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Does strong tropospheric forcing cause large amplitude mesospheric gravity waves? A Deepwave Case Study

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The DEEPWAVE (deep-propagating wave experiment) campaign was conducted in and around New Zealand from 24 May till 27 July 2014. During this campaign, at 4 July 2014, strong tropospheric winds with speeds of about 35 m/s at 700 hPa were present and the DLR Rayleigh Lidar measured temperature fluctuations with peak-to-peak amplitudes of about 20 K in the mesosphere (60 km to 80 km MSL) over a period of more than 10 hours. Here, we present a study where we investigate whether large amplitude mesospheric gravity waves over New Zealand (NZ) are connected to strong tropospheric forcing. For this reason we use in-situ measurements of the DLR Falcon and the NSF/NCAR GV aircraft as well as measurements of radiosondes launched in Haast and Lauder. Additionally, ECMWF operational analysis and forecasts, 2 km WRF simulations along the flight track and simulations of the Unified Model (UK Met Office) covering the complete altitude range from the surface to the mesosphere are investigated.