



MetService Update – Research and Development

CAA MET Symposium

Norm Henry

General Manager Science Strategy

October 2018



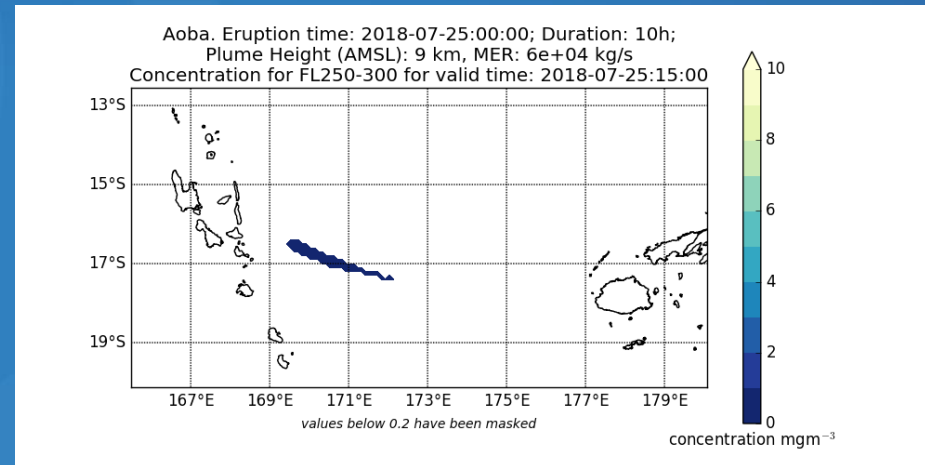
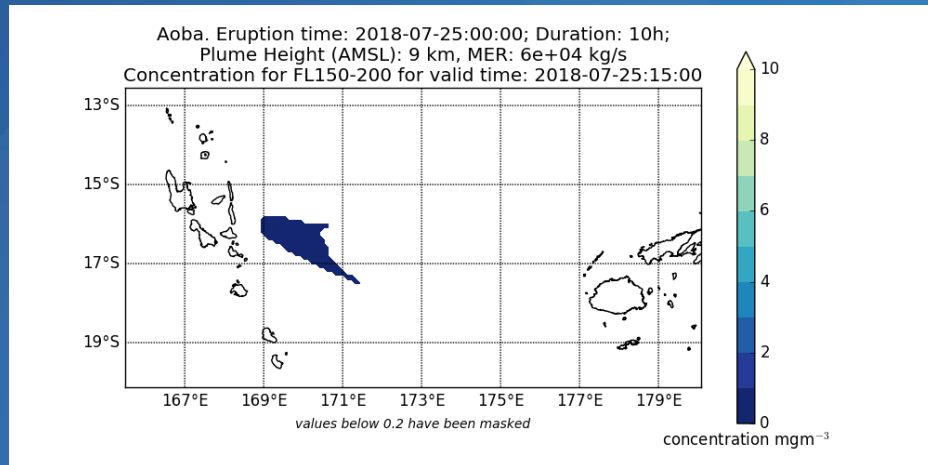
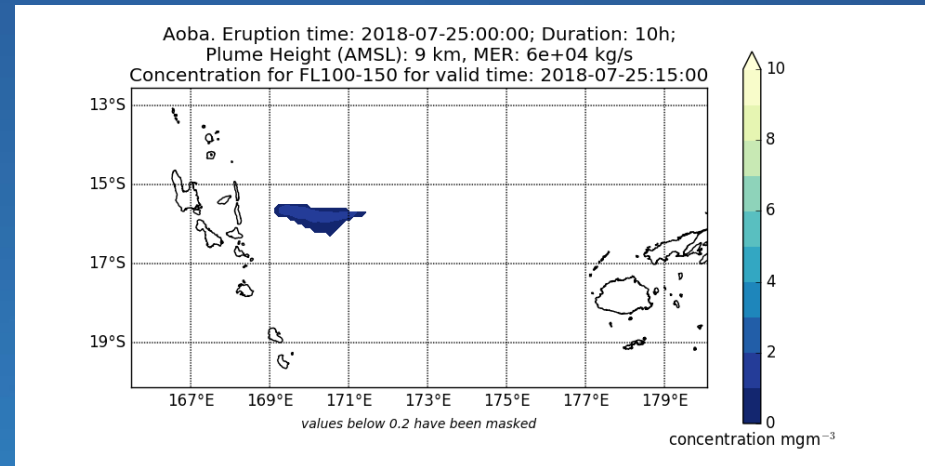
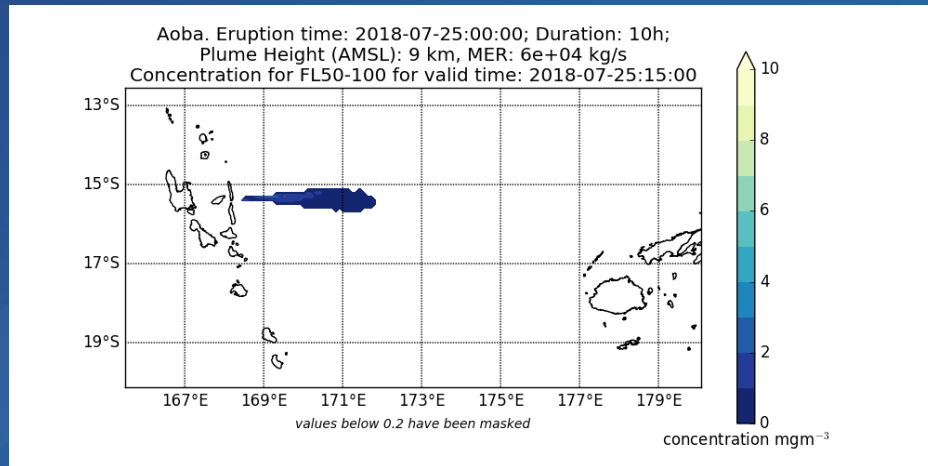
Forecasting Research Update – VAAC Support

- Himawari-8 volcanic ash detection
 - VOLCAT – advanced satellite algorithms developed by Michael Pavalonis at Univ. Wisconsin/NOAA-NESDIS
 - Ash detection, eruption detection (e.g., surface thermal anomalies), and eruption parameters – plume height and mass loading
- Ash dispersion modelling
 - Global capability with Hysplit model
 - Cloud-based version in place for R&D (not yet migrated into operations)
 - Ensemble approach using a range of eruption parameters
- Under development
 - Automatic VAAC alerting of H8 eruption detection
 - Automatic initialisation of volcanic ash dispersion modelling



Forecasting Research Update – VAAC Support

- Request from Rolls Royce (Rory Clarkson) for concentration data for the July Aoba eruption
- Average concentration over 5000ft layers 15 hours after the start of the eruption



Forecasting Research Update – General NWP Modelling

- Improved model initialisations
 - Wx radar assimilation capability established (collaboration with NCAR)
 - Frequently updating analysis using radar/satellite/etc
- Cloud-based for resilient and scalable high-performance computing
 - Significantly increased independence from Wellington infrastructure
- Other R&D:
 - Land-surface modelling (with visiting scientist from MeteoFrance)
 - Full review of best practice – optimising resolution and model physics for NZ application
 - Nowcasting of convective storms using lightning and radar data



NZ Observation Network Update – Otago Radar

Slow progress on preferred site near Milton:

- Site is high-quality from Met & access perspectives
- Dealing with both land and forestry owners
- Sale of the land to an overseas company late 2017... and again mid-2018

Committed to having the new radar operational by Autumn 2020

- Alternative sites to the north of Dunedin are now being investigated
- Decision point to abandon Milton site will be ~30 Nov



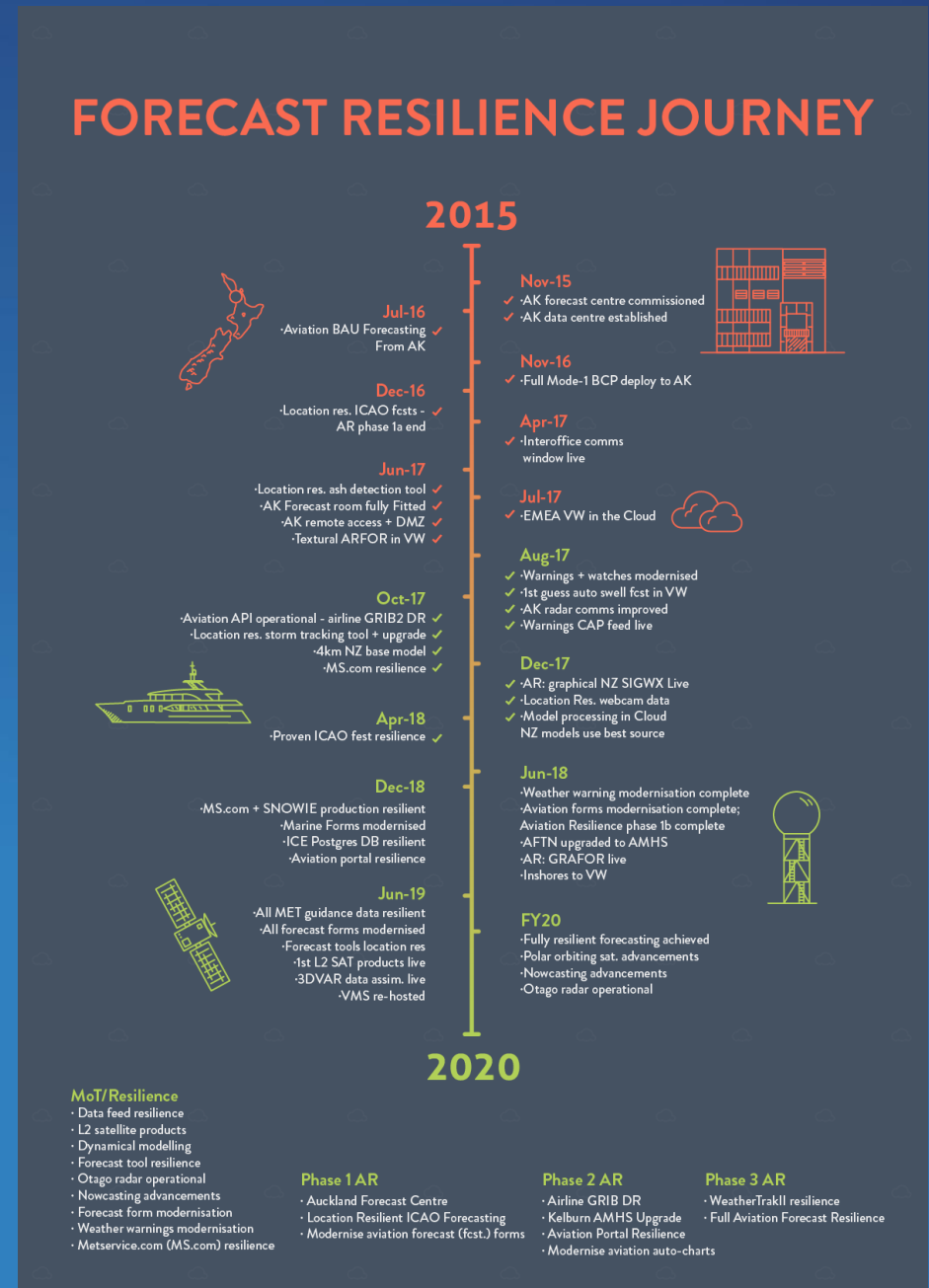
Resilience Programme

Now:

- Auckland office – staffed and operational
- Independent feeds of essential data
- Backup mode production capability for ICAO forecast products (Int’l TAF, SIGMET, SIGWX)
- Operational weather models in the Cloud
- Resilient AMHS link in Akl

Next two years:

- Migrate remaining Aviation products (TAF, GRAFOR)
- Migration of other public-safety forecasts (MoT contract)
- Fully site-independent production
- Resilient web delivery channels and APIs
- Continue to increase Akl staffing levels and extend beyond aviation to other teams





MetService Update – Meteorological Operations

CAA MET Symposium

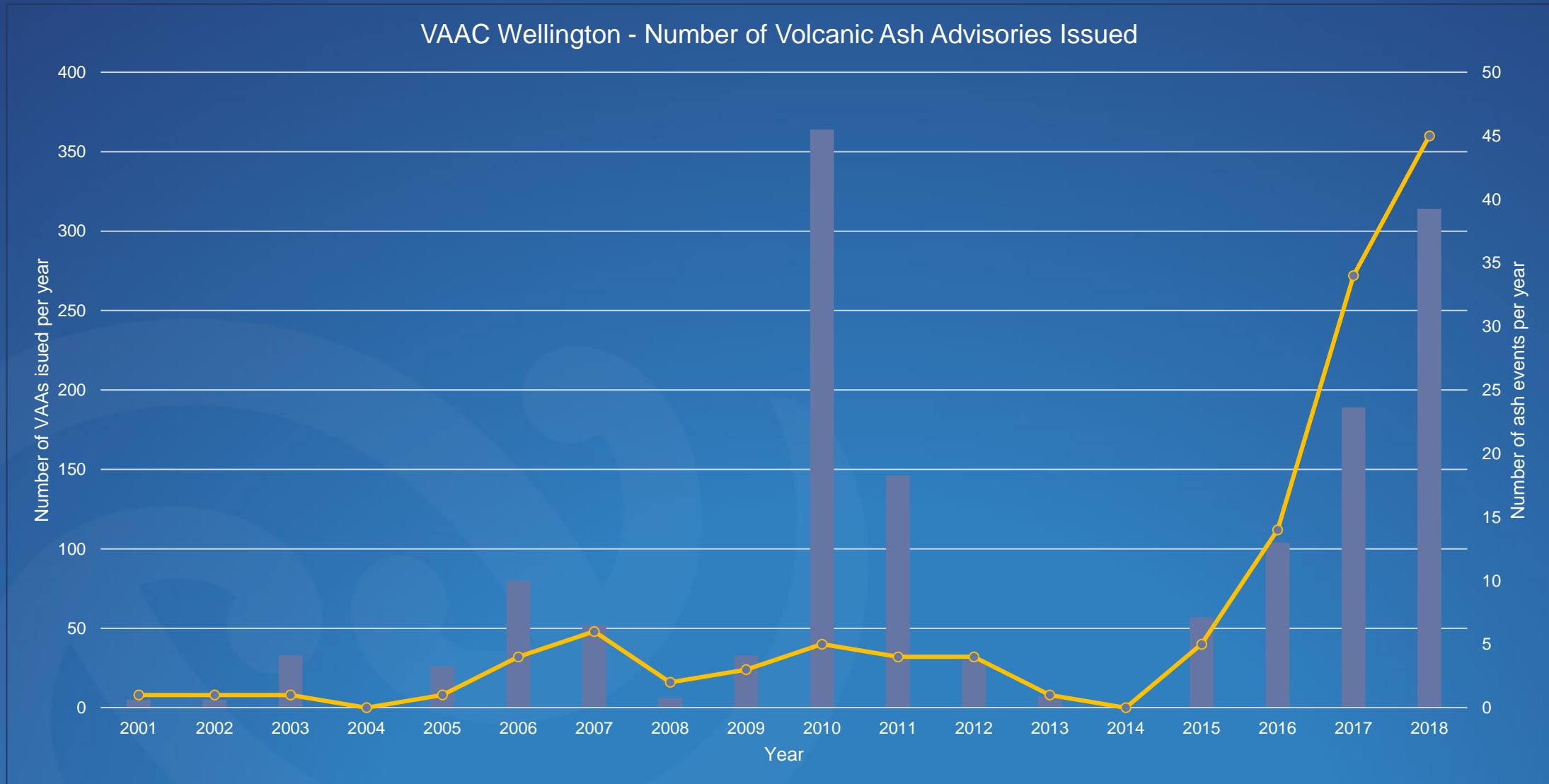
Ramon Oosterkamp

General Manager Meteorological Operations

October 2018

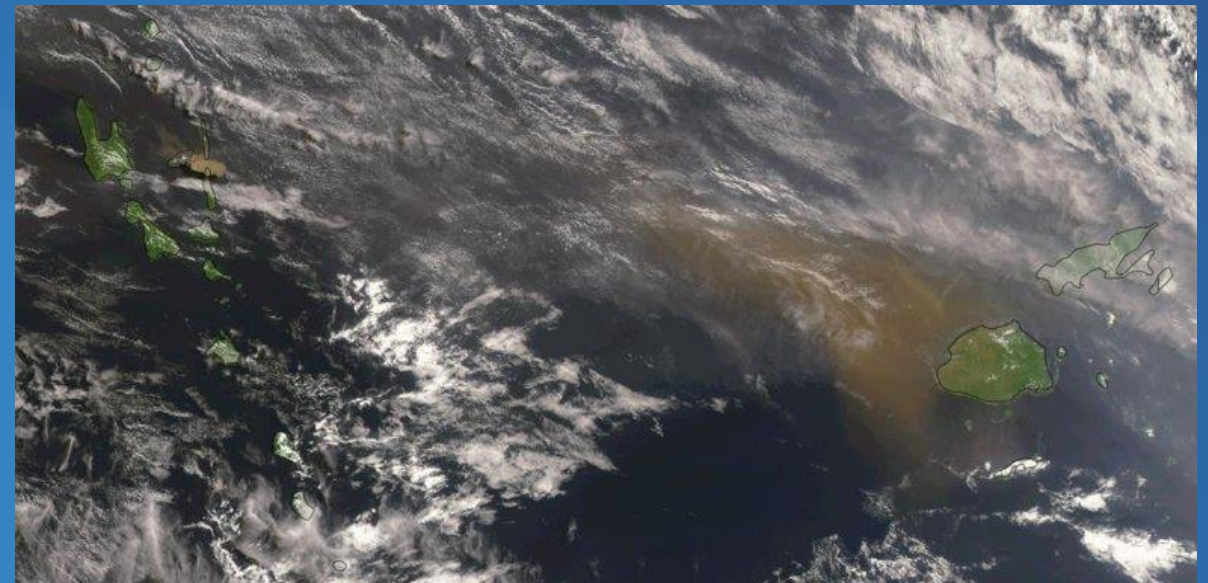
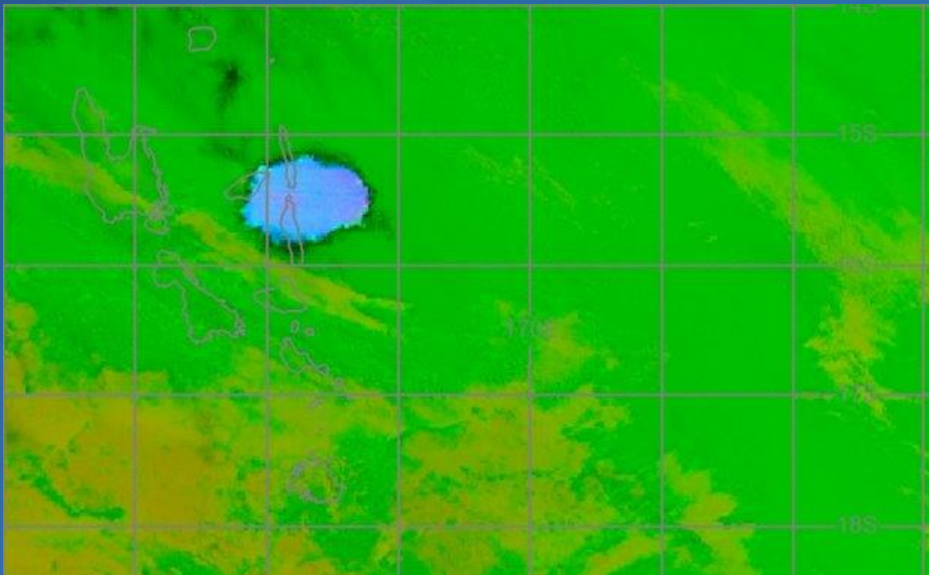


VAAC Update - VAA and VAG forecasts

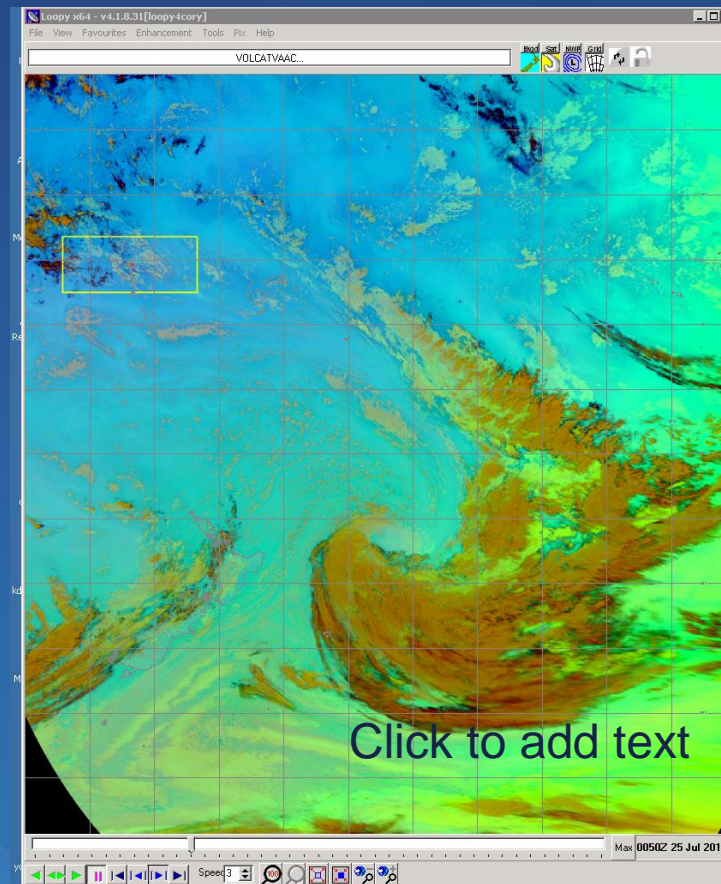


VAAC Update - Aoba

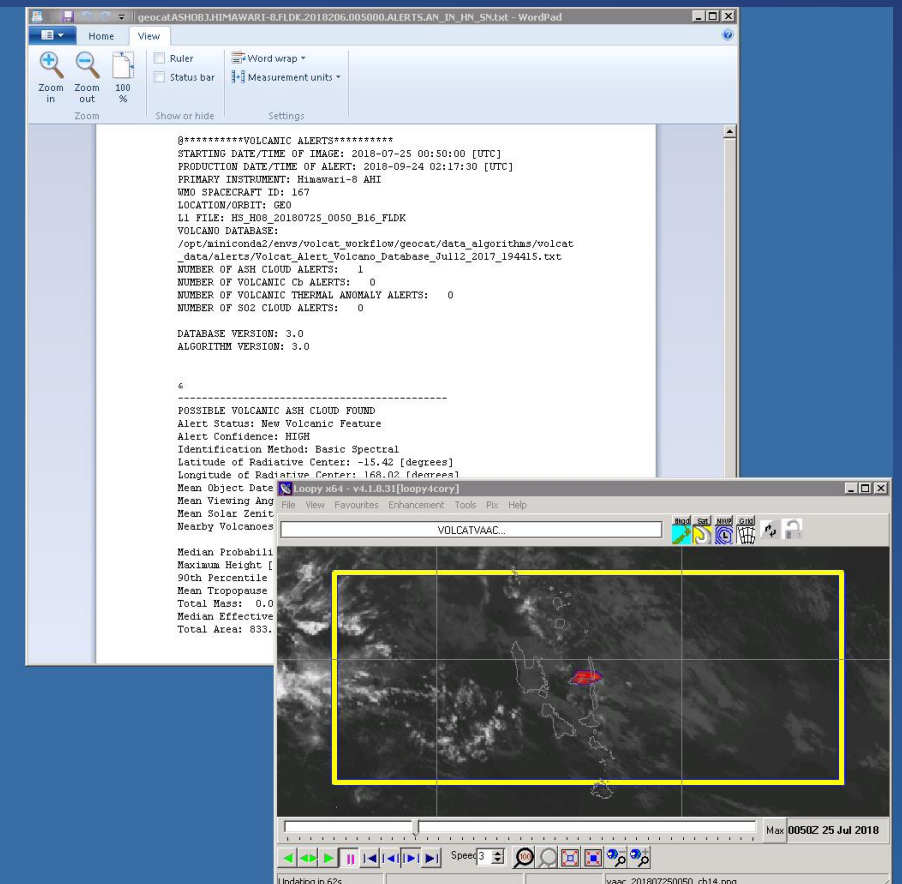
- Aoba has been the most active volcano within the VAAC
- The April event demonstrated the value that the good communication with Vanuatu GeoHazards
- The July event demonstrated the value of accurate pilot reports proving crucial to the VAAC decision making.



VAAC Update - VOLCAT



Volcat Image



Retrieved Ash Cloud height and Text product

- Implementation of NOAAs VOLCAT system occurred in late July.
- Data regularly disseminated to Meteorologists – most evident during July Aoba eruption



VAAC Update – WWLLN Alerts

The image shows two side-by-side screenshots. The left screenshot is from Google Earth, displaying a map of Vanuatu with a circular area of interest around the island of Aoba. A pop-up window provides the following data:

- Lat: -15.4650
- Lon: 167.8205
- Residual: 11.2000 us
- Stroke detected at 7 WWLLN stations

The right screenshot is an Outlook email titled "WWLLN: Aoba, Vanuatu-SW Pacific" from sferix@flash3.ess.washington.edu. The email content includes:

WWLLN

You forwarded this message on 7/25/2018 8:19 PM

Attachment: 0507-03-.kml (18 KB)

Show all 1 attachments (18 KB) Download Save to OneDrive - MetService

Name: Aoba, Vanuatu-SW Pacific
Location: 15.4000°S, 167.8300°E
Type: Shield volcano

Start: 2018-07-25 05:31:00 UTC
Stop: 2018-07-25 06:31:00 UTC
WWLLN lightning counts:
Inner ring: 3 (1 new)
Outer ring: 0 (0 new)

- Automated lightning alert email
- Could detect events that VOLCAT may not
- Could arrive up to 20 minutes before latest satellite imagery
- Additional alert information



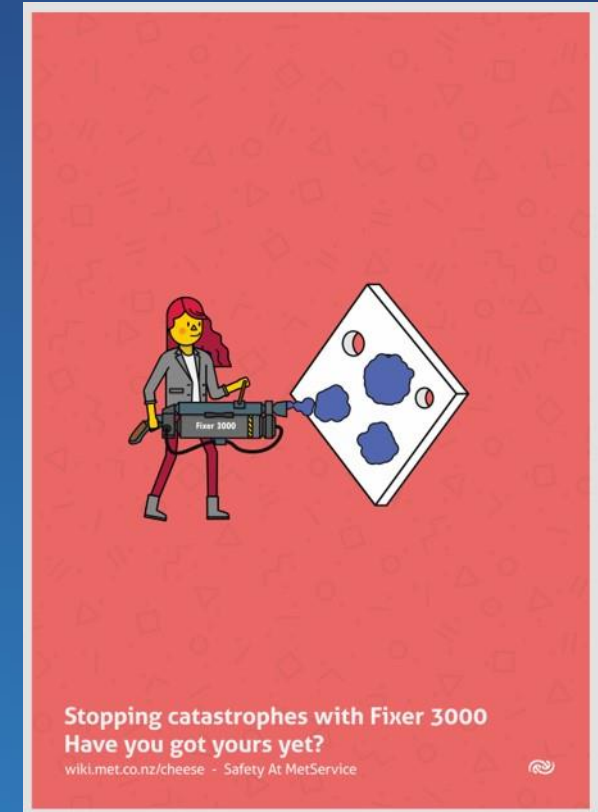
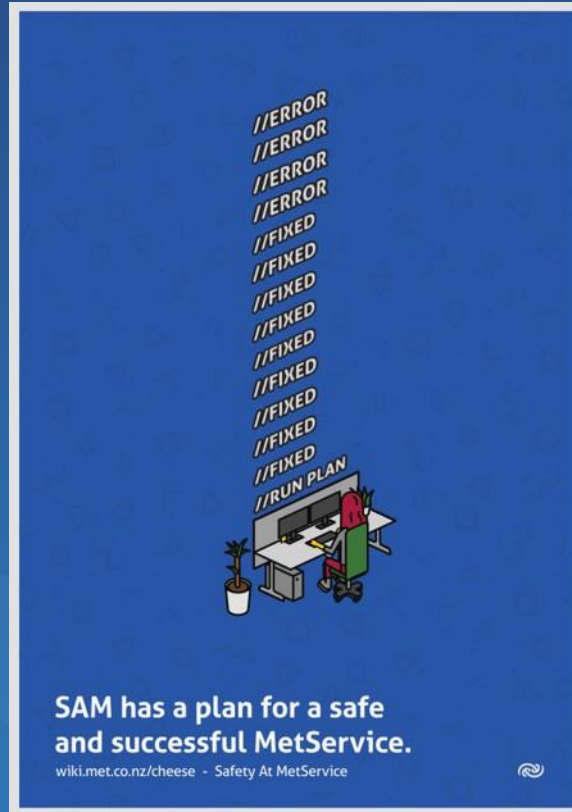
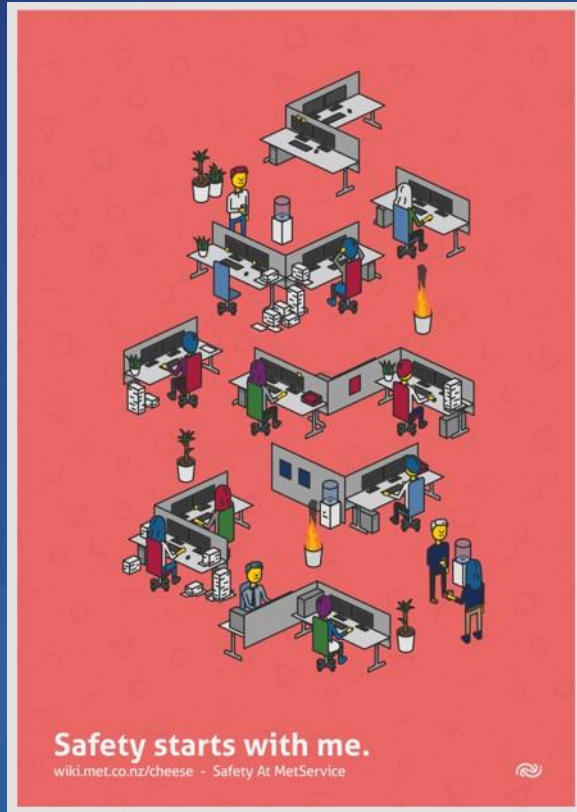
SIGMET Harmonisation

MetService and the Bureau of Meteorology

- Collaboration across the NZZO, YMML and YBBN FIR border (163E)
- BoM and MetService working together to create seamless SIGMETs across FIRs.
- 3 way approach:
 - Agree the science
 - Agree the process
 - Work on collaboration technology



SMS and QMS



- ISO 9001:2015 certified September 2017
- SMS certified November 2017 – "Just Culture" principles
- Working towards Operating & Effective





MetService Update – Products and Services

CAA MET Symposium

Ray Thorpe

General Manager Sales, New Zealand

October 2018



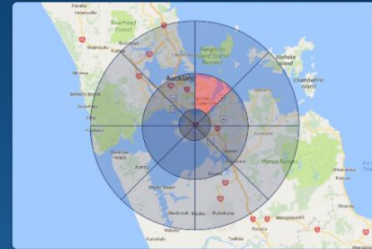


AUCKLAND AIRPORT

Wednesday, 19 July 2017

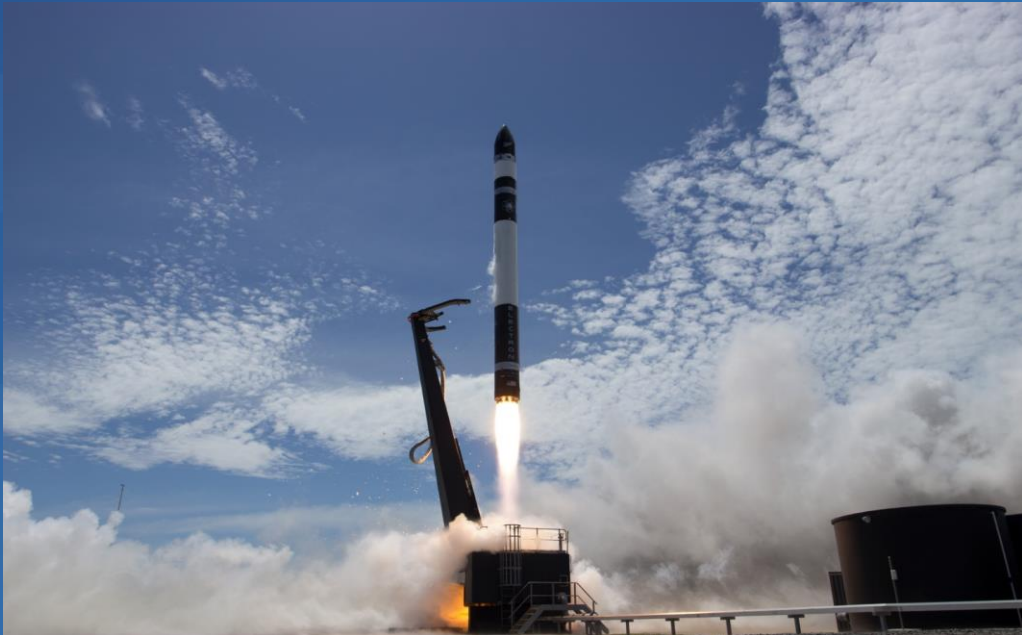
Thursday, 20 July 2017

High risk Moderate risk Low risk



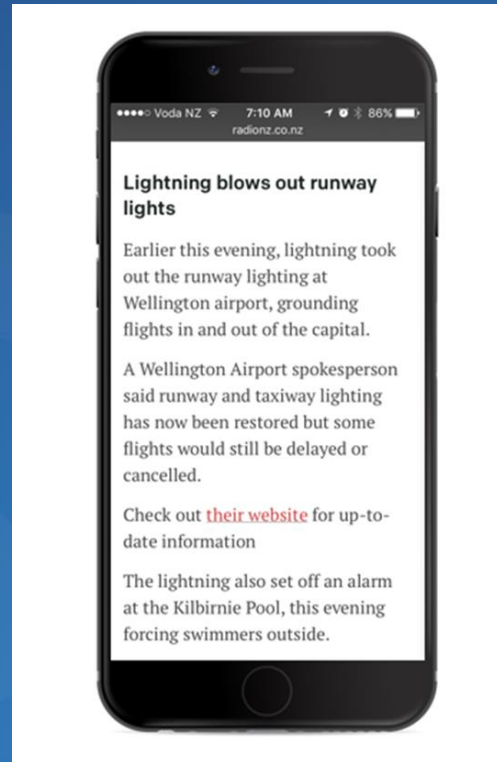
Recent strikes

TIME	TYPE	DISTANCE	DIRECTION
13:57:39	Cloud	183km	WNW
13:57:38	Cloud	185km	W
13:57:37	Ground	182km	WNW
13:35:39	Cloud	183km	WNW
13:34:57	Cloud	185km	W
13:33:28	Ground	182km	WNW
13:32:27	Cloud	183km	WNW



Lightning Event - 11 April 2018

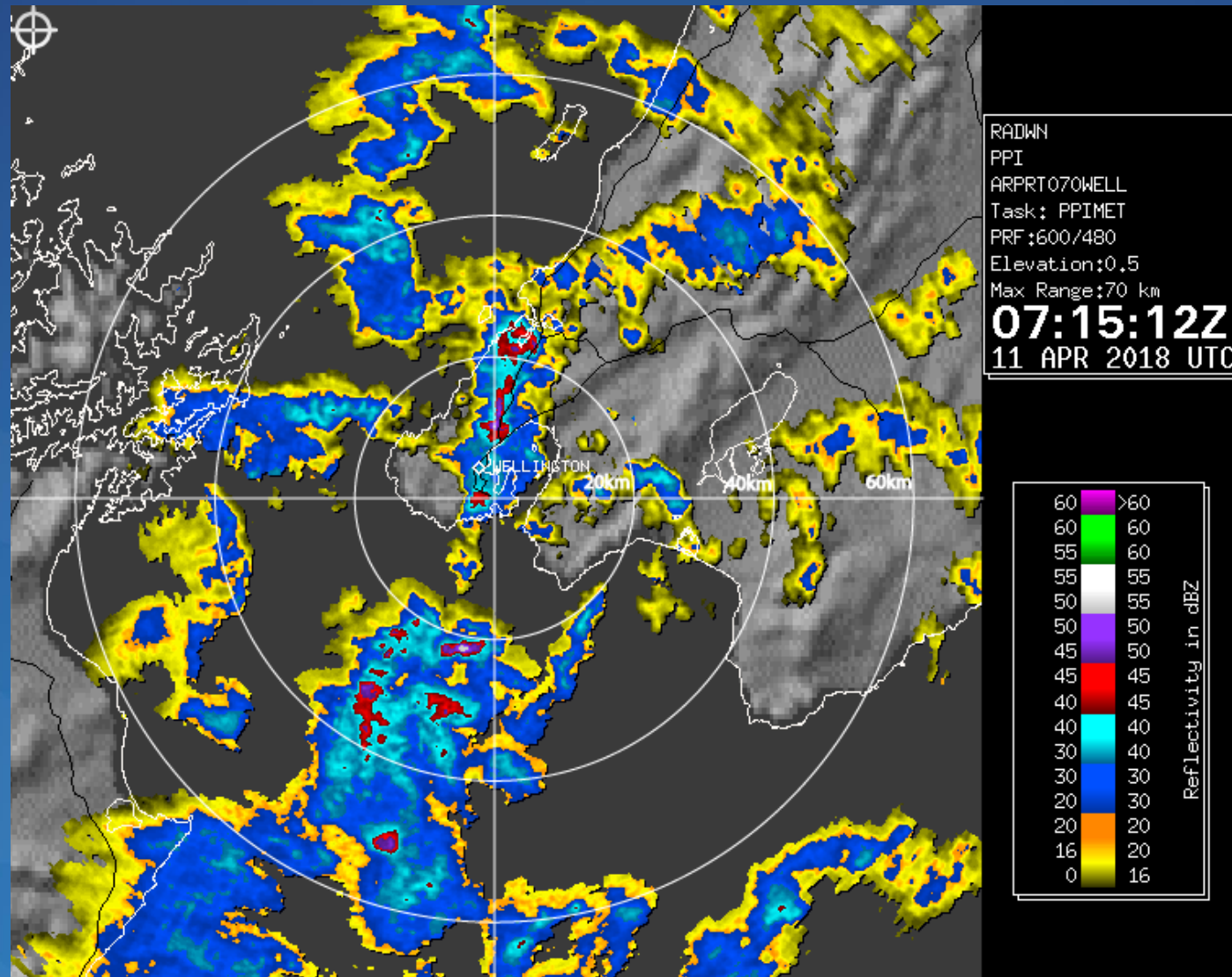
Lightning activity has been detected in the Lightning Warning Zone at Wellington Airport, 0.80 km NW at 7:09 AM, April 11, 2018 UTC



Lightning Event - 11 April 2018



Lightning Event - 11 April 2018



Lightning Event - 11 April 2018

Wellington Airport Weather Risks

Updated at 19:32 NZT Wednesday 11 Apr 2018 based on the 17:03 NZT Wednesday TAF for NZWN

Wednesday 11 Apr to Thursday 12 Apr (times in NZ local time)

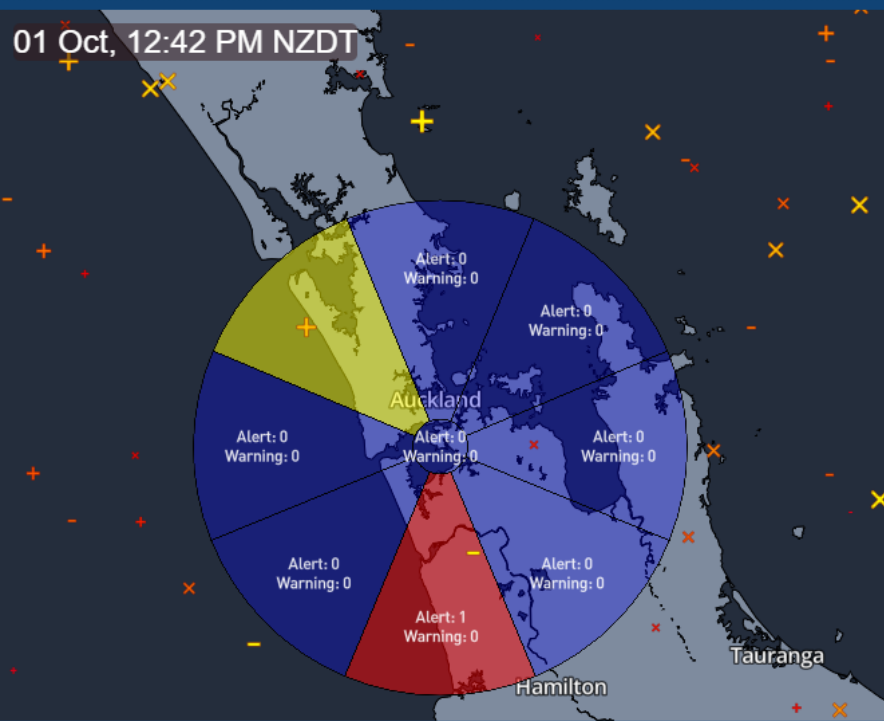
	Current Conditions	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
Cloud base High risk: $\leq 400\text{ft}$; Mod risk: $\leq 1000\text{ft}$												
Visibility High risk: $\leq 3.0\text{km}$; Mod risk: $\leq 5.0\text{km}$												
Heavy rain High risk: $\geq 6\text{mm/hr}$; Mod risk: $\geq 0.2\text{mm/hr}$												
Wind speed High risk: $\geq 30\text{kt}$; Mod risk: $\geq 25\text{kt}$												
Cross wind (gust) High risk: $\geq 13\text{kt}$; Mod risk: $\geq 10\text{kt}$												
Lightning High risk: $\geq 50\%$ risk; Mod risk: $\geq 30\%$ risk												



Auckland Airport with Mock Lightning data

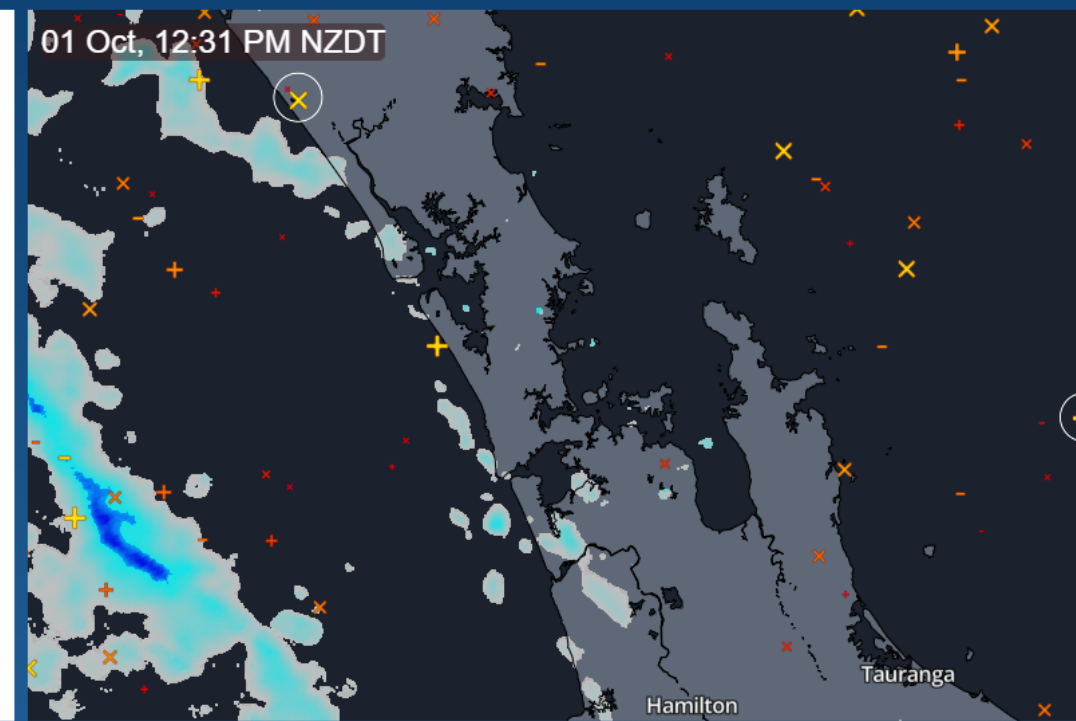
■ Low Risk
 ■ Moderate Risk
 ■ High Risk

Monday Oct 01, 12:00 (local)		CURRENT CONDITIONS	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	Tuesday															
														00.00	01.00	02.00	03.00	04.00	05.00	06.00	07.00	08.00	09.00	10.00	11.00	12.00	13.00	14.00	
CLOUD BASE	■ < 1500ft ■ < 300ft																												
VISIBILITY	■ < 5000m ■ < 1500m																												
RAIN	■ > 0.2mm/hr ■ > 6.0mm/hr																												
WIND SPEED	■ > 25kts ■ > 35kts																												
CROSS WIND	■ > 10kts ■ > 13kts																												
LIGHTNING	■ > 30% risk ■ > 50% risk																												



Recent events

Time	Type	Distance	Direction
12:39:31	Ground ⊖	39 km	SSE
12:18:02	Ground ⊕	66 km	NW



South Pacific Lightning Installations

Phase 1 (Complete)

- Cook Islands x 2
- Fiji (Nadi)
- Kiribati
- Niue
- Samoa
- Tonga x 2
- Tuvalu
- Vanuatu (Port Vila)
- New Zealand x 16
- TOA GLN, 500+ sensors including 120+ sensors in Australia, Guam, Hawaii

Phase 2 (In Progress)

- American Samoa
- Fiji (Suva)
- French Polynesia x 2
- French Polynesia x 3
- Raoul Island
- Pitcairn Island
- Solomon Islands x 3
- Tokelau
- Vanuatu (Espiritu Santo)
- Wallis Island
- Futuna Island

Phase 3 (Planned)

- Cook Islands (Penrhyn)
- New Caledonia x 2
- Kiribati (Kanton Island, Kiritimati Island)
- Papua New Guinea x 3



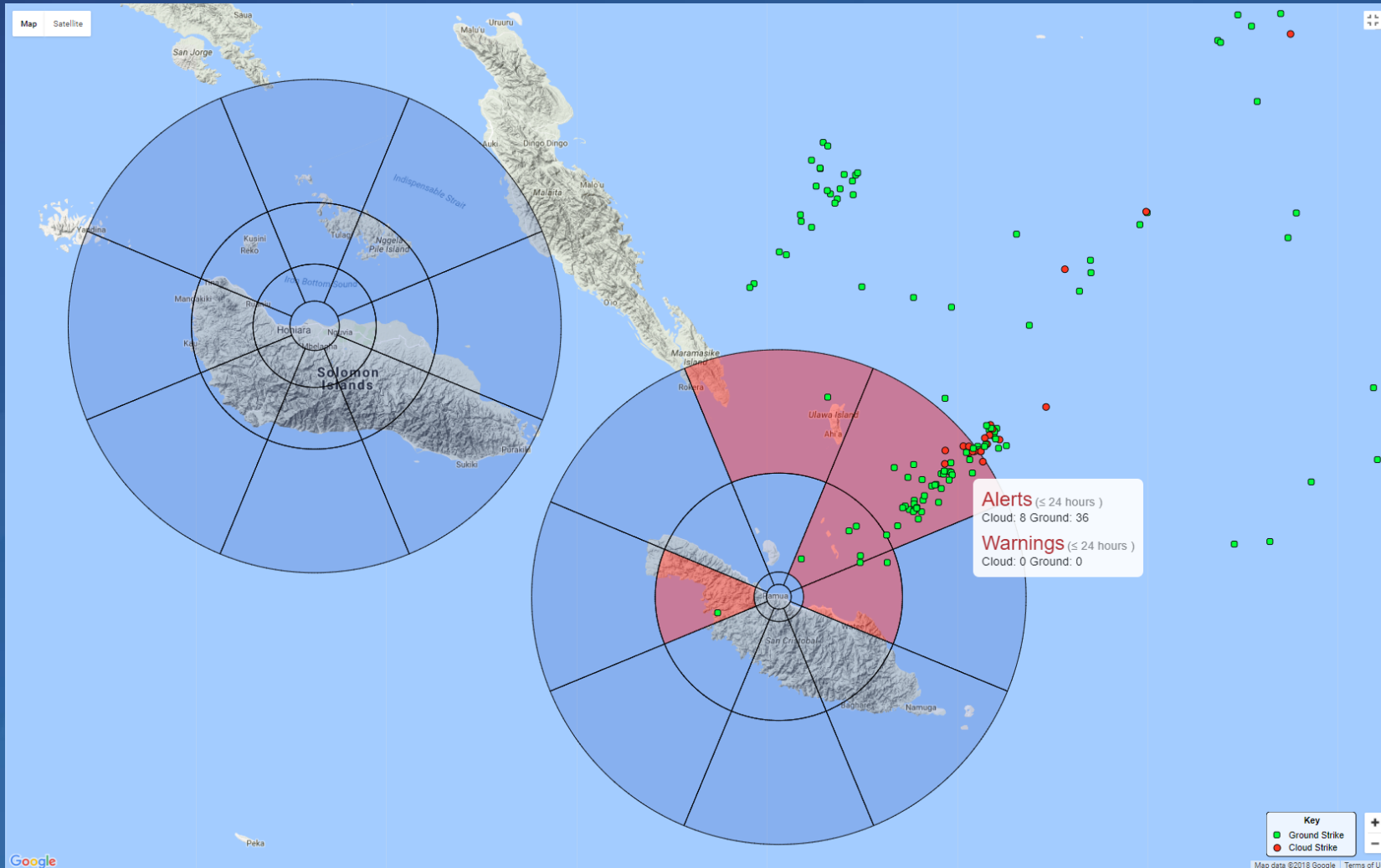
South Pacific Lightning Phase 3 (modelled DE@25kA)



South Pacific Lightning Phase 3 (modelled LA@25kA)



Lightning Proximity Rings



Alerts (≤ 24 hours)

Cloud: 8 Ground: 36

Warnings (≤ 24 hours)

Cloud: 0 Ground: 0

2018-07-21 01:01:55 UTC

51 minutes ago

-93.8

CLOUD TO
GROUND
Type

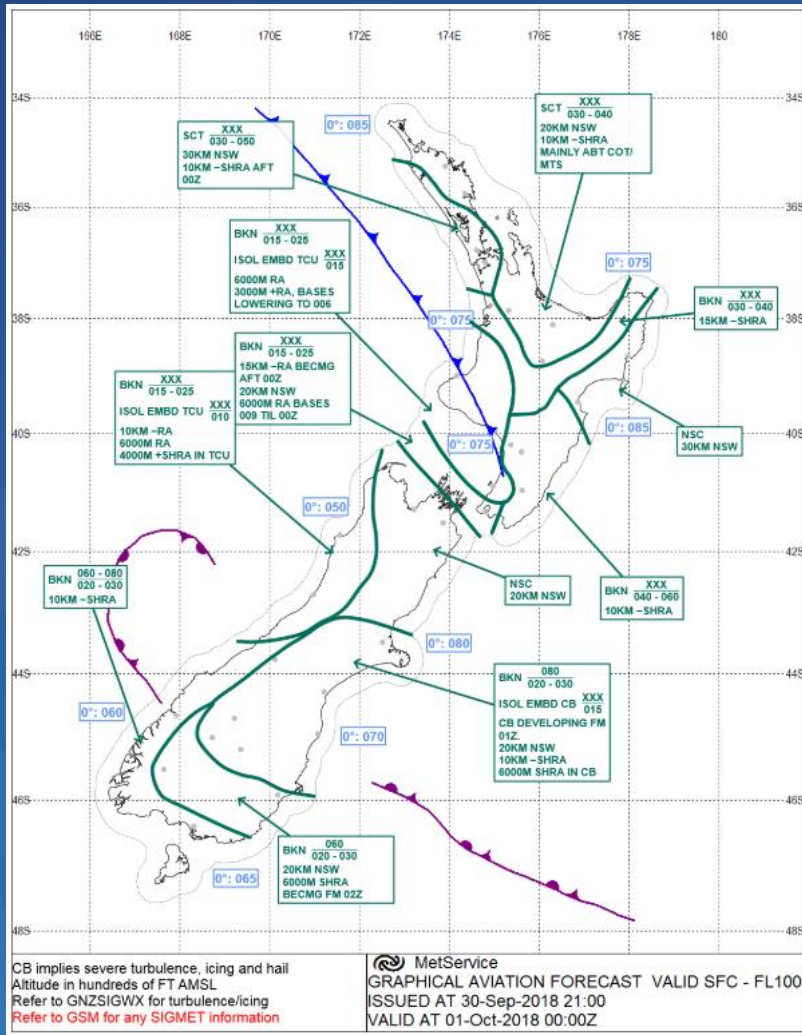
Kiloamperes(kA)

-8.8275,
161.8833

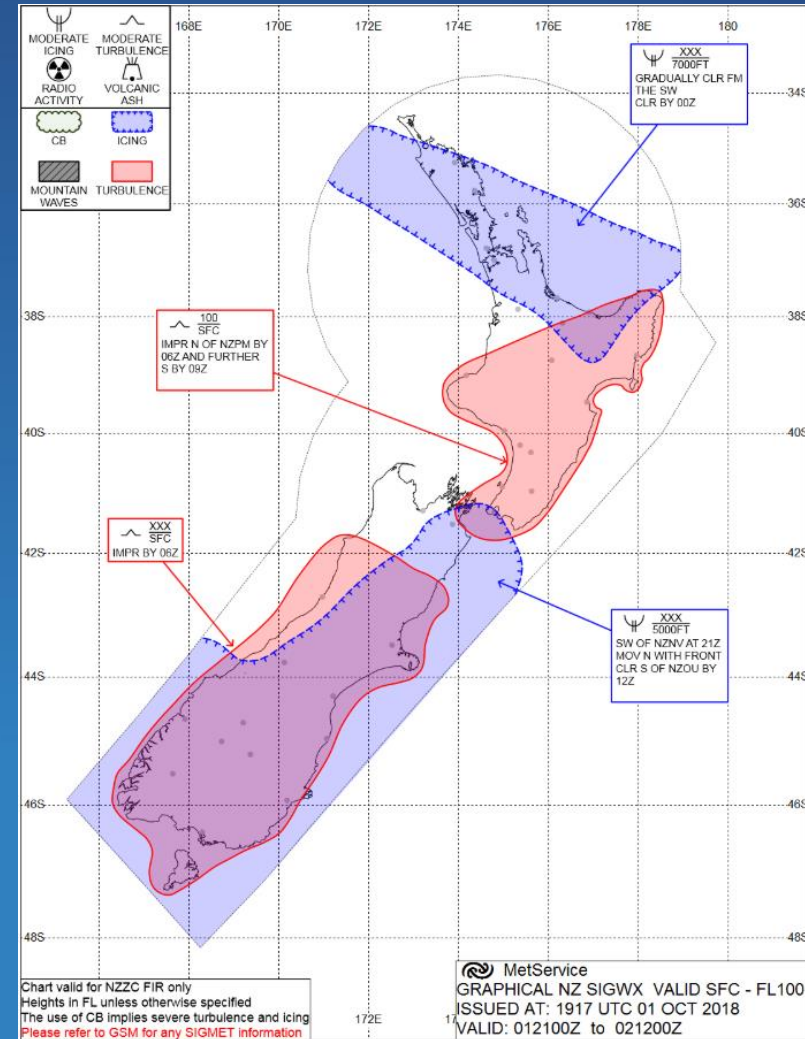
Lat/Long



Graphical Products



GRAFO
R



SIGWX



Embedded MET – Rocket Lab





MetService Update – Products and Services

CAA MET Symposium

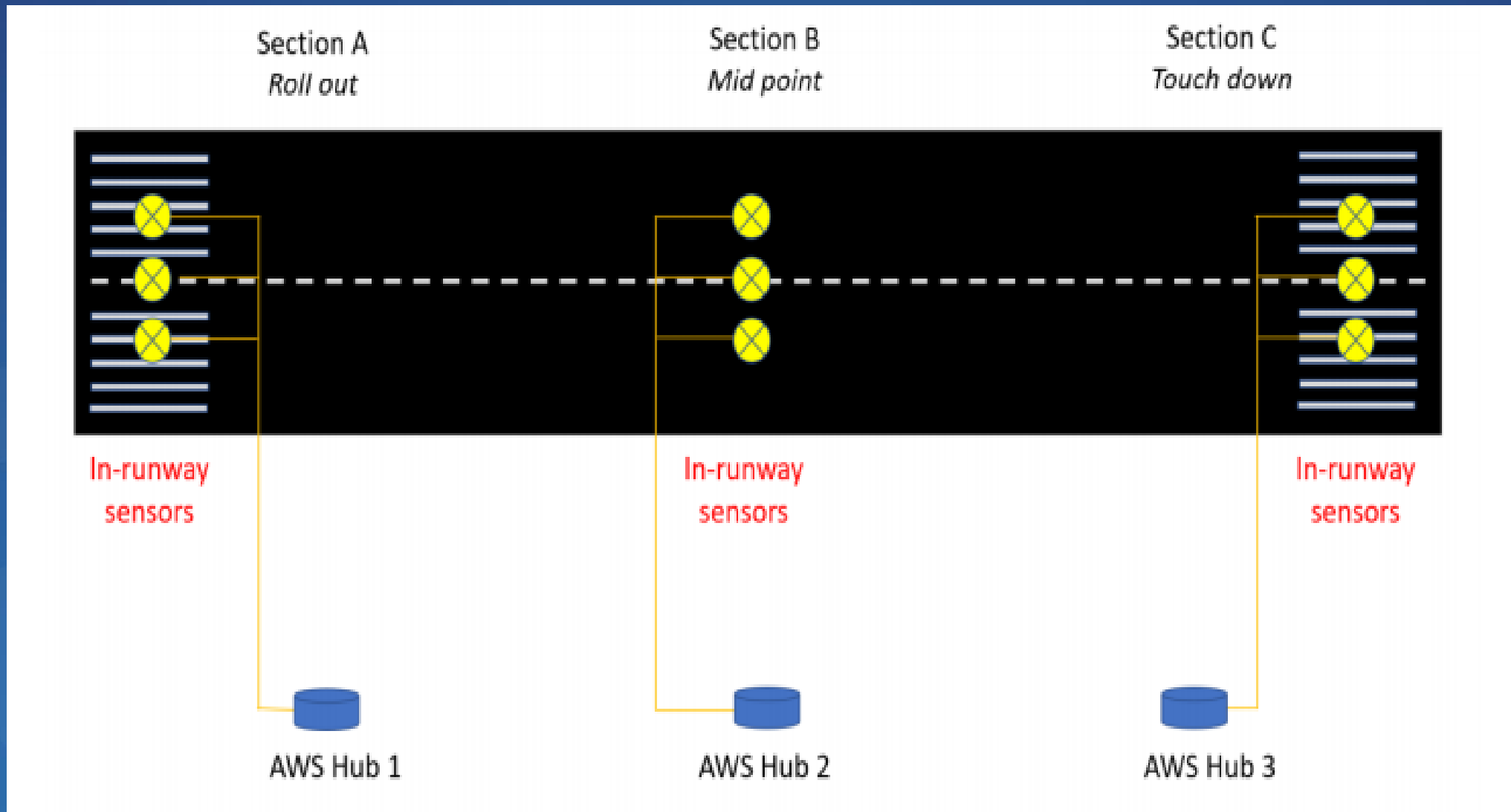
Simon Leyland

Service Delivery Manager, New Zealand

October 2018



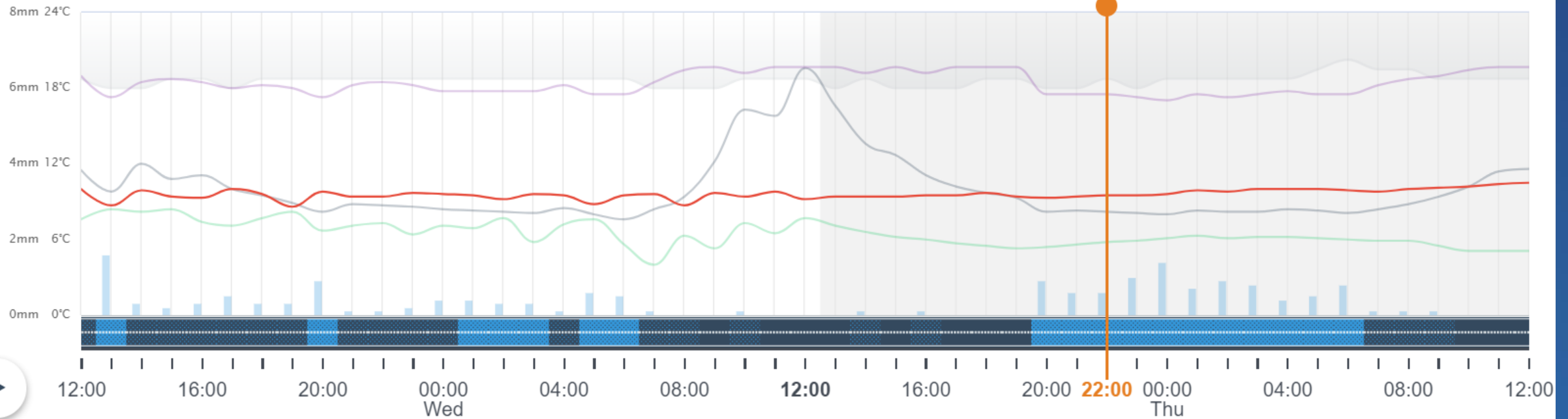
Wellington Airport Runway Condition Observations & Forecasting



Wellington Airport Runway Condition Observations & Forecasting

Wellington Airport (NZWN) 10:00

— Road Temperature: 16.3 °C — Air Temperature: 9.4 °C — Dew Point: 7.3 °C ● Rain Last Hour: 0.1 mm ● Snow LWE Last Hour: 0 mm — Friction: 0.8
● Cloud Cover: 87.5 %



Wellington Airport Runway Condition Observations & Forecasting



NZWN 07181607 16 6/6/5 100/100/100 NR/NR/02 DRY/DRY/WET



Application Programming Interface (API)

Available Products

- TAF
- METAR
- SIGMET (Text & Graphical)
- SIGWX Charts
- VAA
- VAG
- WAFS Data
- Satellite Imagery
- Cloud Top Satellite Imagery
- GRAFOR

Next Development Phase

- TC Advisory & Potential
- Aviation Area Winds
- Radar
- GIS Chart Format
- ???





Thank you 