



## **Seasonal variation of non-methane hydrocarbons (NMHC) and dimethyl sulphide (DMS) in the Antarctic boundary layer: Early results from the CHABLIS experiment, Halley, Antarctica.**

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An automated GC-FID was deployed in the Clean Air Sampling Laboratory (CASLAB) at Halley in Antarctica as part of the **C**hemistry of the **A**ntarctic **B**oundary **L**ayer and the **I**nterface with **S**now (CHABLIS) project. Continual measurements of C<sub>2</sub>-C<sub>7</sub> non-methane hydrocarbons (NMHC) and dimethyl sulphide (DMS) were made from January 2004 until February 2005. The project concluded with a summer intensive in which a large suite of measurements, of both oxidant species and radicals in the troposphere and snowpack, were collected.

NMHC exist from a combination of biogenic and anthropogenic sources and have varying 1/e atmospheric lifetimes. They are important markers of atmospheric pollution and are precursors of tropospheric O<sub>3</sub> in the presence of NO<sub>x</sub>. DMS is produced biogenically in the oceans from phytoplankton and is further oxidised to give products integral in the formation of CCN aerosol. The measurement of these species in a region where anthropogenic pollution is minimal gives a context to processes occurring in polluted atmospheres, and poses a challenging test to atmospheric models.

Ethane and propane were found to be present in the highest concentrations of all the NMHC, throughout the dataset, and showed distinct seasonal trends consistent with studies in similar environments. The absolute concentrations were however lower, in

conjunction with Halley being the most southerly site. Short-lived lower molecular weight alkenes were also present for most of the campaign implicating the existence of a local source. The results can be explained by the seasonal dependence of emissions such as biomass burning, fluxes from the oceans and/or snowpack, together with the variation in atmospheric removal rates. During the austral winter the production of OH from O<sub>3</sub> photolysis is absent, however the changing ethane/propane ratios assume July values for [OH] of up to 1 x 10<sup>6</sup> molecules cm<sup>-3</sup>. Although this is highly dependent on the transport of atmospheric species into the continent, assumptions are that this is at a minimum, and so the [OH] can be potentially attributed to production from O<sub>3</sub> + alkene reactions. Focussing on periods of tropospheric O<sub>3</sub> depletion, influences of chlorine and bromine chemistry have been observed in late austral winter and early spring.

DMS showed its maximum values in austral summer, in-line with a minimum in sea ice cover. DMSO and MSA concentrations can be inferred from these measurements to provide more data coverage of these species in the Antarctic troposphere.