IOP 09 (RF11) Proposal
Predictability Flight
Summary

Presented at the DPM
29 June 2013
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RF11 Objectives

• Predictability Objective:
  – To sample a region of adjoint sensitivity in the northern Tasman Sea upstream of the Southern Alps prior to a gravity wave event on Sunday.

• Gravity Wave Objective:
  – To sample the Mt. Cook (1b) transect under weak flow (good baseline for fluxes).
• Takeoff: 0548 UTC 28 June
• Landing: 1205 UTC 28 June
• Dropsondes: 12 Dropsondes (planned for 11)
• FL400 for entire flight
• Performed maneuvers on return WP4-WP2 leg
• Crew:
  – Lee Baker
  – Ed Ringleman
  – Jim Doyle
  – Bill Irwin
  – Biff Williams
  – Clayton Arendt
  – Katrina Bossert
  – Dominique Pautet
  – Nick Potts
G-V Flight Track
Mt. Cook as Cross Mountain Leg

1 leg out
1-3 legs return
Predictability Dropsonde Plan

12 Dropsondes
G-V Flight Track: Predictability

850-mb Moisture Sensitivity
at 12 UTC 28 June (24h Lead Time)
Evolved Total Energy

Final Time (12 UTC 29 June)
28 June 06 UTC
Takeoff
28 June 15 UTC
Landing
200-mb Winds ECMWF
28 June 12 UTC
Cape

CAPE (J/kg)
Valid: Sat. 28 Jun 2014, 12 UTC (step 0.25 h from Fri. 27 Jun 2014, 12 UTC)

28 June 12 UTC
Cape

WRF
Init: 2014-06-27_00:00:00
Valid: 2014-06-28_12:00:00

Sea Level Pressure (hPa)
Cape (J/kg)
Latitude (deg)
Longitude (deg)

Sea Level Pressure Contour (hPa): 1025 by 4
IR from 0632 UTC
IR from 0732 UTC
Lightning from 7pm NZST
Lightning from 8pm NZST
Lightning from 9pm NZST
Lightning from 9pm NZST
Divert Around Convection Approaching WP3
Dropsonde 250-hPa wind
Dropsonde 700-hPa wind
Vertical Velocity (WIC) from WP1 to WP2 (Mt. Cook 1b transect)
Vertical Velocity (WIC) from WP2 to WP3
Horizontal wind speed (WSC) from WP2-WP3
MTM Imager (0642Z)
MTM Imager (0728Z)
MTM Imager (0729Z)
MTM Imager (0827Z)
MTM Imager (0828Z)
AIRS at 100 hPa 1331Z 28 June
Dropsonde 1 (Upstream of Cook Ib Leg)
Dropsonde 3
RF11 Dropsondes in Ops Models

FNMOC 06Z

FNMOC 12Z

ECMWF 06Z

ECMWF 12Z
Pitch

![Pitch Time Series Graph](Image)
Roll
Side slip angle
Altitude
IOP-09 (RF11) Predictability Summary

- Successfully sampled dynamically active region of large initial condition sensitivity over the North Tasman Sea, featuring deep convection with active lightning and strong jet stream (>75 m/s at FL400)
- Large instability and strong vertical shear seen in dropsondes on WP2-WP3
- High-altitude GWs observed over Tasman by MTM
- Non-orographic jet stream waves observed
- Dropsondes were assimilated in operational models (ECMWF, FNMOC)
- GV maneuvers performed successfully
- Returned after one transect on
RF11 Issues

- Divert around convection SE of WP3
- Dropsonde near WP4 was near small island (delayed release)
- Did not perform last two transects since they were not scientifically interesting and threat of immanent fog (verified on drive to peppers).