MetService and DEEPWAVE

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MetService: brief overview

• New Zealand’s National Weather Service
• State-Owned Enterprise
• Many decades of knowledge / experience:
  • Observing systems (New Zealand and Pacific)
  • Numerical modelling
  • 24 x 7 forecasting operations
• Strong involvement in WMO activities
• Outside of New Zealand, MetService owns forecasting operations in Australia and United Kingdom largely focused on the energy market
Areas of responsibility: tropical cyclones

TCWC Wellington

[Map showing areas of responsibility for tropical cyclones, including TCWC Wellington and other locations like New Delhi, Tokyo, Honolulu, Miami, La Reunion, Port Moresby, Nadi, and Wellington.]
Areas of responsibility: volcanic ash

Wellington VAAC
Areas of responsibility: SIGMETs

Wellington Meteorological Watch Office
Areas of responsibility: high seas

New Zealand as Issuing Service
Areas of responsibility: regional severe weather

Wellington as Lead RSMC
Areas of responsibility: local severe weather

MetService as Responsible Agency under National CDEM Plan
Scientific focus: operational forecasting

• 65-odd on-shift meteorologists* organised in groups:
  • Severe weather
  • Regional, including RSMC / TCWC responsibilities
  • Marine, including GMDSS responsibilities
  • Public / media
  • Aviation

• Average operational meteorologist experience
  • Severe weather: ~ 19 years
  • Regional and forecast policy: ~ 13 years
  • Overall: ~ 12 years

* Either ab-initio-trained at MetService or recruited from overseas with technical backgrounds and experience which well exceeds the WMO Meteorologist standard
Scientific focus: modelling, NWP data, research

- Multi-model approach*: ensembles and model “flavours”
  - Global: UKMO, ECMWF, etc.
  - Local: various configurations of WRF
- Tuning models to work best for New Zealand (land use, orography, etc.)
- Customisation (using information theory) of forecast products for decision-making – both by external customers and by forecasters
- 10 scientists; strong mix of physics, maths, computer science
  - Remote sensing
  - Statistics
  - Modelling of physical processes
  - Synoptic and mesoscale meteorology
  - Software development

* 91 different models; 226 forecasts per day; and all are wrong
Radar and Upper Air

Doppler radar

- Scans every 7.5 minutes
- Dual-polarised radar near Hokitika and conventional radar near Christchurch
- Selected PPI-type imagery available via MetConnect
- Polar volume data available
- Coverage shown on slide after next

Upper Air

- Whenuapai, Paraparaumu, Invercargill
- 0000UTC and 1200 UTC (midday and midnight in New Zealand Standard Time)
- Standard and significant levels
- Can modify hardware and software at Invercargill to provide 10-second data – at a cost, and would need a reasonable period of notice
Surface observations

- About 200 automatic weather stations
- Most report every minute
- Data of very high technical quality
- Like radar and upper air:
  - Regularly calibrated
  - Strict maintenance service level agreements in place

- Also gather observations from drifting buoys and voluntary observing ships
Weather stations in project area

- Weather radar coverage at 0.5 degree beam elevation
- Weather radar coverage above 2 degree beam elevation
- Weather radar
- Full AWS (includes cloud, visibility, present weather)
- Standard weather station
- Road weather station

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Satellite data

• Geostationary:
  • Hourly MT-SAT imagery available via MetConnect
  • Raw-ish hourly MT-SAT data (GRIB) available soon

• Polar-orbiting:
  • Various satellites received / processed
  • Raw-ish hourly data (again, likely to be GRIB) could be made available – but probably some cost involved
Identifying sources

- From https://ams.confex.com/ams/19Fluid17Middle/webprogram/Paper226862.html: “...waves that don’t seem to be connected with any topography ...”