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Spectral Analysis of Gravity Waves in a High-Resolution ICON Simulation

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Gravity waves are an important component of atmospheric dynamics, causing the transport of momentum and energy to the stratosphere and mesosphere. To make their parameterizations in atmospheric models more accurate, we need to improve our understanding of gravity waves. We address this problem by studying data from a global ICON simulation with a horizontal resolution of approximately 2.5 km. The data are divided into triangular subdomains defined by a low-resolution ICON model grid with a horizontal resolution of approximately 160 km, and 3D spatiotemporal spectra are evaluated within these subdomains. Finally, the spectra are filtered using the linear theory of gravity waves, yielding the global distribution of gravity wave spectra. Thanks to the spatial dependence and high number of subdomains, the results can be used to link the spectrum to flow properties or gravity wave sources.

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