include the phenomenon and its effects. This work reviews studies that assimilated the QBO in climate models, usually by zonal wind nudging, and discusses problems of the methodology, as related for example to the tropical momentum budget and the dynamical coupling between the QBO layer in the stratosphere and higher layers. Different aspects will be discussed based on a set of integrations including simulations with different QBO assimilation schemes and simulations with direct QBO simulations.