



CANDAC

Canadian Network for the Detection of Atmospheric Change

<http://www.candac.ca>

Instrument:

PEARL-GBS

Contact for Information:

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In Operation Since:

August 2006

Data Products:

Differential slant column densities (DSCD: molecules/cm²) of O₃, NO₂, BrO, and OCIO.
Vertical column densities (VCD: molecules/cm²) of O₃, NO₂, and BrO.

Sampling:

One DSCD every 15 minutes during sunlit hours (solar zenith angle less than 95°).
One VCD per twilight during sunlit part of the year (mid February to mid October).

Co-ordinates of Instruments:

PEARL-Ridge (80.05N, 86.42W, 608m elev.)

Photo Credit:

Annemarie Fraser, 2006

Non-technical Summary of Instrument and Measurements:

The PEARL-GBS (Ground-Based Spectrometer) is a UV-visible grating spectrometer that measures vertical column densities (VCDs) of ozone, NO₂, and BrO, and differential slant column densities (DSCDs) of OCIO when OCIO concentrations are high (generally when Eureka is inside the polar vortex). Since 2006, the PEARL-GBS has measured absorption spectra of zenith-scattered sunlight, with good sensitivity to the stratosphere. A sun-tracker, developed at the University of Toronto, was installed above the PEARL-GBS in February 2008. With the sun-tracker, direct-sun and off-axis measurements can be made to improve sensitivity to the troposphere. PEARL-GBS DSCDs are retrieved using the differential optical absorption spectroscopy technique and converted to VCDs using a radiative transfer model. Through these measurements, understanding of the diurnal, day-to-day, seasonal, and inter-annual variability of ozone, NO₂, BrO and OCIO can be gained. PEARL-GBS data are also used to study spring-time ozone depletion and bromine explosions in the Arctic sea-ice. The data are contributing to satellite validation and comparisons with data from ACE, OMI, and OSIRIS. In 2009, the PEARL-GBS was granted certification from the Network for the Detection of Atmospheric Composition Change (NDACC).