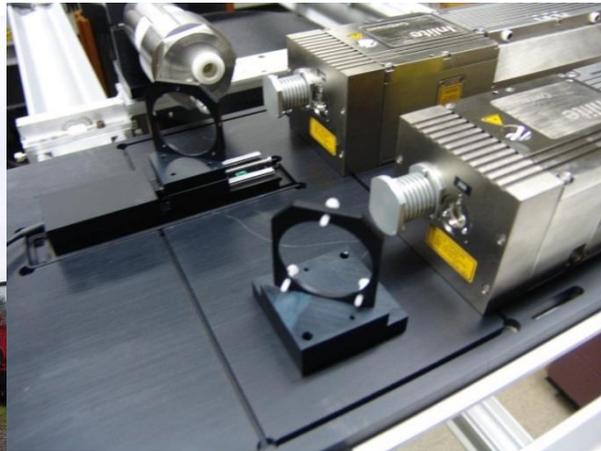




Environment and Climate Change Canada AMOLITE Station Report



Kevin Strawbridge
Michael Travis
Bernard Firanski

Autonomous Mobile Ozone Lidar Instrument for Tropospheric Experiments (AMOLITE)



Named after gemstone AMMOLITE that is only found in Canada!



ECCE Autonomous Lidars

Canada



Gouvernement
du Canada

Government
of Canada

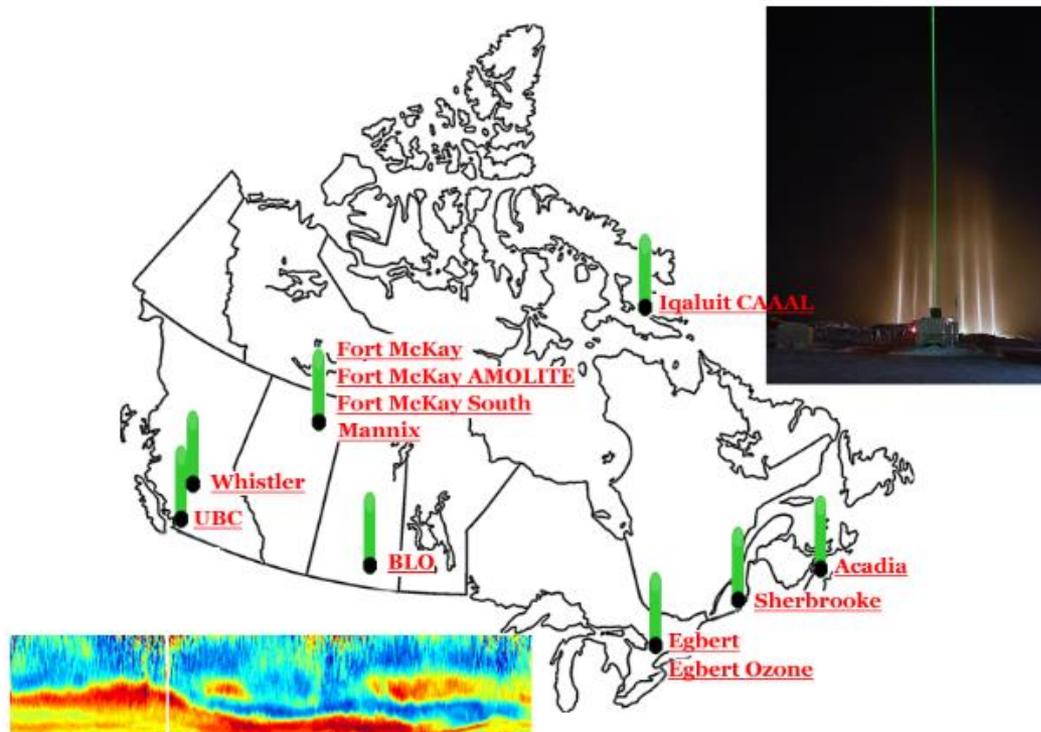
Environment and Climate Change Canada Autonomous Lidars

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[Lidar Basics](#)

[Contact](#)

Select a Lidar Site :



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

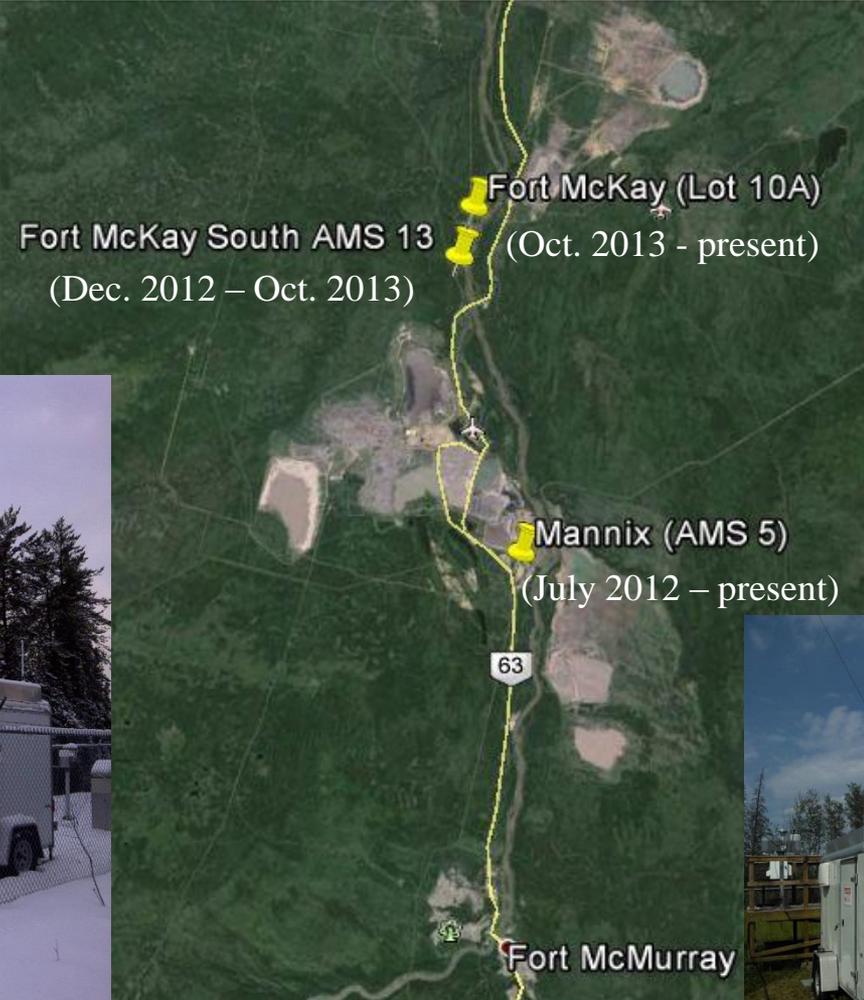
Canada

Deployment to the Oil Sands Region

- Coincident and long-term record for aircraft measurements
 - In-situ chemistry package
 - Winter campaign planned
- Coincident and long-term record for ground measurements
 - Ground-level ozone, NO_x etc
 - PANDORA, CIMEL sunphotometer
 - WIND RASS
- Satellite comparison/validation (eg. TROPOMI, TEMPO)
- Environment Canada GEM-MACH Model verification/validation



LIDAR Locations in the OS Region



Instrumentation at Fort McKay (Oski Otin) Site



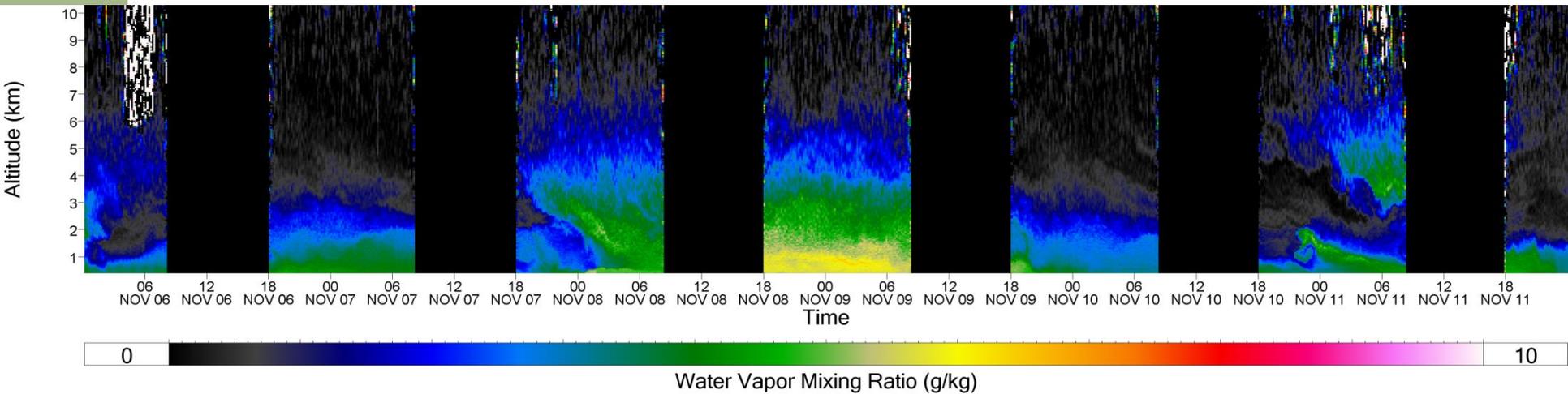
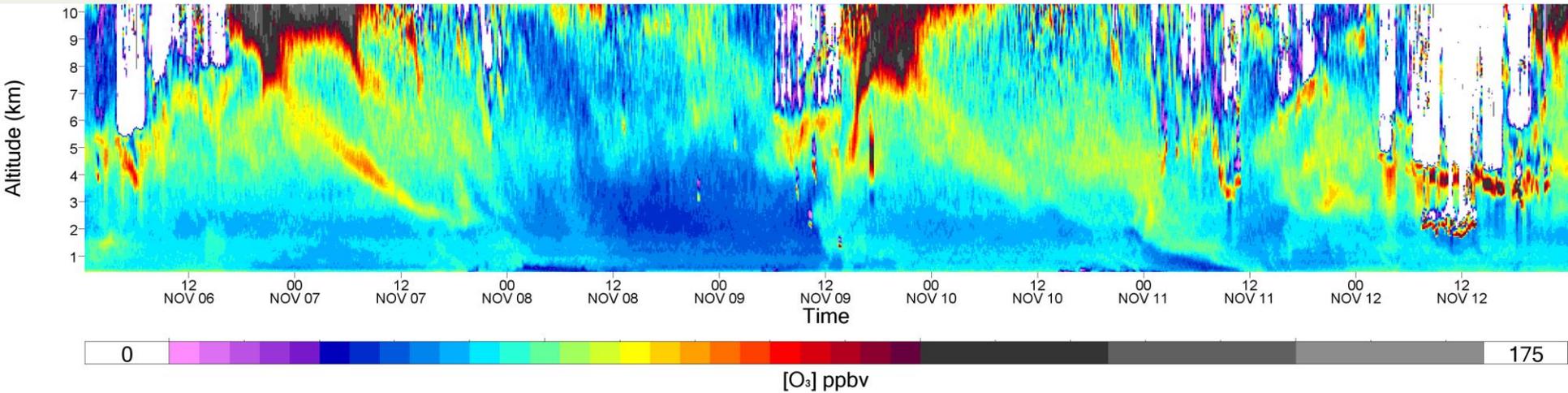
chemistry measurements from CAM1
courtesy of Jeff Brook (ECCC)

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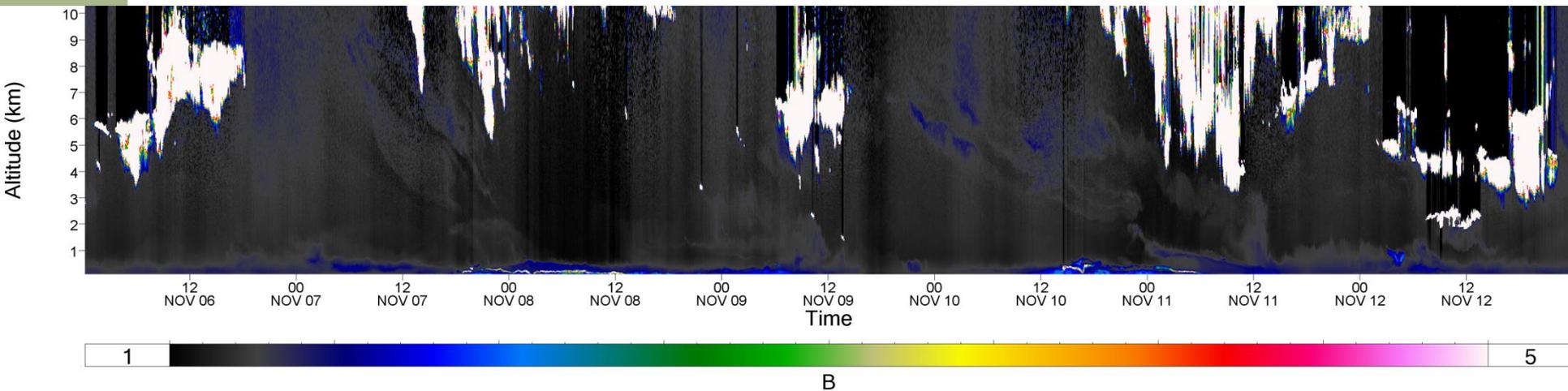
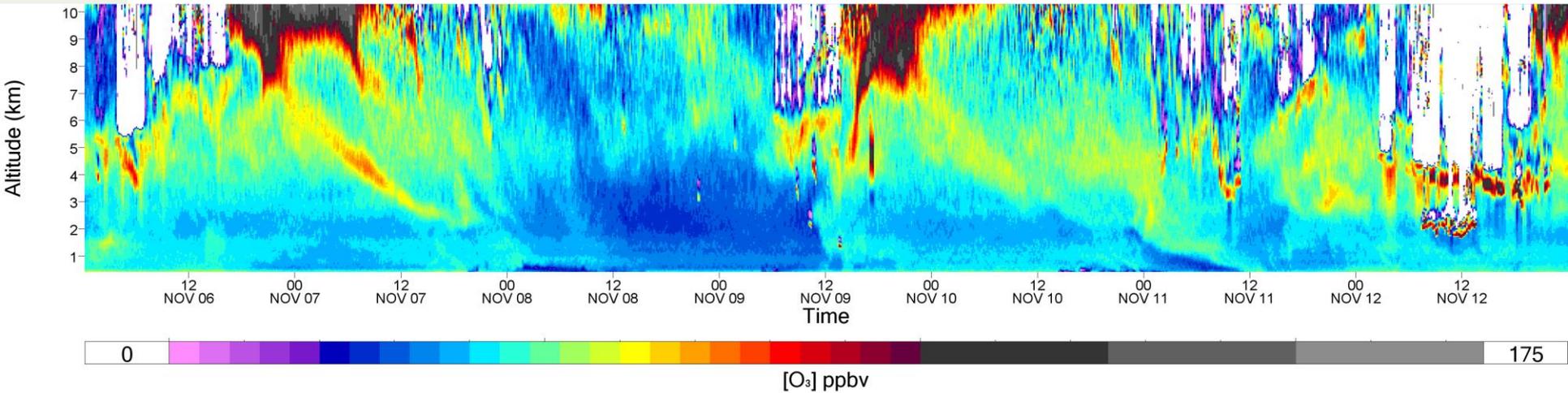
| Measurement(s) | Instrument |
|---|--|
| NO _x , O ₃ , SO ₂ , H ₂ S (ppb) | Airpointer with Thermo sensors for pollutants Trace level Thermo r |
| Temperature (C), pressure (mb), relative humidity (%), wind speed (m/s), wind direction (deg), precip rate/occurrence (mm/hr) and solar radiation (watts/m ²) | CAM-1 (Vaisala and Deka): LIDAR trailer (RM Young, Rotronix and Vaisala) Climatronics Met One |
| NO, NO ₂ and NO _y (ppb) | Thermo Model 42CTL with a Mo converter |
| CO (ppb) | Thermo Model 48CTL |
| Total Sulfur (TS) (ppb) | Thermo Model 43 TL with Thermal Converter (950C) at inlet |
| CO (ppb), CO ₂ , and CH ₄ (ppm) | Picarro (cavity Ring Down spectrometer) |
| Benzene, toluene, ethylbenzene xylenes | Syntech (GC/PID at AMS 01) |
| C ₂ -C ₉ Hydrocarbons (ppb) (every 30 min) | Syntech GC/PID |
| PM _{2.5} (µg/m ³) | 5030 Thermo SHARP |
| Black Carbon (B _{abs} in Mm ⁻¹) | Droplet Measurement Technologies –Photoacoustic Spectrometer |
| Particle surface bound polycyclic aromatic hydrocarbons (PAHs), semi-quantitative (ng/m ³) | EcoChem Photo-ionization detector |
| Particle size distributions 0.03-30 µm (number/cm ³) | GRIMM Dust monitor with Nano Particle counter |
| Collected samples analyzed for C2-C12 VOCs. (µg/m ³) | Xontech canister sampler |
| Particle size distributions 0.5-0.30 µm and aerodynamic sizing (number/cm ³) | TSI Aerodynamic Particle Sizer |
| Aerosol Optical Depth (AOD) (every 3 min during direct sunlight hours) | CIMEL Sun Photometer |
| Wind Speed (m/s) and direction (deg), turbulence and temperature (C) vertical profiles up to at least 300 meters (every 15 min) | Radio Acoustic Sounding system (RASS) |
| Vertical column density SO ₂ and NO ₂ (Dobson Units) (10 min averages during direct sunlight periods) | Pandora |
| Vertical aerosol profiles into the upper troposphere (Backscatter ratio) | Light Detection and Ranging (LIDAR) |
| Vertical ozone profiles from near ground to 7 km | Differential Absorption LIDAR (DIAL) |



First Light in the OS Region



First Light in the OS Region



Been busy.....

- SCOOP campaign – validation of our new instrument August 2016
- Deployed to Oil Sands region in Nov 2016
- Processed SCOOP data @ various resolution schemes
- Validated our algorithm with Thierry's simulations
- Validated our uncertainty analysis with Thierry
- Wrote code for inputting model data
- Wrote code for HDF format output – eg. TROPOMI etc.
- Wrote AMT paper – submitted
- Added small telescope to system in March 2018

