

6.096 Assessing the impact of the anthropocene on atmospheric composition using remote sensing from aircraft and space based instrumentation..

Presenting Author:

John Philip Burrows, Univeristy of Bremen, burrows@iup.physik.uni-brremen.de

Co-Authors:

Heinrich Bovensmann, Univeristy of Bremen

Andreas Richter, Univeristy of Bremen

Michael Buchwitz, Univeristy of Bremen

Maximilian Reuter, University of Bremen

Anne Bleckschmidt, University of Bremen

Anja Schönhardt, University of Bremen

Andreas Meier, University of Bremen

Folkard Wittrock, University of Bremen

Oliver Schneising, University of Bremen

Konstantin Gerilowski, University of Bremen

Sven Krautwurst, University of Bremen

Jens Heymann, University of Bremen

Stefan Noel, University of Bremen

Abstract:

Since the industrial revolution the population of the earth has grown to ~7.5 Billion, urbanized and at the same time its standard of living has increased dramatically. This has been made possible through the exploitation of fossil fuels as an energy source. Since the 1950s and in spite of legislation successes in North America and Europe, there has been globally an acceleration of the release of both short lived climate pollutants and long lived greenhouse gases. Air quality, stratospheric ozone and climate change are all being influenced by anthropogenic activity and the earth has entered a new geological epoch the Anthropocene. The SCIAMACHY (Scanning Imaging Absorption spectrometer for Atmospheric CHartography) project, which began in the 1980s, aimed to yield the amounts and distribution of atmospheric constituents: trace gases, aerosols and clouds from space based passive remote sensing in the solar spectral range. As a result of this initiative the following instruments have been developed and launched on satellite platforms into sun synchronous low earth orbit: GOME (Global Ozone Monitoring Experiment - ESA ERS-2 1995-2011), SCIAMACHY (ESA Envisat 2002 to 2012) GOME_2 (EUMETSAT Metop A 2006 to present, Metop B 2012 to present). In addition the spin off OMI (Ozone Monitoring Instrument - NASA AURA 2004 to present) was developed by NSO. Appropriate mathematical inversion of the measurements of these instruments yields information about the total stratospheric and tropospheric column amounts and distributions of the following gases, which are either short lived climate pollutants or greenhouse gases: O₃, NO₂, H₂O, HCHO, CHO₂, BrO, IO, CO, CH₄ and CO₂. This presentation will provide an update on the analysis at the University of Bremen of the time series provided by these instruments and new measurements from related

instruments developed for aircraft.