Mountain waves penetrating into the mesosphere observed by airborne lidar

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Flight ST08
11/12 September

Temperature

Temperature Perturbations
Flight ST08  
Second mountain leg

- Mountain waves reach about 60 km altitude before breaking
- Excitation of secondary waves
- Mountain waves extend several hundred kilometers downstream
Flight ST12
20/21 September

Breakdown of the vortex;
Low horizontal wind speeds in the mesosphere
Flight ST12

- Mountain waves upstream of mountains
- Critical level at approx. 40 km
- Good agreement with ECMWF forecasts
Flight ST 14 (26/27 September)

- Shortening vertical wavelength due to decreasing horizontal wind speed

- Adiabatic temperature gradient limits amplitude growth