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Non-methane hydrocarbon (NMHC) and lightweight oxygenated volatile organic compound (o-VOC) concentrations measured on an airborne platform during ITOP

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Mixing ratios for C_2 to C_8 non-methane hydrocarbons (NMHC) along with lightweight oxygenated volatile organic compounds (methanol, acetone and acetaldehyde) measured during the Intercontinental Transportation of Ozone Precursors (ITOP-UK) experiment will be presented. Whole air samples were taken using Silco steel canisters on board the Facility for Airborne Atmospheric Measurements (FAAM), BAe-146 aircraft, with subsequent ground analysis by Dual Channel – Gas Chromatography – Flame Ionisation Detection. (DC-GC-FID).

The campaign was conducted in the mid-Atlantic region (Faial, Azores) as part of the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) with concurrent experiments based in the USA (INTEX-NA), and France (European ITOP), during summer 2004. During three flights, air masses previously sampled up stream, closer to the emission region, by the NASA DC 8 and the NOAA P3 aircrafts were intercepted by the FAAM BAe-146 before being subsequently sampled by the DLR Falcon over Europe.

CO and Ozone were used to determine the sample locations in-flight. Types of air masses sampled included polluted air masses at both low (2 km) and high (8 km) altitudes from the East coast of the USA, Alaskan forest fires, Western Africa outflow and marine boundary layer origins. Concentrations of individual NMHCs were naturally highly dependant upon air mass origin. For example, ethene was below the limit of detection ($<$5 pptv) under marine conditions but reached levels of 1261 pptv in forest

fire plumes. Combinations of NMHCs and CO mixing ratios, along with air mass trajectories, have been used to provide quantitative chemical fingerprints of the air mass types encountered during the experiment.