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## Aircraft campaigns in support of the North Atlantic Climate System Integrated Studies (ACSIS)

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The North Atlantic is witnessing major changes during the Anthropocene. These include changes in the physical climate system: in ocean and atmosphere temperatures and circulation; in sea ice thickness and extent; and in atmospheric composition, where ozone, ozone precursors and aerosols have undergone significant changes over the last few decades. Changes in aerosols over the North Atlantic have been linked to changes in sea surface temperatures (SST) and North Atlantic climate variability. A long-term research project, The North Atlantic Climate System Integrated Study (ACSIS), involving data collection and interpretation, has begun to better understand the processes and composition-climate interactions associated with these changes. Here we report on one of the major observational components of the ACSIS programme which involves repeated measurements of the composition of the North Atlantic using the NERC FAAM BAe146. To date six campaigns have taken place including three which coincided with the NASA ATom campaigns (2-4).

In this presentation we will discuss the rationale for the aircraft project and recent results including the observation of transport of biomass burning plumes into the North Atlantic that are estimated to have originated from fires sampled as part of the NASA FIREX campaigns during the summer of 2019. We will highlight results from an intercomparison with the NASA DC-8 during our second campaign and ATom 3, which reveal good agreement in measurements of O<sub>3</sub>, CO and NO<sub>x</sub> between the two aircraft but large differences in measurements of non-methane VOCs, and we will summarise our results to-date including the comparison against chemical transport models.

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