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Atmospheric Gravity Wave Observations from a Special Aeolus Campaign over the Southern Andes during Winter 2021

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As the first Doppler wind lidar in space, ESA's flagship Aeolus satellite provides us with a unique opportunity to study the propagation of gravity waves (GWs) from near the surface to the tropopause and UTLS. Existing space-based measurements of GWs in this altitude range are spatially limited and, where available, use temperature as a proxy for wind perturbations. Recent research confirms Aeolus' ability to measure GWs, and so this and future spaceborne wind lidars have the potential to transform our understanding of these critically-important dynamical processes.

Here, we present results from a special campaign onboard Aeolus, involving a change to the satellite's range-bin settings designed to allow better observations of orographic GWs over the Southern Andes during winter 2021. In line with recent research, we expect to see GW wind structures extending down to near the wave sources, enabling detailed measurements of vertical and horizontal wavelength, pseudo-momentum flux and wave intermittency. Such parameters will feed into the next generation of NWP and global circulation models, which will resolve waves at higher resolutions and employ more advanced parametrization schemes.