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A stochastic parameterization of the gravity waves due to convection and impact on the equatorial stratosphere

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A formalism is proposed to represent the gravity waves due to convection in a General Circulation Model that includes a well resolved stratosphere.
It is based on a stochastic approach, where an ensemble of monochromatic waves is built up, by launching few waves at each time step, and by cumulating the effect of these waves via an AR1 relation between the GWs tendency at a given time step and that at the next time step. Some properties of each waves are chosen randomly, like their wavenumbers and frequencies and with fixed probability distribution. Their amplitude nevertheless, is directly related to the precipitation, translating it in an heating rate and using linear theory to predict the amplitude of the waves such a heating can produce.
First, off-line tests are done using re-analysis and global precipitation data. They illustrate that the scheme launches GWs momentum fuxes that are much more heratic then when uniform sources are considered. This makes that the scheme has a tendency to act at lower level then when uniform sources are considered.
We then verify that the parameterization, when applied to a General Simulation Model (GCM) with high vertical resolution in the stratosphere (delta z $\sim$ 500m)
is able to produce a Quasi-Biennial Oscillation (QBO), and to improve the Semi-Annual Oscillation (SAO).