8RA.3
Measurement of Free Tropospheric Aerosols in the North Atlantic at the Pico Mountain Observatory. KATJA DZEPINA, Sumit Kumar, Claudio Mazzoleni, Paulo Fialho, Mike Dziobak, Jacques Hueber, Detlev Helmig, Louisa Kramer, Seth Olsen, Lynn Mazzoleni, *Michigan Technological University*

The Pico Mountain Observatory is located at 2225 m amsl on an inactive volcano at Pico Island in the Azores archipelago in the North Atlantic ~3900 km east and downwind of North America (38°28'15''N; 28°24'14''W). The unique location of the Observatory enables sampling of free tropospheric air transported over long, intercontinental distances and is rarely affected by local emissions. The Observatory is affected mainly by North American outflow after its trans-Atlantic transport. Therefore, its location is ideal for observations of long-range transported pollutants emitted from anthropogenic and biogenic continental sources.

The composition of continental pollution outflow is altered during transport by mixing, chemical reactions, phase changes, and removal processes. Thus, the properties of aerosol and trace gases in downwind regions are impacted by the outflow of pollutants, their chemical transformation, and sinks. In previous work, the sampled air-mass measurements (including CO, O_3, NO_x, NO_y, NMHC, black carbon and aerosol optical size) and the simulations of their dispersion indicated outflow of North American tropospheric ozone and its precursors. Although the measurements have been crucial in explaining the evolution of North American gaseous pollution, little is known regarding the nature of the aged aerosol. New work is currently underway at the Observatory to provide chemical characterization of the intercepted free tropospheric aerosols.

Here, we show the preliminary results of the free tropospheric aerosol composition and its physical properties. Samples were collected using high-volume filter samplers with quartz filters and analyzed for organic and elemental carbon (OC and EC, respectively). We compare the observed OC and EC values to the collocated measurements of gas- and particle-phase species, meteorological parameters and to the values found in current literature. We highlight the future work in which we will select filter samples based on the arrival of highly polluted air masses from anthropological or biomass burning emissions for further detailed analysis.

8RA.4
Source Identification and Long-term Trend Analysis of Finnish Arctic Aerosols. JAMES R. LAING, Philip K. Hopke, Liaquat Husain, Vincent A. Dutkiewicz, Jussi Paatero, Tanveer Ahmed, *Clarkson University*

Arctic Haze has been a focus of study since the early 1970, but there are relatively few long-term datasets of their chemical composition. Week-long historical filter samples collected at Kevo, Finland from 1964-2010 have been analyzed for various chemical species. Major ions and methane sulfonate (MSA) have been analyzed by ion chromatography (IC), trace elements by inductively coupled plasma - mass spectrometry (ICP-MS), and BC by light transmission. The 47-year complete data set will be analyzed by Positive Matrix Factorization (PMF). The receptor modeling results will be connected with back trajectory data in a Potential Source Contribution Function (PSCF) analysis to determine possible source areas. The combination of PMF and PSCF will identify source profiles and the geographic areas of those sources. Sources of wood smoke, oil and coal burning, non-ferrous metal smelting, biogenic sulfate, and crustal elements will be identified. Trend analysis on the sources produced by PMF will be performed to evaluate the evolution of sources over time. Global inventories of anthropogenic emissions indicate a dramatic decrease in the early 1990's in the Soviet Union [Bond 2007; Smith 2011]. The Kevo site is heavily impacted by the Kola Peninsula industrial area. It is expected that elemental markers of industrial processes there will decrease starting in the early 1990s. Of particular interest are the factors for forest fires and biogenic sulfate. Siberian forest fires are a major source of Arctic BC during the spring/summer [Generoso 2007]. It has been predicted that climate change has increased forest fires in central Canada and Russia [Stocks 1998]. This prediction will be assessed and source areas of forest fires will be determined. Sea surface temperatures in the North Atlantic have increased since 1970 [Thompson 2010]. Whether the biogenic sulfate factor is correlated with increased temperatures will be examined and source locations will be determined.