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# An Introduction to the Canadian Meteorological Aviation Centre

**Meteorological Service of  
Canada**

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# Contents

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- History of the CMAC
- Current structure of CMAC-W
- Who we are
- Suite of products
- Tools
- Meteorological Watch Office responsibilities



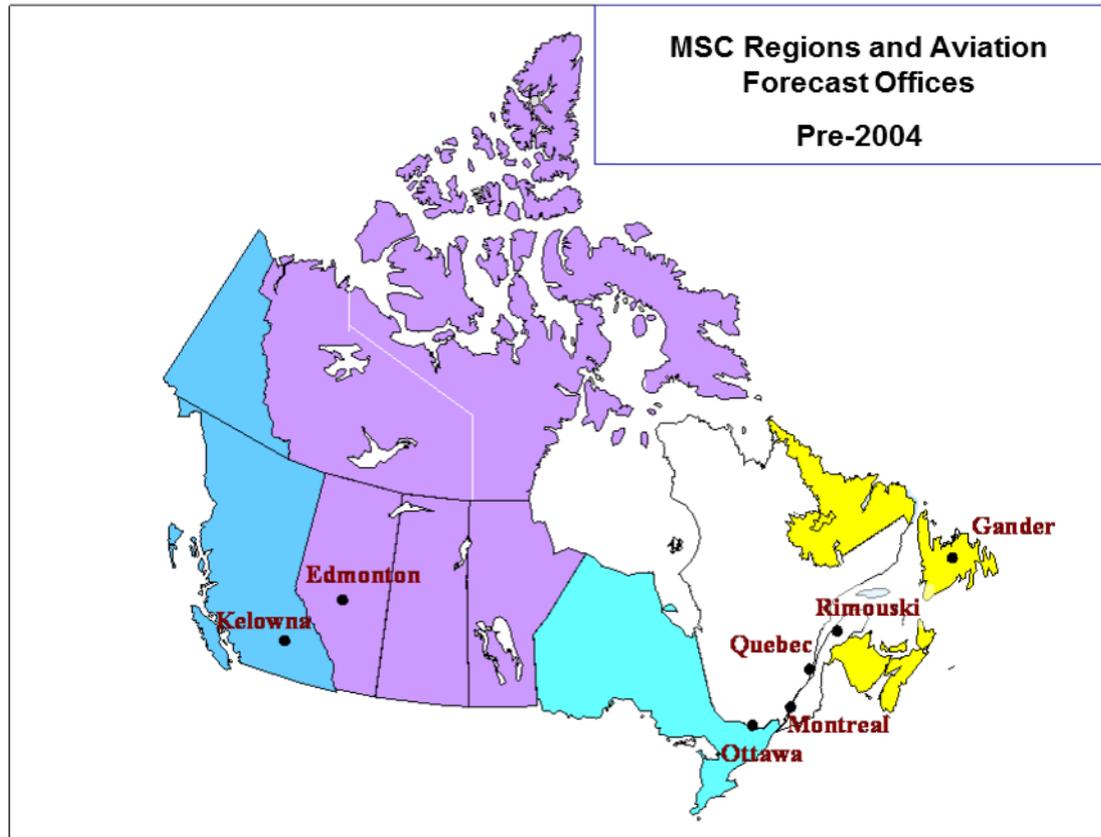
# History of the CMAAC

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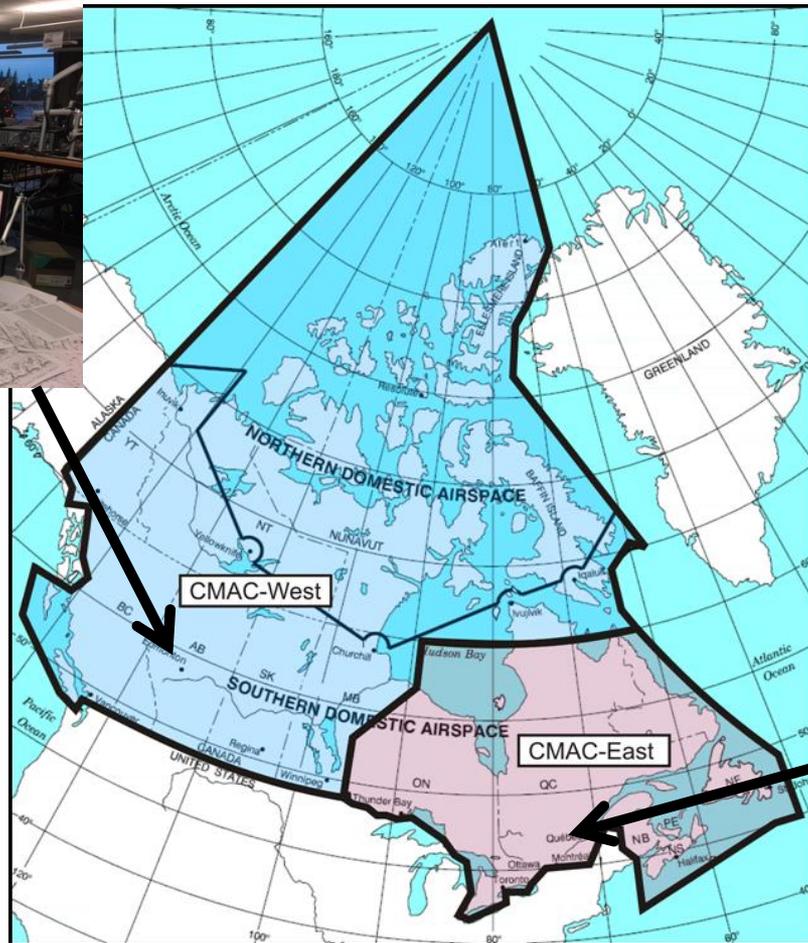
- The Meteorological Service of Canada (MSC) is the branch of Environment and Climate Change Canada responsible for atmospheric science and monitoring, and weather forecasting services.
- MSC has been contracted by NAV CANADA to provide aviation weather services in Canada.
- Canadian Meteorological Aviation Centre (CMAAC) is the name given to MSC's national aviation weather services operation.



# Aviation Weather Services – Pre 2004



# The CMAC approach... since 2004



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# Benefits of the CMAC Approach

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- Meteorologists dedicated to aviation weather
  - techniques/training with aviation focus
  - aviation-related research
  - more knowledgeable with respect to ANS policies/procedures
  - clear priorities during significant weather events
- promotes national consistency in products
- contingency operations
- more transparent in our accountability to NAV CANADA



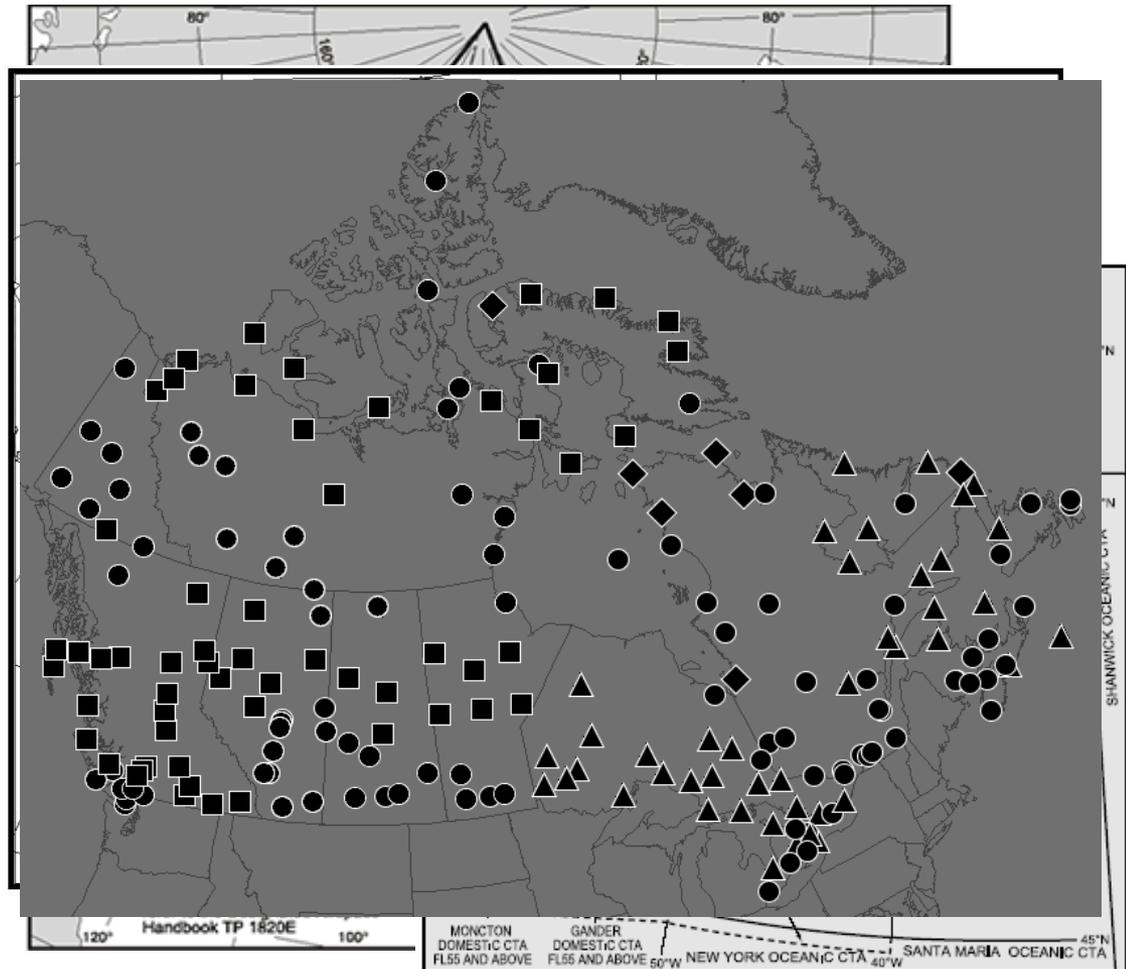
# National CMAC Operations

- Provides aviation weather forecast services for Canadian Domestic Airspace
- SIGMET services for Gander Oceanic FIR

## Over CDA

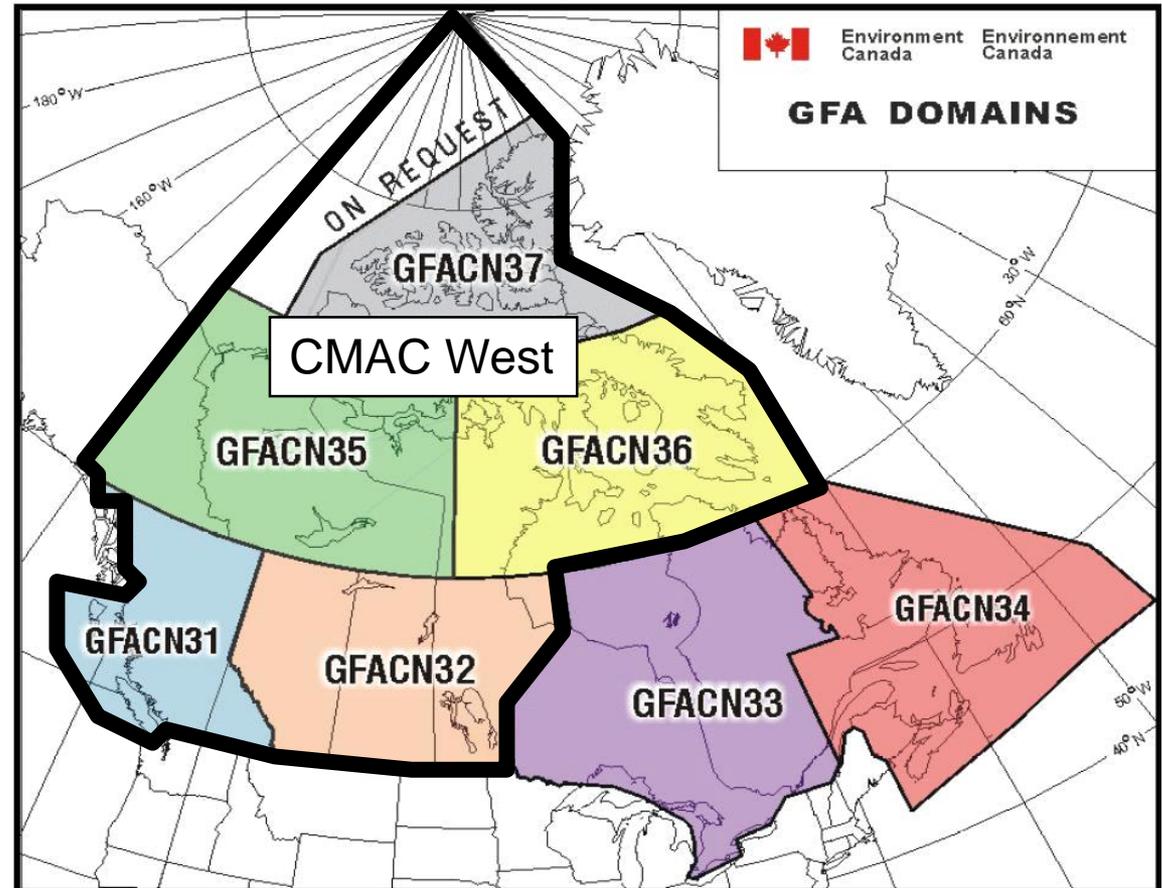
- Seven GFA regions
- TAFs prepared for 190 aerodromes (combination of T+0, T+1, and T+2 issues times)

CMAC employs approximately 85 full-time meteorologists



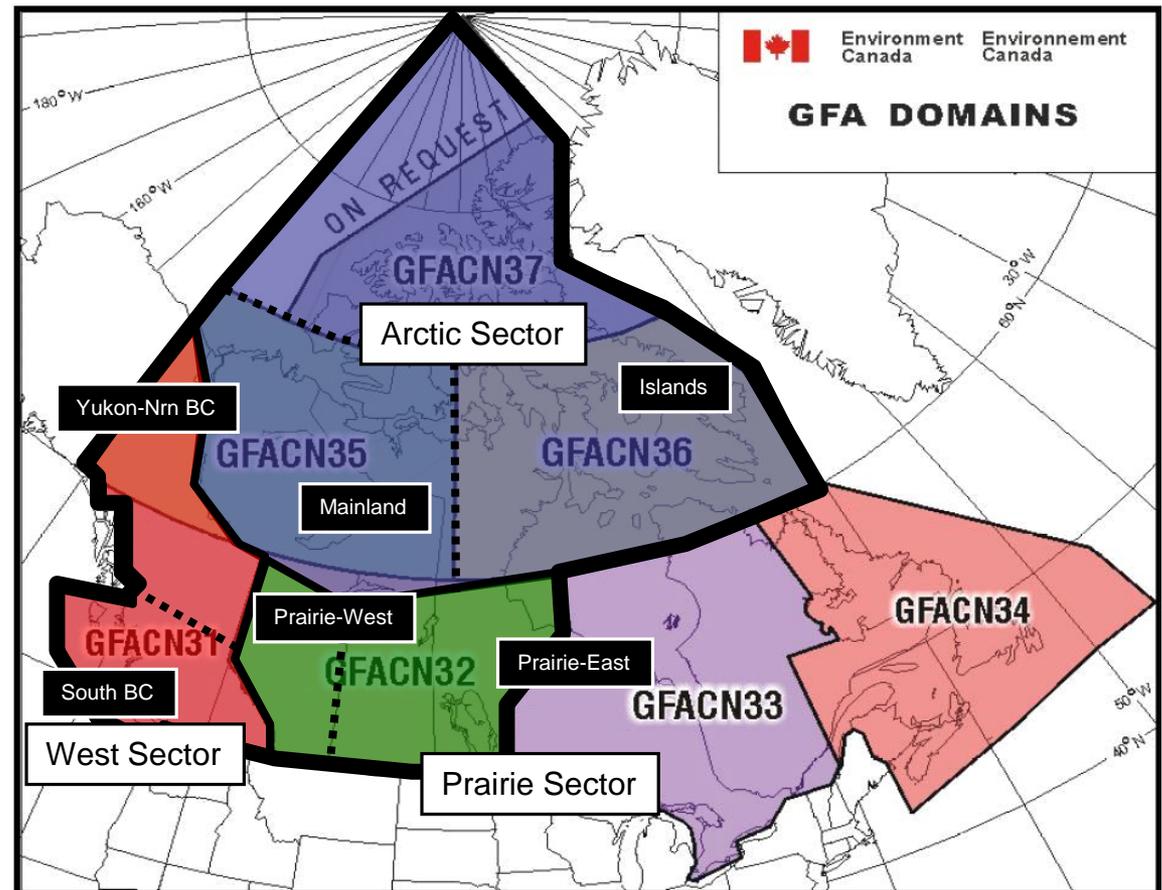
# CMAC-West (Edmonton) Operations

- Five GFA regions
- 110 TAFs
- 6 full-time operational desks
- Additional daytime WC-LGF desk
- additional support desk for busy days/seasons



# CMAC-West Operations

- 3 Operational Sectors
- 2 Operational Desks/Sector
  - West Sector
  - Arctic Sector
  - Prairie Sector
- One operational meteorologist doubles as overall Shift Supervisor.
- Additional support desk for busy days/seasons as required.
- Staffing contingent of 45 meteorologists



# Who we are

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- All operational staff certified as Aeronautical Meteorological Forecasters according to ICAO/WMO standards of competencies
- All staff began with ECCC through the Meteorologist Operational Training Program, starting with a classroom internship and progressing through operational double-banking



# Forecast Services

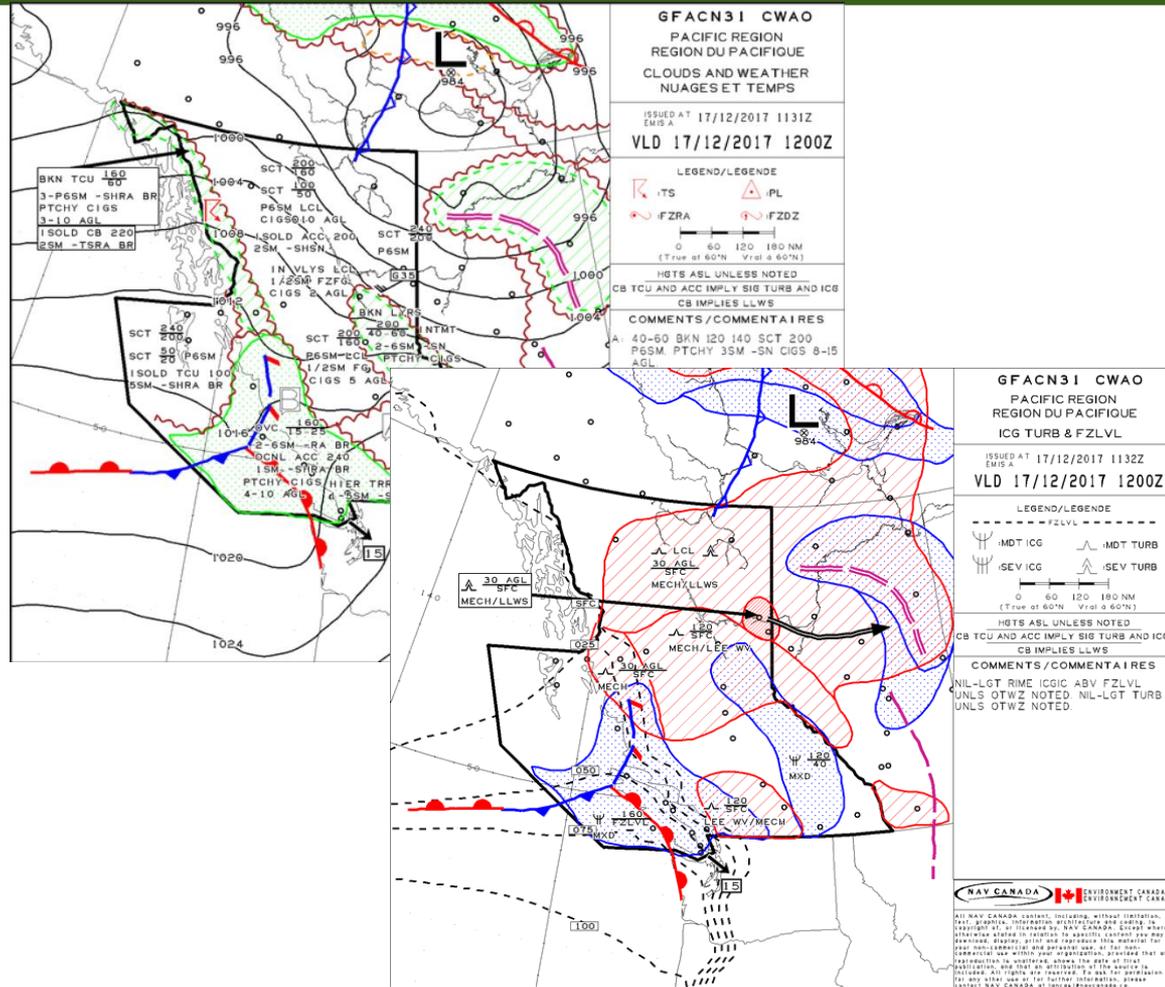
- Our client is [NAV CANADA](#), the owner and operator of Canada's civil air navigation service
- Through them, we provide forecast service to users operating on many different scales with many different requirements

The screenshot shows the NAV CANADA Aviation Weather Web Site. The header includes the logo and navigation links like 'Login', 'Search', 'Feedback', 'Disclaimer', 'Français', 'Tips', and 'FAQ'. A secondary navigation bar contains links for 'What's New', 'Weather and NOTAM', 'File a Flight Plan', 'Publications', 'Update Profile', and 'FIC Tel.'. Below this is a blue bar with 'My Wx Data/Wx Mail | Route Data | Regional Area Data | Local Data | Forecasts and Observations'. A yellow banner displays 'AWWS News : There is 1 active notice. Last update: 2017/12/13'. The main content area is titled 'Forecasts and Observations' and includes a link for 'Web Site Navigation - Executive Summary'. It is organized into three sections: 'Alphanumeric Data' with buttons for AIRMET/SIGMET, Volcanic Ash, UPR WND5 (FDs), PIREP, METAR/TAF, Live RVR, NOTAM, VFR Route Forecast (Avbl Mar-Oct), AIC, and AIP Supplements; 'Graphical Weather Products' with buttons for Flight COND, Wx Cams, UPR WND5 ≤ FL180, UPR WND5 FL240 to FL450, SIGWX MID LVL, SIGWX HI LVL, SIGWX Atlantic, SFC ANALYSIS, UPR AIR ANALYSIS, CDN TURB FCST, N ATLC TURB Eastbound, N ATLC TURB Westbound, Graphical FA, Local Graphic Fcst West Coast, Radar, Satellite, ASEP, and COMOX (DND) Charts; and 'Additional Links' with buttons for Airport Diagrams, U.S. Wx (ADDS), U.S. Wx Cams, Sunrise / Sunset (NRC), and NOTICES. A disclaimer at the bottom states: 'NAV CANADA is not responsible for the ADDS, U.S. Wx Cams & NRC websites.'



# Forecast Products - GFA

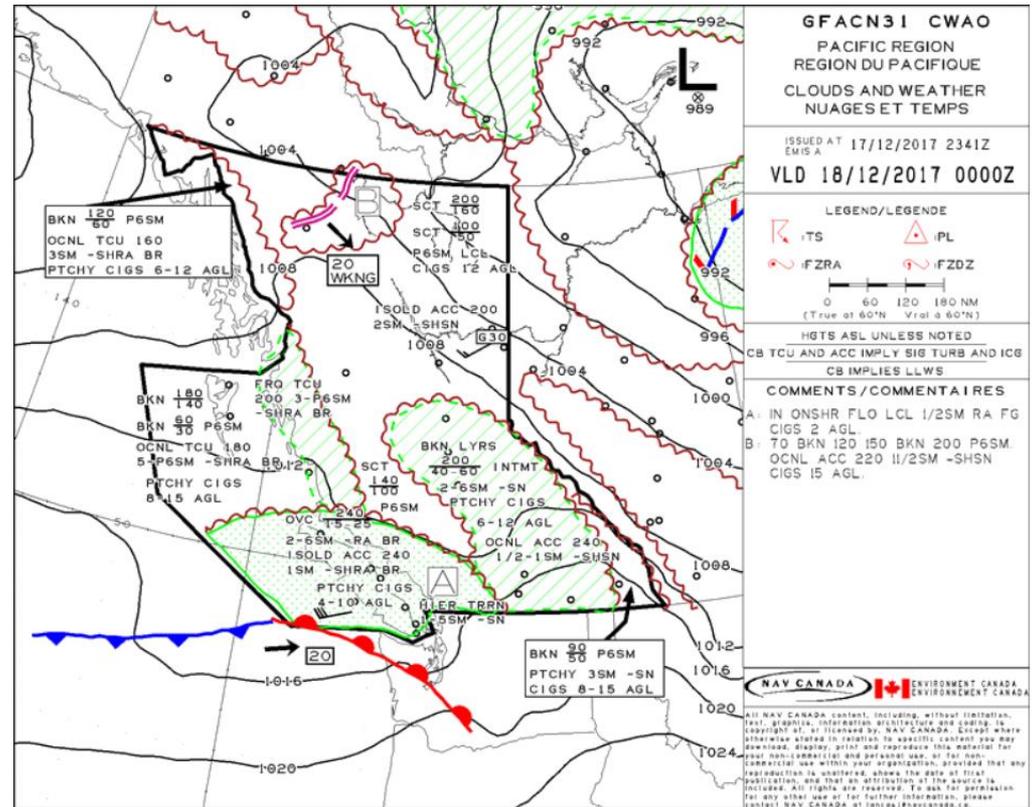
- Graphical depiction of weather/flight conditions below FL240
- Issued 4x/day
- Clouds/Wx, Icing/Turbulence
- Three six hour time steps



# Forecast Products - GFA

## The *Clouds & Weather* chart depicts:

- Relevant synoptic features (highs, lows, fronts, etc.)
- Base and top of cloud layers & surface-based phenomena
- Visibility
- Weather
- IFR Outlook for the period +12 to +24 hours

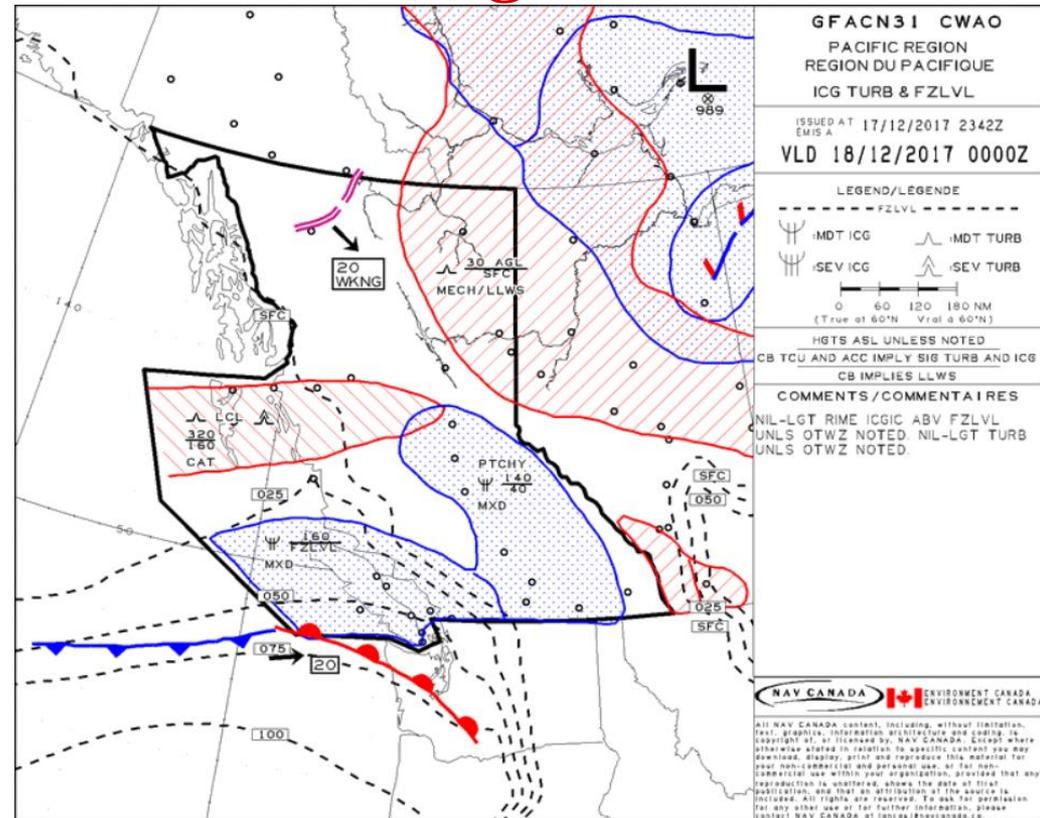


# Forecast Products - GFA

## The *Icing, Turbulence & Freezing Level* chart depicts:

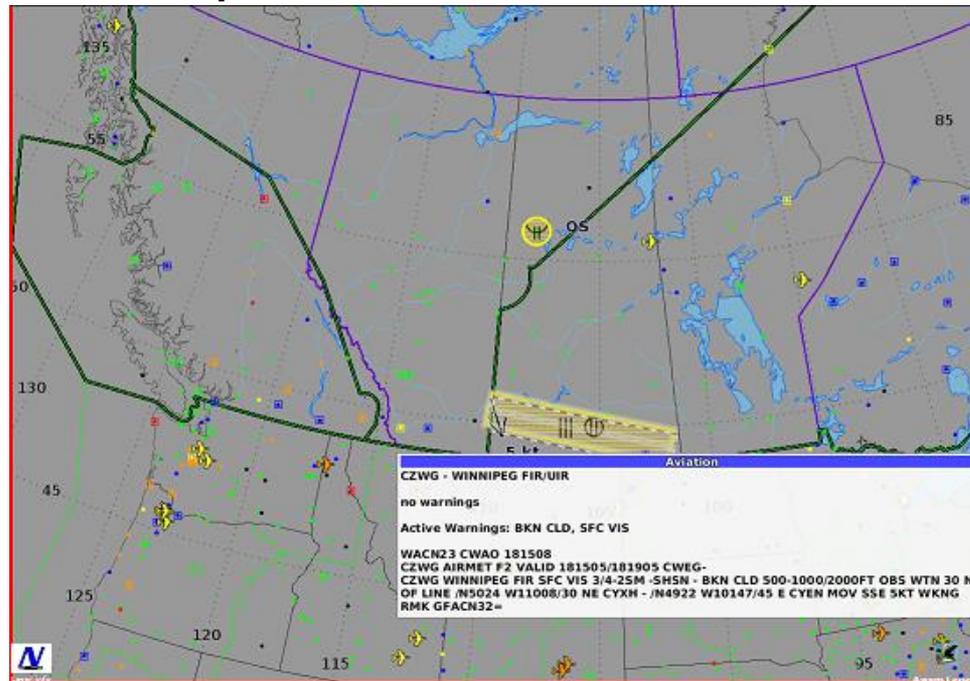
chart depicts:

- Areas of moderate or severe icing
- Areas of moderate or severe turbulence
- Freezing level altitude
- Relevant synoptic features (highs, lows, fronts, etc.)



# Forecast Products - AIRMETs

- Text product issued to amend the GFA in situations of unforecast hazards to aviation
- Issued on an as required basis



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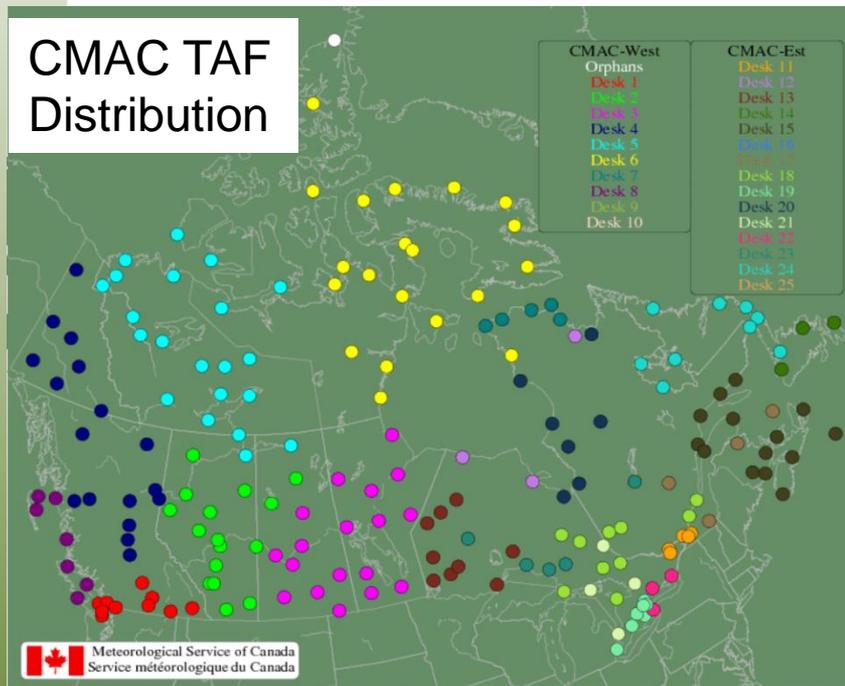
# Forecast Products - SIGMETs

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- Text product issued to amend/update the GFA in cases of significant aviation hazards
- Issued on an as required basis, valid for 4hrs, usually updated every 3hrs
- SIGMETs are similar to AIRMETs in that they update/supersede the issued GFA
- SIGMETs differ from AIRMETs in that they will be issued regardless of whether or not the GFA already forecasts the phenomena



# Forecast Products - TAFs



- 190 Aerodrome sites have TAF service supplied by CMAC
- Issue times and valid periods based on NAV CANADA specifications
- Forecast of the weather conditions to affect the 5NM radius of the aerodrome
- TAF workload at CMAC-W corresponds to GFA regions, varying between 10 to 21 TAFs/forecaster

# Forecast Products - TAFs

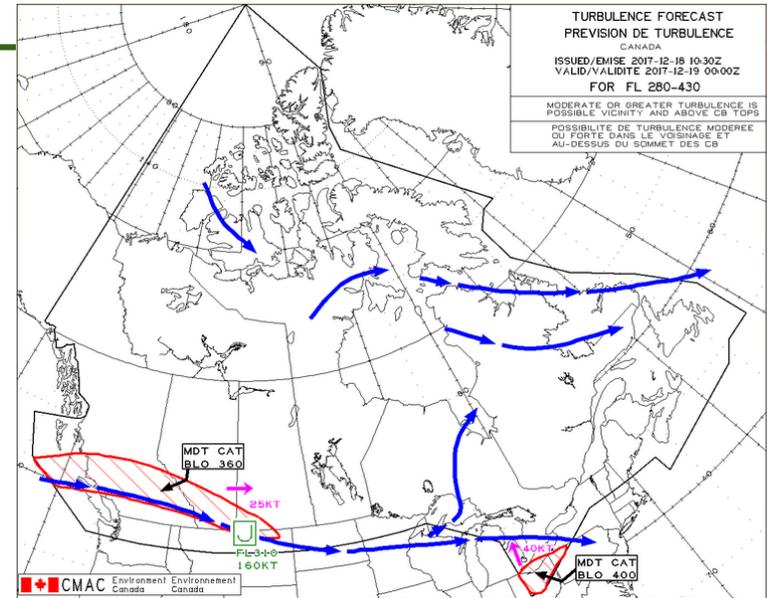
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- Specific amendment criteria and 20min response requirement, forecaster discretion notwithstanding
- Amendment criteria includes:
  - unforecast hazardous phenomenon (TS, FZRA, SG, PL, FZDZ, etc).
  - unforecast flight category (IFR Approach, Alternate, IFR, MVFR, VFR)
  - wind direction out by 50 degrees or more, with winds (observed or forecast) over 14 knots
  - Wind speed out by half or double with winds (forecast or observed) greater than 14 knots
  - Wind speed out by 20 knots, regardless of speed



# Forecast Products – HLT

- The High Level Turbulence chart depicts significant weather between FL280 and FL430.
- Issued twice per day (11Z and 23Z) and valid at To+13 (00Z and 12Z).
- Includes high level air flow (greater than 50 knots) and jet maximums (greater than 75 knots).
- Associated CAT levels and tendencies (motion and intensification) are included.
- CB activity if tops above FL280.



The content of the HLT Chart is largely NWP driven due to its associated valid time and flight levels.

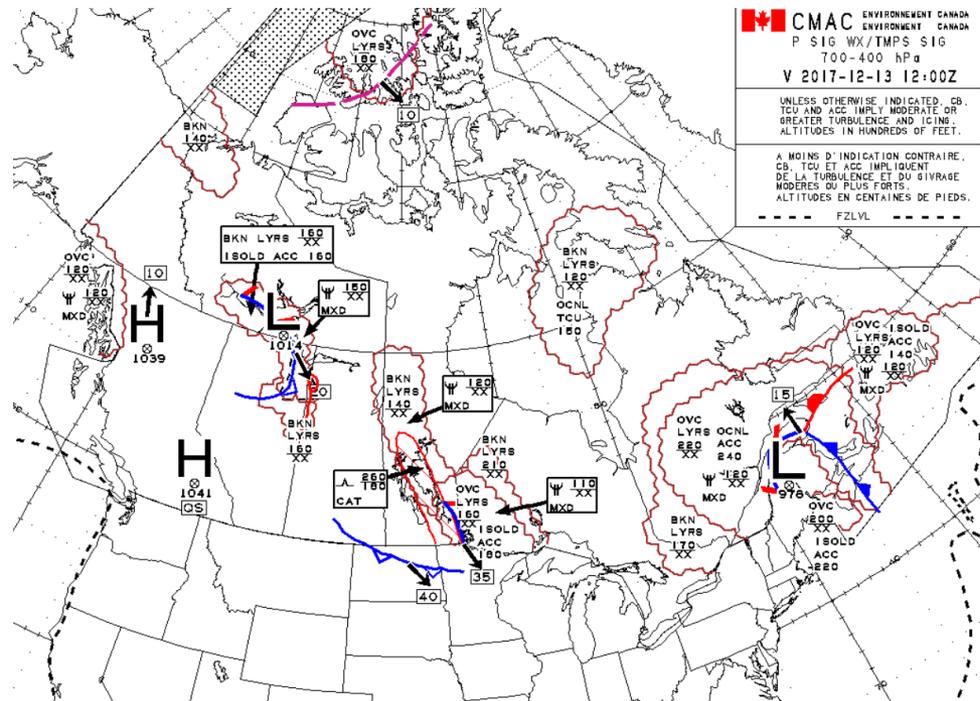
NWP model runs used to derive the content are actually 11 hours old before the product is generated, in essence the depiction is then a T+24 hour model depiction of these levels.



# Forecast Products – Canada SIGWX Chart

- The Canada SIGWX Chart depicts significant weather above FL100.
- Issued four times per day (01, 07, 13, and 19Z) and valid at To+11 (12, 18, 24, and 06Z).

The content of the Canada SIGWX Chart is largely driven by the GFA depictions that are associated with the given valid time.

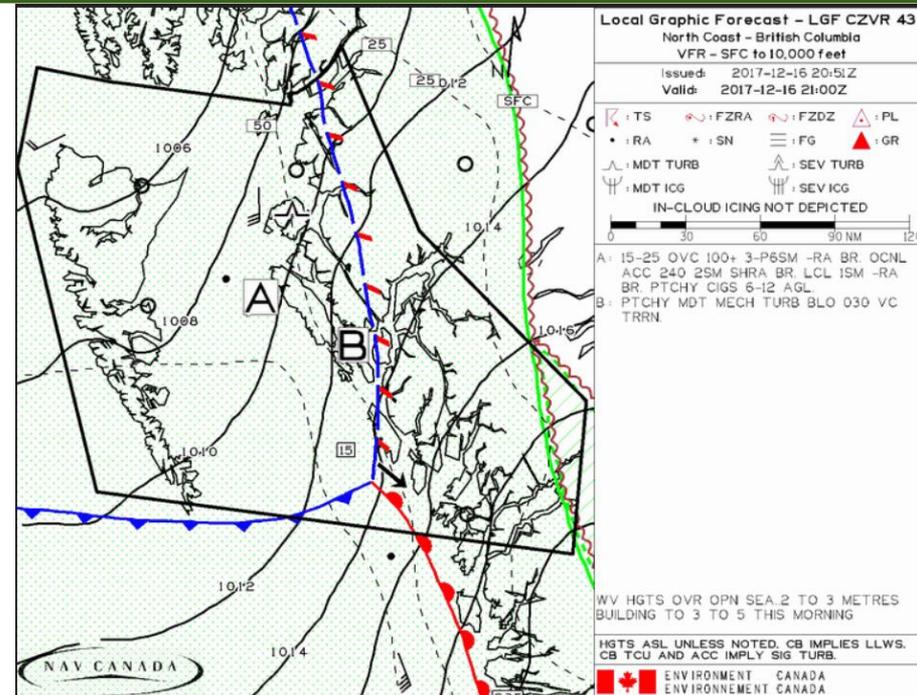


# Forecast Products – WC-LGF

- The West Coast – Local Graphic Forecast is a small scale, high spatial and temporal resolution, GFA-type product produced for VFR operators over the south BC coast.
- Due to the high volume of traffic along the BC coast, the aviation industry required greater detail over the region



© Marcel Siegenthaler



# Forecast Products - TAFPlus

- Text-based product to communicate synoptic conditions, forecaster confidence, and an outlook beyond the period of the TAF for 4 HUB airports in Canada (YVR, YYC, YYZ, YUL)

FXCN38 CWEG 181747

TAF FORECASTER NOTES ISSUED BY THE CANADIAN AVIATION METEOROLOGICAL CENTRE AT 1815 UTC MONDAY 18 DECEMBER 2017.

CYVR - VANCOUVER INTL.

VFR CONDITIONS ARE EXPECTED TODAY IN BETWEEN SYSTEMS. WESTERLIES SHOULD EASE OFF LATER IN THE AFTERNOON AND EVENTUALLY SWING AROUND TO THE EAST IN RESPONSE TO THE NEXT SYSTEM.

BY LATE EVENING, THE NEXT FRONTAL WAVE SHOULD BRING STEADY PRECIPITATION TO THE TERMINAL, CONTINUING FOR THE REST OF THE TAF PERIOD. IFR CEILINGS BECOME MORE LIKELY ON TUESDAY, NEAR THE HEAD OF THE WAVE. THE MODELS ARE FORECASTING RAIN FOR THE TERMINAL, BUT FREEZING LEVELS WILL BE FAIRLY LOW WITH THIS SYSTEM. CURRENT FORECASTS HAVE THE FREEZING LEVELS STARTING AT ABOUT 2500 FEET THIS EVENING, LOWERING TO AROUND 1500 FEET BY THE END OF THE TAF. WET SNOW IS NOT OUT OF THE QUESTION FOR YVR, BUT ANY SNOW THAT DOES OCCUR SHOULD NOT ACCUMULATE, GIVEN TEMPERATURES JUST ABOVE FREEZING.

OUTLOOK: A RIDGE BUILDS IN ON WEDNESDAY AND SHOULD BRING A FAIR-WEATHER DAY WITH IT.

WEATHER VARIABILITY: LO.

FORECASTER CONFIDENCE NEXT 3 HOURS: HI.

FORECASTER CONFIDENCE NEXT 6 HOURS: HI.

END/INTIHAR/CMAC-W

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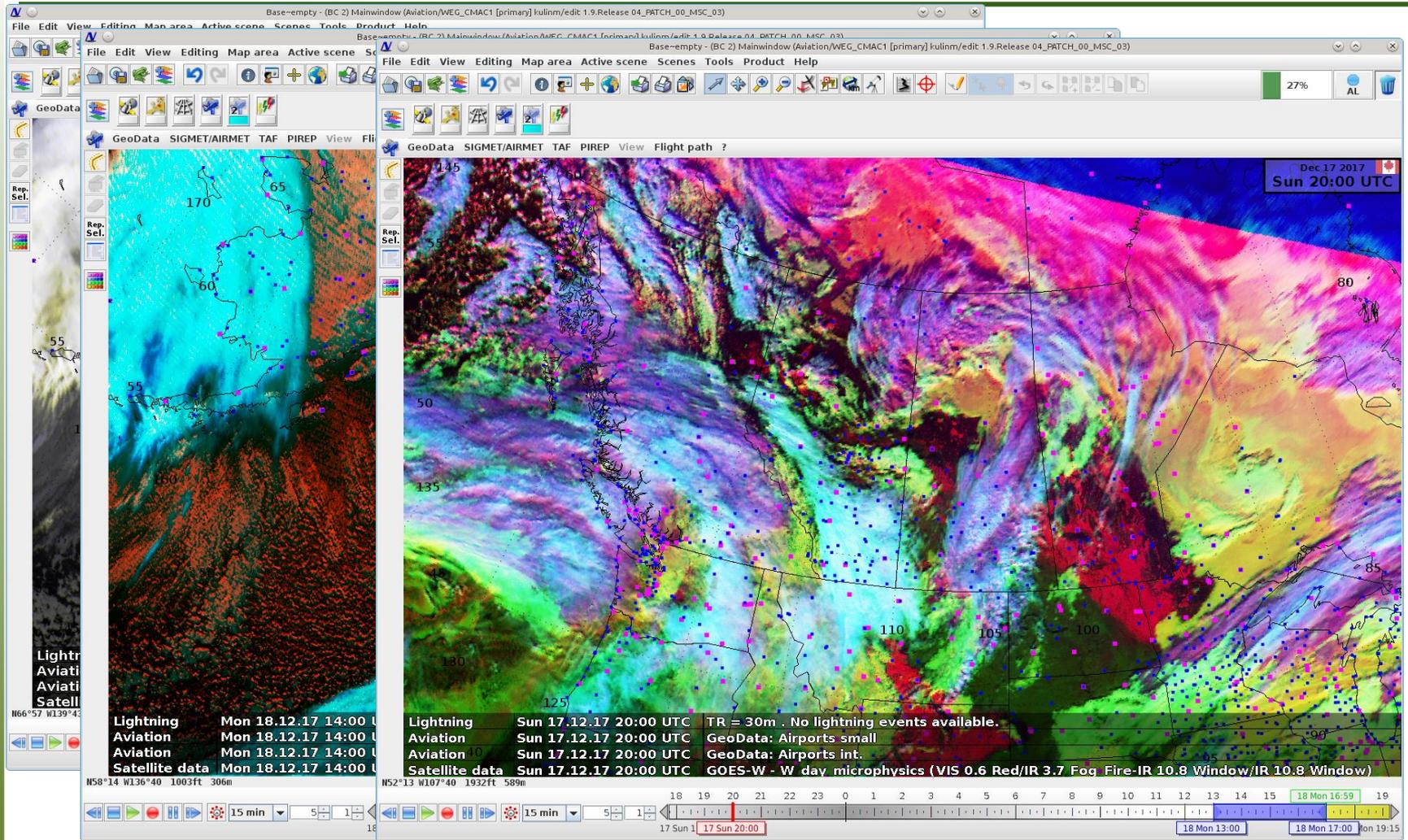
# Tools - NINJO

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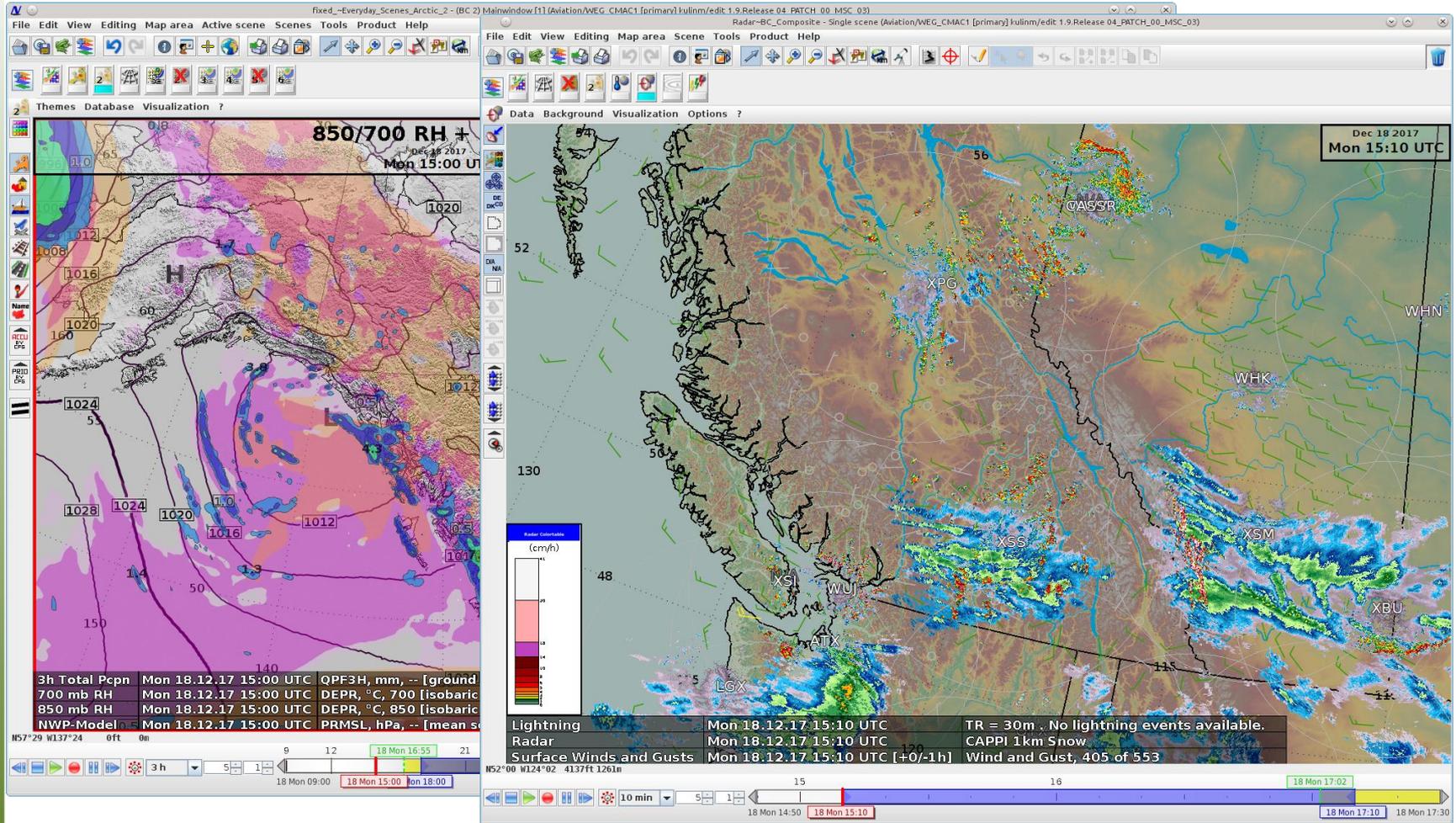
- Primary method of analyzing observations, model data, RADAR, and Satellite imagery is through the NINJO software
- NINJO also used by:
  - National Meteorological Service of Germany
  - MeteoSwiss
  - Danish Meteorological Institute
- Model data available to us in NINJO is limited to the Canadian model suite, run out of CMC



# Tools - NINJO



# Tools - NINJO



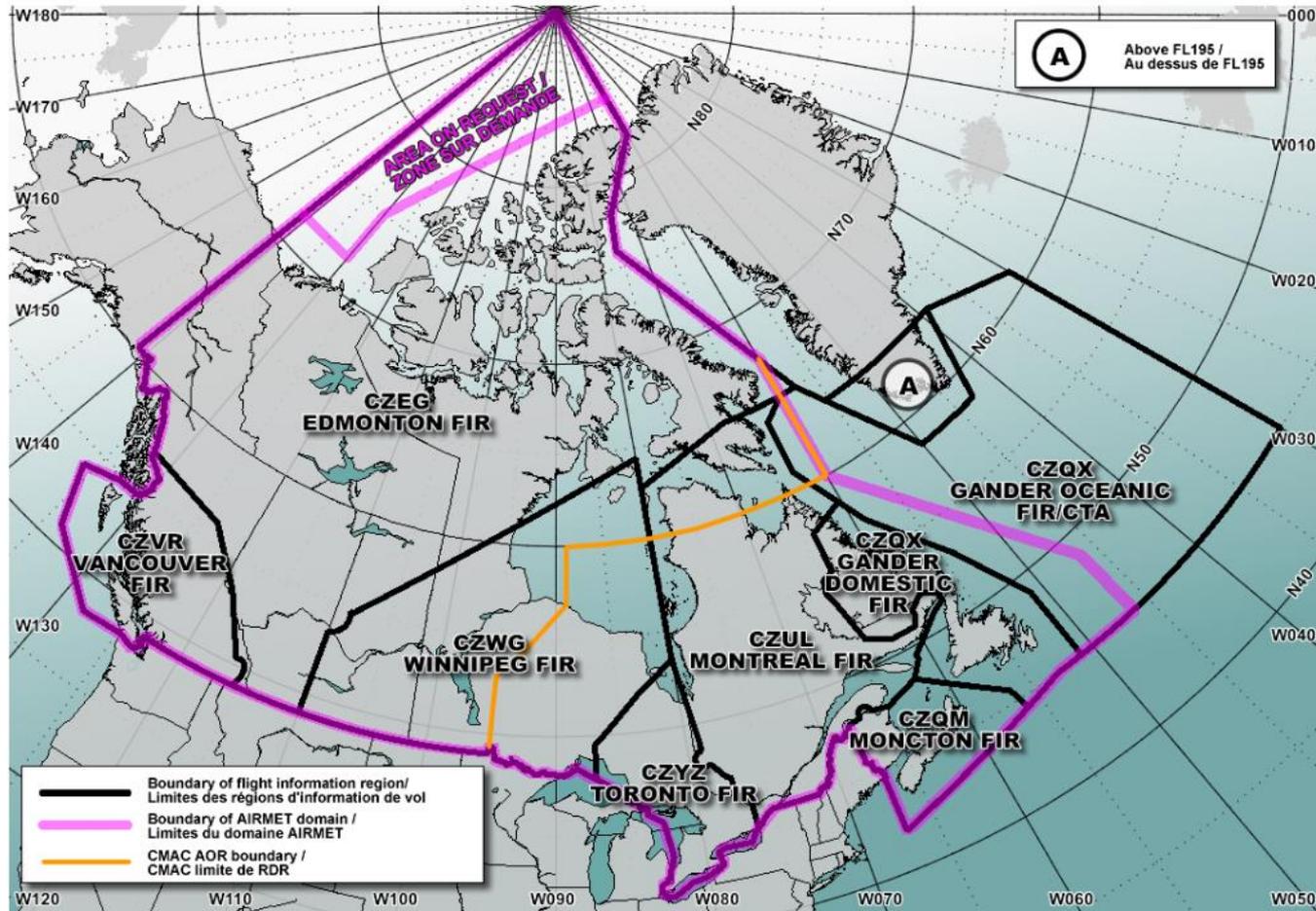
# Meteorological Watch Office

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- VAAC-Montreal is located in Dorval, QC
- CMAC-W is the associated MWO, responsible for issuing Volcanic Ash SIGMETs over all Canadian airspace based on the data provided to us by VAAC-Montreal
- In the event of VA entering Canadian airspace, we are contacted by the VAAC via phone and email
- Most (all) events of VA experienced in Canada thus far have entered our region from elsewhere, usually Kamchatka, Alaska, or Iceland



# Area of Responsibility: Volcanic Ash



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# Thanks!

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# Questions?

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