PCL: at a glance

- **Location**: outside of London, ON (281m)
  - Delaware (1992-2010)
  - Echo Base (2010-present)
- **Laser**: ~1000mJ @ 30Hz, 532nm
- **Channels**:
  - 532 (Rayleigh, high gain)
  - 532 (Rayleigh, low gain)
  - 607 (Nitrogen)
  - 660 (Water Vapor)
- **Data**:
  - Temperature (1992-2010, 2012-2013)
  - Water Vapor (1999-2010, 2012-2013)
- **Mirror**:
  - 2.6m aperture
  - Liquid Mercury
Repairs and minor issues

- Roof Hatch
- Water vapor/Low-gain Rayleigh multi-channel scaler/averager (SR430)
- Chopper controller
- Laser stability (power dropping over time)
- New type of elastic for mirror stepper motor
- Laser coolant pump motor
Upgrades & Improvements

- New hose, electric bleed valve added to air line
- More back-up power supplies added
- New raspberry pi (mirror control program)
- Mounted lamp for white light calibration
- Set up webcam feed on Teamviewer link to monitor mirror
PCL OEM temperature retrieval

March 22, 2017

6 nights in 2016/2017
Water Vapour Measurements

March 22, 2017

![Graph showing water vapour measurements at different altitudes with lines representing PCL, Buffalo NWS, and White Lake NWS.](image-url)
Ongoing Concerns

• Lidar controller
• Air Compressor is aging
• Mirror control feedback system
  • occasionally out of sync
PCL: Current Status

• New air system is working well and looks promising.
• Litron Laser is working
• Mirror closed/running well most of the time
• Still need to finish fine optical alignment (delayed by abnormally wet winter and spring)
• Routine operation on the horizon
Papers

Accepted


• Sica, R. J., Haefele, A., Jalali, A., Gamage, S., & Farhani, G., “How to apply the optimal estimation method to your lidar measurements for improved retrievals of temperature and composition”, EPJ Web of Conferences 176, 01025, 2018. (ILRC 28)

• Gamage, S. Mahagammulla, Haefele, A., & Sica, R. J., “First application of the optimal estimation method to retrieve temperature from pure rotational raman scatter lidar measurements”, EPJ Web of Conferences 176, 01011, 2018. (ILRC 28)

Submitted

• Jalali et al., “A middle latitude Rayleigh-scatter lidar temperature climatology determined using an optimal estimation method” (submitted to Atmospheric Measurement Techniques)

In prep, to be submitted soon

• Farhani et al., “Optimal Estimation Method Retrievals of Stratospheric Ozone Profiles from a DIAL Lidar.”

• Gamage et al., “Retrieval of Tropospheric Temperature From a Multiple Channel Pure Rotational Raman-Scatter Lidar Using an Optimal Estimation Method.”

• Hicks et al., “Calibrating Water Vapour Lidars with a Radiosonde Trajectory Method”