



**- Master Thesis -**



**The airborne radiometer group ASUR**

(<http://www.iup.physik.uni-bremen.de/asur>)

**Description**



Since 1991 microwave sensors have been developed and optimised at the Institute of Environmental Physics and have been used within international ozone measurement campaigns (e.g. NASA SOLVE 2000). The Airborne S<sub>U</sub>bmillimeter Radiometer (ASUR) is operated on board a high flying research aircraft and hence not affected by tropospheric water vapor absorbing in this frequency range. From the shape of the pressure broadened molecular lines vertical profiles can be retrieved using radiative transfer models. Key stratospheric constituents like ClO, HCl, HNO<sub>3</sub>, O<sub>3</sub>, N<sub>2</sub>O, etc. are measured along the flight track of the aircraft. Objectives are investigations of chemical changes due to anthropogenic activities (ozone hole) and the validation of satellite instruments.

**Master-Work**

**"Multi-annual studies of chlorine species and ozone in the arctic and mid-latitude stratosphere using airborne microwave measurements."**

Since 1994 ASUR has been improved by using a Helium-cooled superconducting sensor. Measurements of the chlorine species ClO and HCl have been taken nearly every winter. By evaluating the time series from 1995 to 2000 chlorine activation in the arctic winters over the past years will be studied. The investigations will be expanded by a series of campaigns in 2002/2003 spanning from arctic to tropical latitudes. Particular attention will be payed to events clearly outside the polar vortex where the presence of activated chlorine is not yet fully understood.

The subject is also suitable to train the students skills in basic microwave data handling as a peculiar prerequisite for future challenges in environmental research.

**Schedule**

Month 1-3	Basics of microwave measurement methods and data analysis tools
Month 4-5	Retrieval of recent ClO and HCl measurements (using existing algorithms)
Month 6-8	Selection of enhanced chlorine events and study of the air parcel history
Month 9-10	Data interpretation focusing on activation and/or transport mechanisms
Month 11-12	Final writing of master thesis

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