

The Polar Environment Atmospheric Research Laboratory (PEARL): A Scientific Facility for monitoring atmospheric change in the Canadian High Arctic

William E. Ward¹, James R. Drummond² and the CANDAC Science Team

¹*Department of Physics, University of New Brunswick, Fredericton, Canada*

²*Department of Physics and Atmospheric Science, Dalhousie University, Halifax, Canada*

The Polar Environment Atmospheric Research Laboratory is a major atmospheric facility located in the Canadian High Arctic at Eureka, Nunavut, Canada ((80N, 86W- see Figure 1). It was established as a result of a collaborative initiative between a network of interested researchers at government institutions and Canadian universities, the Canadian Network for the Detection of Atmospheric Change (CANDAC - Professor J.R. Drummond, PI). Funding for the facility was obtained through grants from a number of agencies in 2004/2005 and the installation of instruments started in the winter of 2005/2006. The facility has been maintained since then through funding from a broad range of sources and recently significant funding to support the facility through 2018 was obtained.

The instruments (over 25 instruments) at this facility provide observations from the surface to ~100 km. They include radars, lidars, photometers, spectrometers, imagers, interferometers and a mass spectrometer. Research over the first 6 years was organized into four research themes (Arctic Tropospheric Transport and Air Quality; The Arctic Radiative Environment: Impacts of Clouds, Aerosols, and “Diamond Dust”; Arctic Middle Atmospheric Chemistry; Waves and Coupling Processes) and a satellite validation effort. Under the most recent funding envelop, effort will be concentrated on understanding the physical processes taking place during Polar night.

In this presentation, the organization and facilities of this initiative will be introduced. The scientific research highlights of the past 6 years will be summarized and the planned research activities for the next 5 years described. International collaborations with other groups and facilities are welcomed as we strive to understand the rapid changes (and their causes) taking place in the Arctic.

Figure 1. Polar map of the location of Eureka in the Canadian Arctic.



Figure 2: The PEARL Ridge Lab in spring.

