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Momentum-flux intermittency and energy spectra from a stochastic parameterization of non-orographic gravity waves

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Momentum flux intermittency and global energy spectra of gravity waves (GWs) generated by a stochastic, multiwave parameterization of non-orographic GWs are studied. To that aim, offline experiments are conducted using dynamical fields from reanalysis datasets. A key point of the study is to constrain the free parameters of the scheme using observations of GW intermittency from long-duration balloon flights over Antarctica during the Concordiasi campaign in 2010. As a consequence, the parameterized GWs show intermittency characteristics of absolute momentum flux that qualitavely agree with recent global observations by satellite instruments, specially in the extratropics. The results show the importance of a stochastic approach for a better representation of the observed intermittency in the GW field.
Additionally, we aim to reconcile the two different approaches more commonly followed in non-orographic GW parameterizations, namely the multiwave and the spectral schemes. For this purpose, it is shown that the observed universal spectra of GWs as a function of the vertical wavenumber, which is on the basis of some spectral parameterizations, can be obtained as a superposition of individual, narrow-banded periodograms represented in our multiwave parameterization.