



The relation between gravity waves and the local wind speed in the lower stratosphere

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Non-orographic gravity waves in the lower stratosphere are analyzed using mesoscale numerical simulations and long-duration balloons, over the Southern Ocean during austral spring (October to December). The probability distribution function (PDF) of the gravity wave momentum fluxes are found to vary in a simple and robust way relative to the background local wind speed. The mean of the PDF increases linearly with the background wind speed, whereas the geometric standard deviation remains constant. This relation is investigated in a state-of-the-art stochastic parameterization of gravity waves. It is found to be absent or partly represented depending the specification of the tropospheric sources and the choice of their phase speeds. The different processes that presumably concur to produce this relation are discussed. This approach provides a novel, compact way to describe the gravity wave field, and an additional constraint to tune parameterizations.