

Comparison of Continuous Surface Ozone Measurements from Two Arctic Observatories

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The Hydrometeorological Observatory of Tiksi and NOAA's Barrow, Alaska Observatory are equipped with Thermo Scientific Model 49 Ozone Analyzers and have been continuously measuring surface ozone levels since October 2010. The two observatories are in the Arctic Circle at similar latitudes of 71.6°N and 71.3°N, respectively. Their locations provide a unique opportunity for measurement comparison due to minimization of solar zenith angle differences. Instrumentation at the site, data collection and quality assurance are discussed. General seasonal trends are presented and we quantify mean surface ozone levels. Both stations show surface ozone depletion events during 2011, likely due to high bromine originating in nearby ice leads. The events were investigated using back trajectories from the Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) Model. At both observatories, back trajectories during depletion events indicate winds passed over the ice leads prior to reaching the stations. However, due to differences of seasonal ice lead longevity at the two sites, the depletion events were found in different months. In addition to study conclusions, recommendations for further study are also discussed.

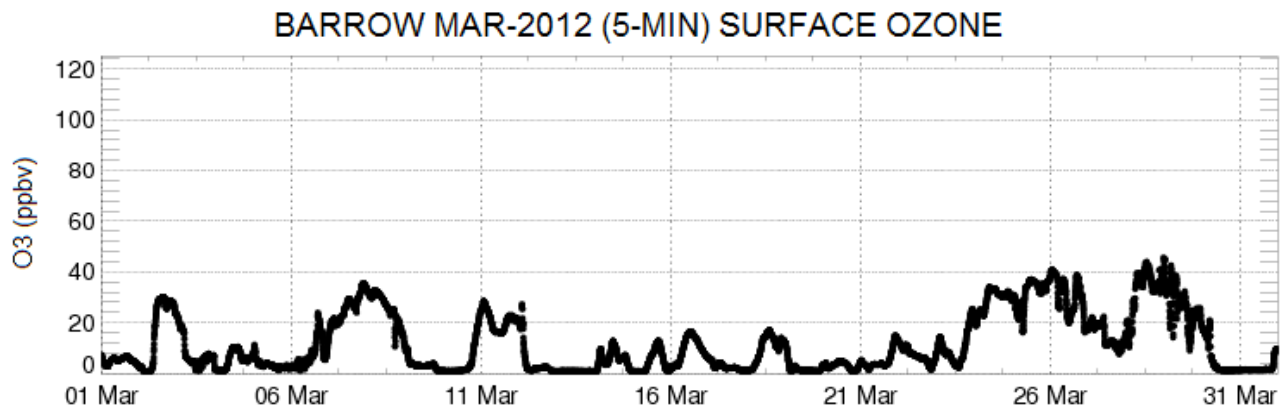


Figure 1. Five-minute averaged surface ozone recorded at Barrow Observatory for March, 2012 shows frequent depletion events during spring, lowering typical O₃ mixing ratios of ~40 ppbv close to 0 ppbv.