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Gravity wave characteristics retrieved from radiosonde observations during DEEPWAVE-NZ

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The field phase of DEEPWAVE-NZ (DEEP propagating gravity WAVE experiment over New Zealand) took place in June and July 2014 on the southern island of New Zealand. One goal of DEEPWAVE-NZ was to explore the propagation of gravity waves excited by the flow across the southern island into the middle atmosphere. Airborne measurements with the NSF/NCAR GV and the DLR Falcon research aircraft were complemented with ground-based measurements at various stations on the southern island.

At Lauder (45 S 169 E), long-lasting upper stratospheric and mesospheric observations were taken by the DLR Rayleigh lidar and the University of Utah Advanced Mesospheric Temperature Mapper and Airglow Imager. To provide data in the lower atmosphere up to 30 km altitude, radiosonde measurements were conducted in periods of mountain wave activity. The 98 radiosondes launched in Lauder reached a mean height of 31.2 km and a maximum ceiling of 36.6 km. We present a comprehensive wave analysis of the radiosoundings using wavelets. This analysis, inter alia, isolates single wave packages and wave properties like intrinsic frequency, horizontal direction of propagation and vertical propagation direction (upward or downward) by means of Stokes parameters. The results will be presented for different cases of mountain induced gravity waves which occurred during DEEPWAVE-NZ.