



## **Global Observations of Stratospheric HNO<sub>3</sub> by the Odin Sub-Millimetre Radiometer: Quality Assessment and Applications.**

J. Urban (1), D. Murtagh (1), N. Lautie (1), I.J. Orsolini (2) and the Odin/SMR Retrieval Group

(1) Chalmers University of Technology, Göteborg, Sweden, (2) Norwegian Institute for Air Research, Kjeller, Norway, (3) Observatoire Aquitain des Sciences de l'Univers, L3AB, Floirac, France, (4) Swedish Space Corporation, Solna, Sweden, (5) University of Edinburgh, UK, (6) Laboratoire d'Aérodynamique, Toulouse, France, (7) Météo-France, Toulouse, France.  
(Email: jo.urban@rss.chalmers.se)

The Sub-Millimetre Radiometer (SMR) on board the Odin satellite, launched in February 2001, employs 4 tunable single-sideband Schottky diode heterodyne receivers in the 485-580 GHz spectral range and a 1 m telescope for passive observations of thermal emission originating from the Earth limb. Spectra are recorded using two high resolution auto-correlator spectrometers. Measurements are performed in a time sharing mode with astronomical observations.

In the aeronomy mode, various target bands are dedicated to observations of trace constituents relevant to stratospheric/mesospheric chemistry and dynamics such as O<sub>3</sub>, ClO, N<sub>2</sub>O, HNO<sub>3</sub>, H<sub>2</sub>O, CO, and isotopes of H<sub>2</sub>O and O<sub>3</sub>. Profile information is retrieved from spectral measurements of a limb scan by inverting the radiative transfer equation for a non-scattering atmosphere. A retrieval algorithm based on the so-called *Optimal Estimation Method* has been adopted for the ground segments of Odin/SMR in Sweden and in France.

The presentation focuses on the stratospheric mode measurements of nitric acid (HNO<sub>3</sub>). This species plays an important role in stratospheric ozone chemistry, for example regarding the heterogeneous chemical processes occurring inside the polar vortices during winter and spring. We present the Odin/SMR measurement capabilities of HNO<sub>3</sub> and an assessment of the level 2 data quality by comparison

with independent measurements. Results such as the observations of denitrification inside the polar vortices as well as the measured enhancement of middle stratospheric  $\text{HNO}_3$  after the 2003 solar proton events are also discussed.

Odin is a Swedish-led satellite project funded jointly by Sweden (SNSB), Canada (CSA), Finland (TEKES) and France (CNES).