Observations of springtime surface O$_3$ and GEM depletion at Toolik Lake, AK

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[Map of Alaska showing Toolik Field Station and surrounding areas.]

http://toolik.alaska.edu/gis/
Toolik Lake Field Site
Surface $O_3$ at Toolik Lake and Barrow, AK: Sep 2010 – Sep 2011
Surface $O_3$ at Toolik Lake and Barrow, AK: Spring 2011

Graph showing the concentration of $O_3$ in parts per billion (ppbv) over time from March to May 2011 for Toolik and Barrow. The graph illustrates the fluctuations in $O_3$ levels with Toolik (blue line) and Barrow (orange line) data points.
Observed GEM depletion at Toolik Lake: April 2011
Surface O$_3$ Measurement Comparison: April 2011

- UV photometric analyzer, 1.5 m
- UV photometric analyzer, 2.0 m
- Fast-response chemiluminescence, 3.5 m

The graph shows the variation of O$_3$ (in ppb) throughout April 2011, with data points indicating measurements made at different heights. The graph is segmented by day of the year, ranging from Day 92 to Day 120.
Release Start: 2011-03-24 09:00:00, Release End: 2011-03-24 12:00:00
Release Start: 2011-03-29 09:00:00, Release End: 2011-03-29 12:00:00
Before Event

During Event
FLEXPART Analysis

Before Event

During Event
Before Event

During Event
Conclusions

• Springtime surface O$_3$ and GEM depletion observed at Toolik Lake.
  • O$_3$ < 5 ppbv; GEM < 0.2 ng/m$^3$

• Inland depletion events are correlated with over-ocean transport

• Unique far inland measurements of O$_3$ and GEM depletion
  • How are ODEs and MDEs transported inland from the ocean?
  • What potential impact does this have on surface chemistry and Hg cycling in the north slope/low Arctic environments?
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