Mission Objectives (continuation of RF-12):

- primary: explore orographic GWs under significant but reducing forcing and potential for higher altitude propagation over South Island

- secondary: explore presence of trailing GWs in lee of South Island and other non orographic sources
RF12 Flight Overview

Take-off: 05:48 UT
Landing: 5:15 UT
Duration: 9 hr 27 min

Mission Scientist: Mike Taylor
Pilots:
Crew:
Science team: Biff Williams, Katrina Bossert
Dominique Pautet, Jorgen Jensen

Six circuits of cross-mountain flight track (WP1-2-3-4-1)
- altitudes: FL400, 400, 400, 445, 445, 400

One round trip to WP5: FL400

20 dropsondes (Circuit 1 at FL 400 and circuit 4 at FL445)
Proposed RF13 Flight Plan - 30 June
- MWs – South Island
- deep responses
- trailing GWs
RF13 DWS points – approximate upstream legs after WP3 and WP4

South Island WPs:

Mt. Cook 1b: 25, 26, 27, 29
Mt. Aspiring 2b: 10, 11, 12, 13
comparison of cross-mountain $T'$ for RF13 and RF12
RF-13 Left - 7:53 UT - Right

View over ocean to east
View over South Island

Long southward leg
Circular Waves
Summary so far

• Great mission, lots of wave activity under reduced MW forcing

• All scientific instrument performed well
Left - - 13:57 UT - - Right
Gravity Waves over Lauder
Forecast Basis for Flight Plan
EC 700 hPa winds – 6, 9, 12, and 15 UT 29 June
EC winds at 1, 10, 30, and 150 hPa – 12 UT 29 June

Geopotential Height (m) & Horizontal Wind (m/s) at 150 hPa
Valid: Sun, 29 Jun 2014, 12 UTC (step 024 h from Sat, 28 Jun 2014, 12 UTC)

Geopotential Height (m) & Horizontal Wind (m/s) at 30 hPa
Valid: Sun, 29 Jun 2014, 12 UTC (step 024 h from Sat, 28 Jun 2014, 12 UTC)

Geopotential Height (m) & Horizontal Wind (m/s) at 10 hPa
Valid: Sun, 29 Jun 2014, 12 UTC (step 024 h from Sat, 28 Jun 2014, 12 UTC)

Geopotential Height (m) & Horizontal Wind (m/s) at 1 hPa
Valid: Sun, 29 Jun 2014, 12 UTC (step 024 h from Sat, 28 Jun 2014, 12 UTC)
WRF Cook 1b and Aspiring 2b w' cross sections – 9 and 12 UT 29 June
Cook 1b and Aspiring 2b EC w' cross sections – 6, 12, and 15 UT 29 June

Vertical Wind (cm/s), Log Potential Temperature (K)
Valid: Sun, 29 Jun 2014, 12 UTC (step 060 h from Fri, 27 Jun 2014, 00 UTC)

Vertical Wind (cm/s), Log Potential Temperature (K)
Valid: Sun, 29 Jun 2014, 15 UTC (step 063 h from Fri, 27 Jun 2014, 00 UTC)
EC divergence at 1 hPa – 09 UT 29 June

DIV (10^-5 s^-1, pos.: red, neg.: blue, Delta=4.) and Z (m) at 1 hPa
Valid: Sun, 29 Jun 2014, 09 UTC (step 021 h from Sat, 28 Jun 2014, 12 UTC)
Flight level data – last 4 cross-mountain circuits

2014-Jun-29 12:00:00 - 16:48:00

UCX (m/s)  VY (m/s)

Time
last 4 cross-mountain circuits
RF13 Mission Plan

- Take-off 05:48 UT 30 June 2014 (17:48 NZST)
- Flight duration ~9.5 hours
- Primary flight altitude 40,000 ft or optimal for maximum range
- Mt. Cook 1b and Mt. Aspiring 2b legs
- extended downwind for trailing waves
- Balloon launches at Lauder, Haast, and Hokitika at 00, 03, 06, 09, 12, 15 UT (to edit)
- DWS over fixed points and upstream/downstream of terrain ~2030 maximum
- Lidar at Lauder
- Airglow cameras and AMTM at Lauder and Mt. John
- meteor radar at Kingston
RF12 Mission – Summary of Observations

- Strong MW forcing, but with weakening winds, propagation in stratosphere

- MW refraction and breaking, $a = u'/U \sim 1$, are significant and captured well in FL data, likely in lower lidar meas.

- MWs seen at MLT altitudes over Cook and Aspiring earlier, cease at later times

- circular GWs also seen in MLT airglow