Measurement of Anthropogenically Influenced Aerosols at a Nova Scotia Site

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During the summer of 2004, CMDL deployed a large suite of integrated aerosol and solar radiation instruments to Chebogue Point (CBG), Nova Scotia, to conduct ground measurements as part of a large, multi-national campaign to investigate the transport of pollutants from the Midwest across New England and into the Atlantic. One of the goals of the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) project is to answer the question "How do the chemical, physical, and optical properties of aerosols impact regional haze and climate?" CMDL's moveable rack system included measurements of aerosol optical properties such as light scattering, absorption, and hygroscopic growth. Additional CMDL instrumentation included a cloud condensation nuclei counter to provide an indication of the cloud-forming potential of the aerosols passing the Nova Scotia site and a scanning electrical mobility spectrometer to measure the size distribution of aerosols.

The hygroscopic growth of the CBG aerosol was considerably different than has been seen at other sites (Figure 1). Airmass trajectories and chemical measurements by other ICARTT investigators suggest that the source of the aerosol can influence its hygroscopicity, while fog processing may also affect the hygroscopic nature of the aerosol. Changes in the optical properties of the aerosol at CBG due to fog scavenging and transport are investigated in the context of their influence on aerosol radiative forcing efficiency. Finally, the measurements at CBG are compared with the CMDL aerosol measurements made at Sable Island, Nova Scotia, between 1992-2000.

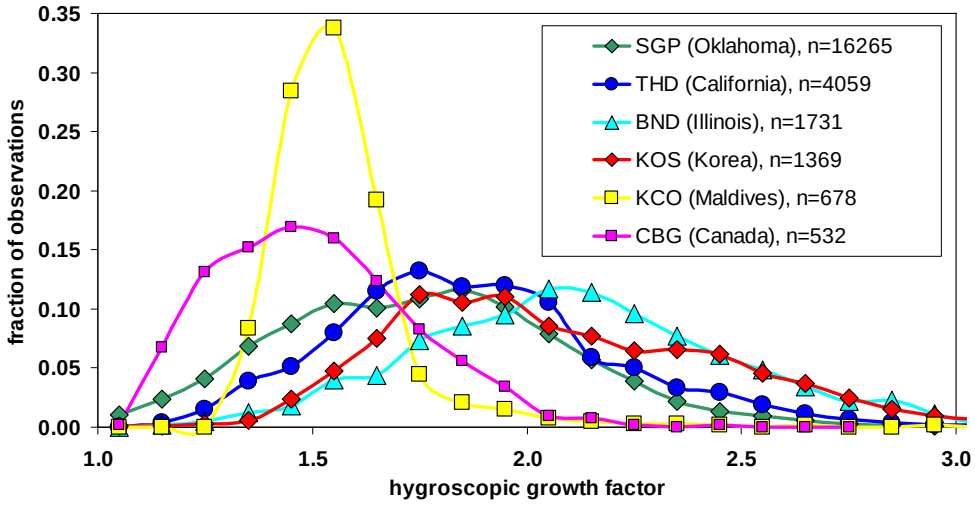

Figure 1. Frequency distribution of the hygroscopic growth factor f(RH) observed at multiple aerosol monitoring sites. The low aerosol hygroscopicity observed at Chebogue Point is remarkably unlike that observed at other sites.