Geophysical Research Abstracts,
Vol. 11, EGU2009-7464-4, 2009
EGU General Assembly 2009

Long term measurements of trace gases at the Weybourne Atmospheric Observatory, seasonal variation and long range transport

Z.L Fleming (1), P.S. Monks (1), B.J Bandy (2), S.A. Penkett (2), S. Koumoutsaris (3), and I. Bey (3)

(1) NCAS, University of Leicester, Chemistry department, Leicester, United Kingdom (zf5@le.ac.uk), (2) NCAS, School of the Environment, University of East Anglia (UEA), UK, (3) Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Fifteen years of data from the UK NCAS (National Centre for Atmospheric Science) funded atmospheric observatory in Weybourne in North Norfolk, UK, on the North Sea have been analysed to study long term changes of a series of trace gases. The site's coastal location is ideal for dividing the air masses into clean North Sea/Arctic, polluted North European and urban UK sectors. A more detailed analysis of the exact pathway of the air arriving at the site has been studied using back trajectories, wind sectors and output from the UK Met office's NAME (Atmospheric dispersion) model.

The dataset is not continuous for all species during the whole 15 year period but several intensive field campaigns with comprehensive VOC measurements have proved to be an essential addition. Ratios of various hydrocarbons and trace gases at the site show the origin and age of the air masses arriving at the site and division of the datasets by air mass direction and season illustrate the changing air composition of Northern Europe. The GEOS-Chem model was used to model ozone levels at the site and compare well to observations, especially for the clean air masses from the Northerly and Easterly North Sea and Arctic sectors.

Other UK monitoring sites (Harwell and Great Dun Fell) ozone trends were compared to those at Weybourne, revealing a certain regional difference but a similar trend peak ozone values declining and background levels gradually increasing. The marine influence at Weybourne also show periods that represent non UK pollution emissions and Arctic air that contains relatively high background ozone levels. Ozone levels at Weybourne have changed considerably over this period due to changes in their precursors.