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Small-scale secondary gravity waves generated by breaking mountain waves

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Breaking gravity waves can lead to the excitation of secondary gravity waves (SGWs), which can then transport energy and momentum from the breaking region further up into the atmosphere.
In numerical simulations of breaking mountain waves, which were originally performed to explain a turbulence event experienced by the research aircraft HALO, we find wave-like fluctuations in all atmospheric state variables above the breaking region. We suspect that these are SGWs. These SGWs are emitted from a region of intense wave breaking in the lower stratosphere. The horizontal wavelength of the SGWs is about 5km, which is notably smaller than the horizontal extent of the whole breaking region (> 50km). In the presented simulations the mountain waves are excited by two Witch of Agnesi mountains and the upstream conditions are based on ECMWF operational analysis. Here, we analyze the excitation mechanism of the SGWs and asses which factors determine the characteristics of the SGWs.