

Name of research institute or organization:

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**Institute of Applied Physics, University of Bern**

Title of project:

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Microwave radiometry of atmospheric water vapour

Project leader and team

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Prof. Niklaus Kämpfer, project leader  
Dr. Dietrich Feist, Vladimir Vasic, Stefan Müller

Project description:

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Water vapour in the atmosphere plays a crucial role in atmospheric processes through its radiative, chemical and dynamical properties. However due to its wide range of amount extending over three orders of magnitude from the troposphere to the mesosphere no single technique exists to detect the whole water vapour profile over the whole atmosphere. Whereas conventional balloon soundings produce reliable data up to approx. 6km the lidar technique may give information up to 10km.

We complemented data from a lidar operated on Jungfraujoch with data from ground based microwave radiometry on Jungfraujoch what allowed us to retrieve a water vapour profile for days where coincident measurements were taken.

In 2004 the microwave radiometer AMSOS was operated from late spring to summer on the Jungfraujoch. AMSOS operates at the very strong water vapour transition at 183 GHz and is designed for operation from aircraft. During the dry season it can also operate from high altitudes such as the Jungfraujoch. Analysis of these data is in progress.

Data from complementary instruments on Jungfraujoch such as the GPS receiver of the AGNES network and from precision filter radiometers from the CHARM network are investigated within the project STARTWAVE of NCCR-climate. These data are included in the STATRWAVE database which aims at providing water vapour information for climate research.

Key words:

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Water vapour, microwave radiometry, remote sensing, climate change

Internet data bases:

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[http://www.iapmw.unibe.ch/research/projects/STARTWAVE/startwave\\_dbs.html](http://www.iapmw.unibe.ch/research/projects/STARTWAVE/startwave_dbs.html)

Collaborating partners/networks:

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EPFL Lausanne, MeteoSwiss, NCCR-climate

Scientific publications and public outreach 2004:

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**Refereed journal articles**

Gerber, D., I. Balin , D. Feist , N. Kämpfer , V. Simeonov , B. Calpini , H. van den Bergh, Ground-based water vapour soundings by microwave radiometry and Raman lidar on Jungfraujoch (Swiss Alps), Atmospheric Chemistry and Physics, **4**, pp.: 2171-2179, 2004.

**Conference papers**

Gerber, D. , I. Balin , D. G. Feist , N. Kämpfer , V. Simeonov , B. Calpini , H. van den Bergh, Ground-based water vapour soundings by microwave radiometry and Raman lidar on Jungfrauoch, COST-723 opening workshop, ESTEC, Noordwijk (NL), March 2004.

N. Kämpfer et al., Microwave remote sensing of water vapour, Asia Oceania Geoscience Society, Singapore, July 2004.

**Theses**

Vasic, V., An airborne millimetre-wave radiometer at 183 GHz: receiver development and stratospheric water vapour measurements, PhD Thesis, Universität Bern, 2004.

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