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Observation of High Ozone From Canadian Boreal Forest Fires in 2010

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Although the potential atmospheric impact of boreal fires is large, as both fuel consumption and intensity of boreal fires are typically an order of magnitude larger than for savanna fires, the impact of boreal fires on tropospheric ozone is still debatable. To address this, the BORTAS (Quantifying the impact of BOReal forest fires on Tropospheric oxidants over the Atlantic using Aircraft and Satellites) mission has been planned by several universities and government agencies in the United Kingdom, Canada, and USA. In 2010, nearly 100 ozone soundings were made at 13 stations through the BORTAS Intensive Sounding Network, though aircraft measurements were all cancelled due to the volcanic eruption in Iceland.

2010 was actually an exceptional year for Canadian boreal fires. Satellite MODIS (Moderate Resolution Imaging Spectroradiometer) fire count data reveal large fire events in Saskatchewan with peaks on July 13 and July 24. CO (carbon monoxide) released from these large fires was observed in MOPITT (Measurements Of Pollution In The Troposphere) and TES (Tropospheric Emission Spectrometer) satellite data in the middle to upper troposphere.

On the days with large fire activities and following days, layers of elevated ozone mixing ratios over 100 ppbv are observed around 3-5 km at nearby stations (e.g., Edmonton station) or stations in distance (e. g., Egbert station). Back-trajectories suggest the elevated ozone in the profile is traceable to the fires in Saskatchewan.