# The Multigenerational Oxidative Evolution of Atmospheric Organic Carbon


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The oxidation of organic species is central to the chemistry of the atmosphere, playing a major role in the control of oxidant levels, and forming key products such as ozone and secondary organic aerosol. However our understanding of organic oxidation processes is limited by their immense chemical complexity – each oxidation step can form of a large number of product species, each of which can react further to form still more products, and so on over multiple generations of oxidation. This talk will describe laboratory studies aimed at describing the evolving composition of organic oxidation systems, over the equivalent of hours to days in the atmosphere. Organic species are oxidized within an environmental chamber, and reactants, intermediates, and products are measured using a suite of new mass spectrometric instruments, providing a comprehensive picture of the chemical composition of the entire organic mixture. From these combined measurements, the organic species can be described in terms of total carbon mass as well as distributions of key ensemble properties (such as oxidation state and volatility) that can be used to inform model frameworks. Results to be discussed will include the "completeness" of the instrument suite (carbon balance), the formation and evolution of particulate matter, and the changes to key chemical properties of the organic carbon upon multigenerational oxidation.


**23 May 2018**

**11:30 a.m.**

**Conference Room, 3/F, Mong Man Wai Building**

EARTH SYSTEM SCIENCE PROGRAMME


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