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Using Fourier transform spectrometry to study ozone during polar sunrise in the Canadian Arctic

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In order to fully understand the mechanisms and processes which result in polar stratospheric ozone depletion, quality measurements of atmospheric trace gases are essential. Ground-based measurements, such as those performed utilizing ground-based Fourier transform spectrometers, provide critical data for the validation of satellite measurements. To this end, four Canadian Arctic Atmospheric Chemistry Experiment (ACE) satellite validation campaigns have been conducted during the spring period (February - April in 2004 - 2007) at the Polar Environment Atmospheric Research Laboratory (PEARL) in Eureka, Nunavut (80°N, 86°W). This period coincides with the most chemically active time of year in the Arctic, as well as a significant number of satellite overpasses. A suite of as many as 12 ground-based instruments, as well as frequent balloon-borne ozonesonde and radiosonde launches, participated in each campaign.

During the 2007 campaign, three infrared Fourier transform spectrometers (FTSs) made solar absorption measurements of a wide range of ozone-related trace gases for a 6 week period. Two of these instruments were high-resolution FTSs (a Bruker IFS 125HR and a Bomem DA8), capable of producing partial and total column amounts of the gases of interest. The third FTS (PARIS-IR) was a terrestrial version of the FTS on-board the ACE satellite, capable of very high temporal resolution total column measurements. This presentation will focus on the retrieved total and partial column amounts of ozone and related species (HCl, $ClONO_2$, HNO_3) made by these

FTSs. In addition, comparisons of this data with other ground-based, balloon-borne and satellite-borne instruments during the 2007 Canadian ACE Arctic Validation campaign will be presented.