



# NIWA Facilities



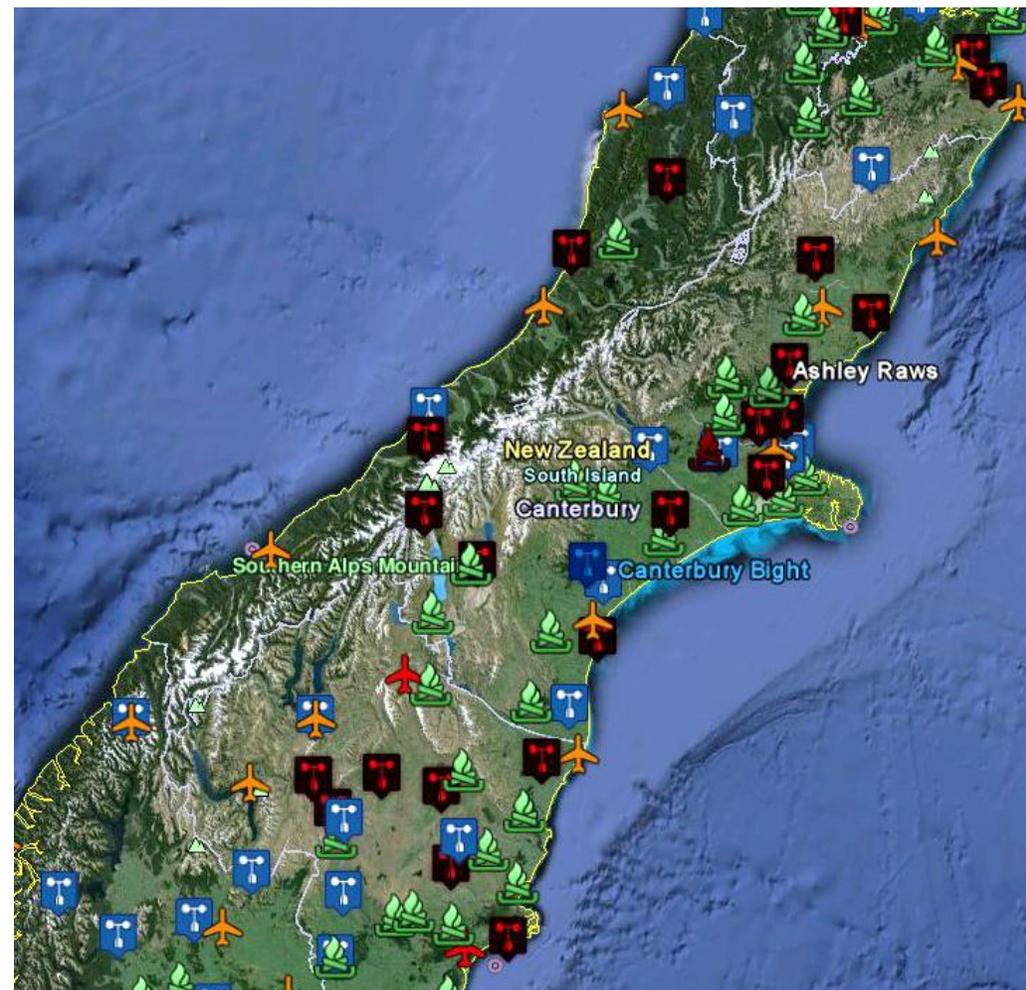
Michael Uddstrom

Principal Scientist, National Institute of Water & Atmospheric Research,  
[michael.uddstrom@niwa.co.nz](mailto:michael.uddstrom@niwa.co.nz)



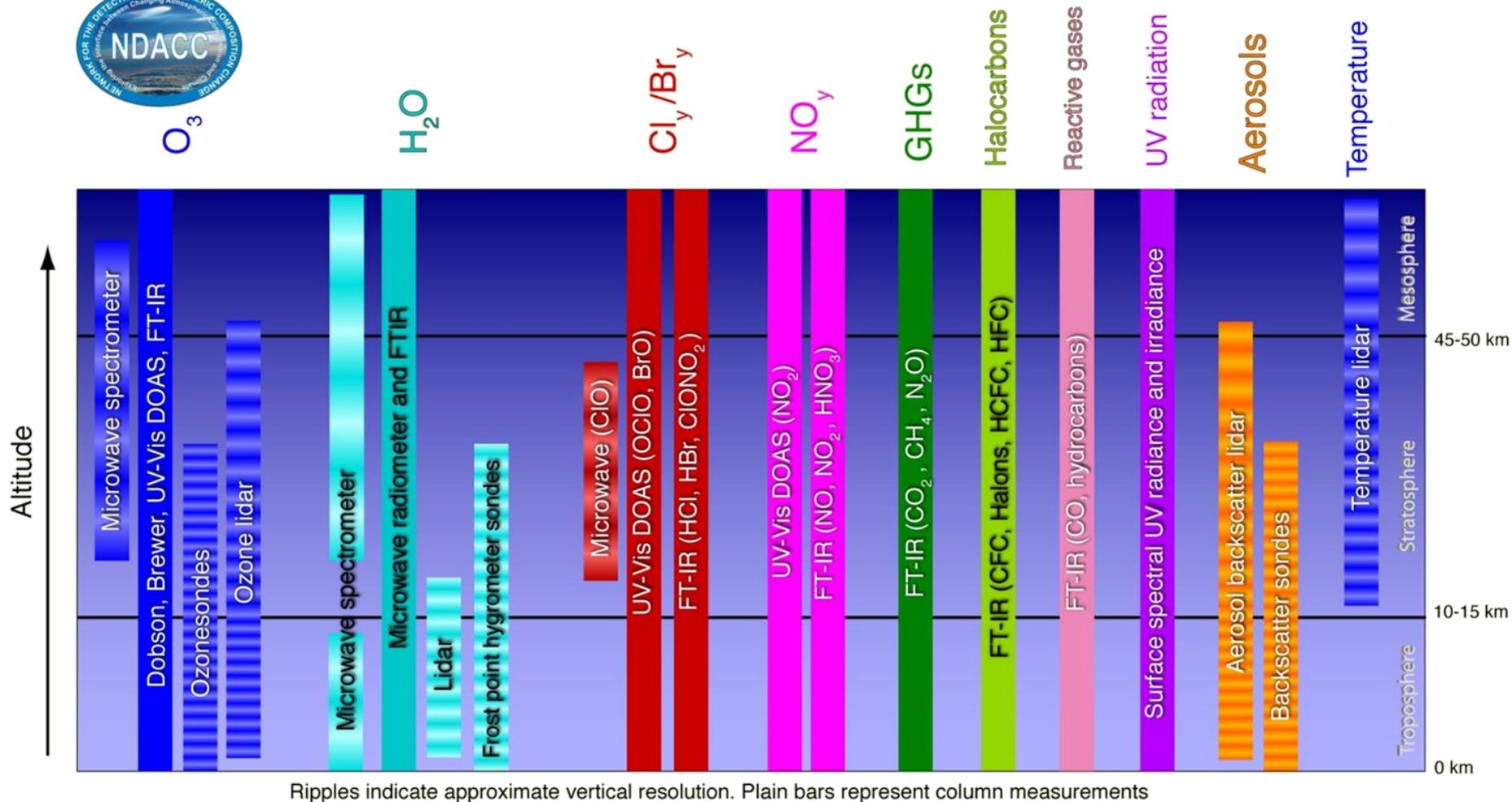
# NIWA Facilities

- Observing Network:
  - Access to (hourly or better) observations from ~200 AWS stations;
  - Lauder instruments (Lidars, FT-IR, Microwave spectrometer, Ozonesondes);
  - Satellite data (Lauder X and L band, Wellington L Band).
- Upper Air Soundings:
  - Mobile Vaisala DigiCORA Sounding System – at Haast (subject to funding of sondes, balloons and gas, NIWA will fund staff, travel etc.);
- NWP Model Forecasts:
  - New Zealand Limited Area Model (12 km resolution);
  - New Zealand Convective Scale Model (1.5 km resolution);
  - Global UM N768L70 cutout (via the UK Met Office).
- Note: NIWA's NWP Model visualisation workflow uses NCL.



# Lauder Observations

Observational Capabilities of the Network for the Detection of Atmospheric Composition Change



Ripples indicate approximate vertical resolution. Plain bars represent column measurements

# New Zealand Limited Area Model (NZLAM)

- Domain:  $324 \times 324 \times 70$  (80 km top);
- Computational Grid: Rotated lat / long;
- Resolution: 12 km (parametrized convection);
- Dynamics time step: 300 s;
- Physics time step: 3600 s;
- DA: FGAT VAR (IAU: AT  $\pm$  3h), 12 km resolution;
- Obs types: Surface (land, ship buoy), AMDAR, ATOVS, IASI, AIRS, SSMI, GPS-RO, Satwind, Scatwind);
- LBCs: 3 hourly, from UM Global model;
- Forecast period: 48 h (extend to 72 h for field campaign);
- Frequency: (4 $\times$  daily), AT: 00, 06, 12, 18 UTC, available at AT + 4 h 25 min;
- Output frequency: hourly.



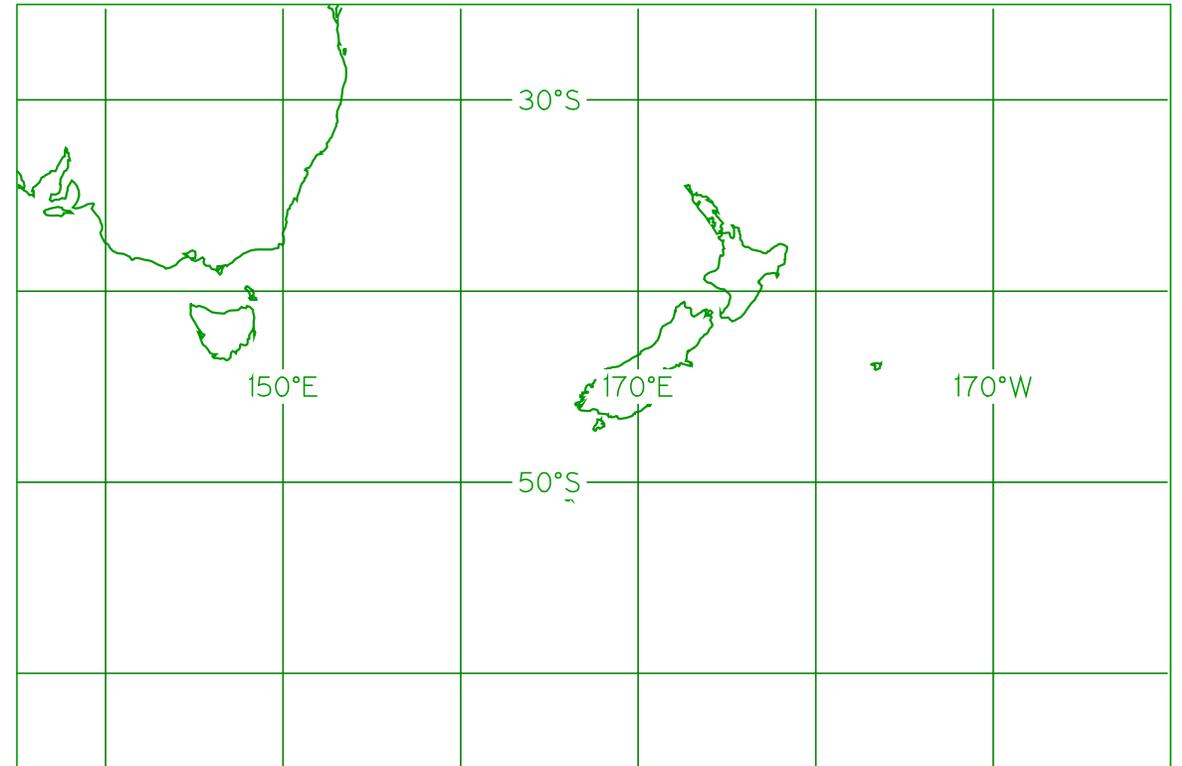
# New Zealand Convective Scale Model (NZCSM)

- Domain:  $1200 \times 1350 \times 70$  (40 km top);
- Computational Grid: Rotated lat / long;
- Resolution: 1.5 km (explicit convection)
- Dynamics time step: 50 s;
- Physics time step: 600 s;
- DA: Pseudo analysis (3 h cycle);
- LBCs: 30 minute, from NZLAM;
- Forecast period: 36 h;
- Frequency: (4× daily), AT: 03, 09, 15, 21 UTC, available at AT + 6 h 15 min.
- Output frequency: 30 minutes;
- New Dynamics operational;
- ENDGame experimental (for field campaign).



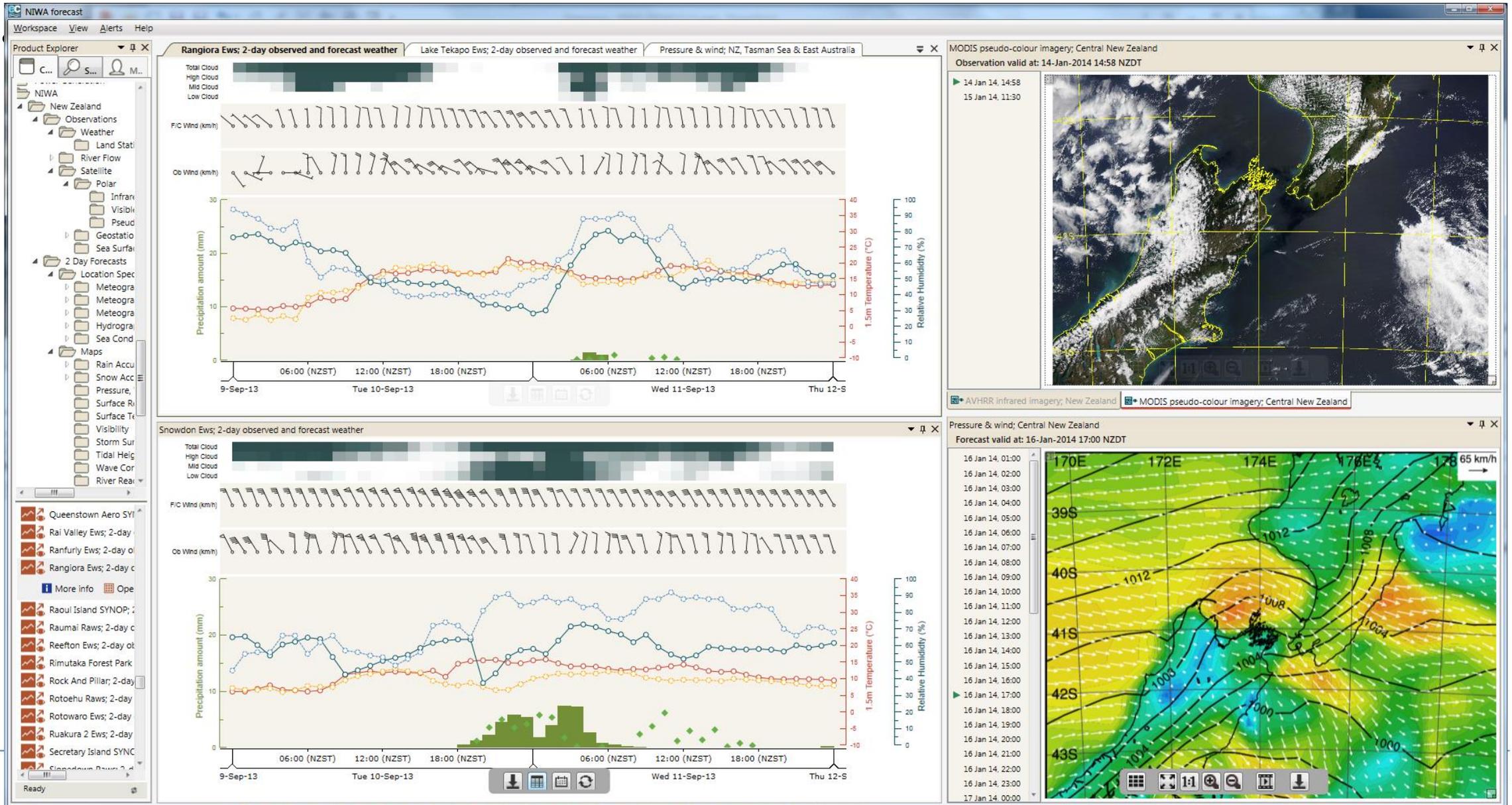
# UM Global: N768L70

- Domain:  $1536 \times 1152 \times 70$  (80 km top);
- Computational Grid: Rotated lat / long;
- Resolution: 17 km (mid-latitudes)
- Dynamics: ENDGame, GA6.1
- Data Assimilation: 4DVAR, inner loop N320  $\approx$  40 km;
- Domain Cutout:
  - BLC:  $65^{\circ}\text{S}$ ,  $135^{\circ}\text{E}$
  - TRC:  $25^{\circ}\text{S}$ ,  $160^{\circ}\text{W}$
- Frequency: (4 $\times$  daily)
  - 00 and 12 UTC to T+144 h
  - 06 and 18 UTC to T+78 h
- Output Frequency: 3 h (or better)



Cutout for UM Global, N768T70 model output

# EcoConnect (GUI & SOAP Webservices) – Data Access





# Dataset Formats

- For Field catalogue:
  - NZLAM, NZCSM, UM Global - Maps & Cross sections: PNG
  - Site specific data (forecasts or observations): XML
  - Access/Ingest: SOAP Webservices (via EcoConnect Database App Server)
- Suggestion / Comment (NIWA perspective we recognise!) for Field Catalogue input:
  - Given
    - Our data post-processing & visualisation uses NCL (on CF NetCDF)
    - Past NCL development work arising from T-REX etc.
  - And the desire to:
    - have map products presented on common grids, with common colour wedges
    - derived products (e.g. flight level forecasts / analyses, energy flux calculations with identical filters etc.)
  - Can NCAR, Yale, NRL, ?... provide NCL templates for each of the desired “Standard Products” that could then be used by all (or at least, many?) contributors.
- For Data Archive:
  - Model Output Fields (NZLAM, NZCSM, UM Global): CF NetCDF (2, 3 and 4D fields);
  - Site specific data: XML, BUFR (Upper Air, Haast)

# Additional Plots



# AWS Network

