Geophysical Research Abstracts
Vol. 17, EGU2015-5789-1, 2015
EGU General Assembly 2015

Large-scale atmospheric conditions during DEEPWAVE-NZ

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The field phase of DEEPWAVE-NZ (DEEP propagating gravity WAVE experiment over New Zealand) was conducted in June and July 2014. Key instruments were the NSF/NCAR GV and the DLR Falcon research aircraft, a suite of ground-based instruments provided by various international partners (e.g. NCAR's Integrated Sounding Station, DLR's Rayleigh lidar, University of Utah's Advanced Mesospheric Temperature Mapper and Airglow Imager, ..), and satellite sensors as the Atmospheric Infrared Sounder (AIRS).

During DEEPWAVE-NZ operational forecasts of the ECMWF's integrated forecast system (IFS) were used to provide guidance for planning the research flights of NSF/NCAR GV and the DLR Falcon during intense observing periods. The IFS has 137 vertical hybrid levels, a model top at 0.01 hPa and a horizontal resolution of about 16 km globally. For certain cases, an astonishing agreement was noticed between the forecasted wave events in the upper atmosphere and observations. Here, operational ECMWF analyses and forecasts are used to characterize the atmospheric state from the Earth's surface to the mesosphere during the DEEPWAVE field campaign. For selected cases, airborne and ground-based observations are compared with the ECMWF data. Special focus of the presentations is put on the atmospheric conditions conducive to deep gravity wave propagation from various sources as the flow across the Southern Alps, coupled jet-front systems and the polar night jet. Furthermore, resolved gravity waves will be analysed and compared with observations as aircraft flight level data, radiosondes and ground-based lidar measurements.