Name of research institute or organization:

École Polytechnique Fédérale de Lausanne (EPFL)

Title of project:

Active optical remote sensing, LIDAR

Project leader and team:

Dr. Valentin Simeonov, project leader
Prof. Marc Parlange, head of the Laboratory of Environmental Fluid Mechanics and Hydrology (EFLUM)
Dr. Todor Dinoev

Project description:

After the end of the project for studying stratosphere- troposphere ozone exchange by lidar in 2009 and the transfer of the aerosol lidar observations in 2008 to the automated Raman lidar, developed by EPFL and jointly operated with MeteoSwiss in Payerne, the lidar activity at HARS Jungfraujoch was suspended. The current configuration of the lidar allows only manual operation making an operator's presence for maintaining the observations indispensible. Consequently, the measurements require significant resources and manpower, unavailable at present. Automatic or remote operations are a possible solution, however, automation of the actual configuration is difficult, mostly because the lidar operation requires manual opening of the astronomical dome. Furthermore, operation of the lidar from the astronomical dome significantly reduces the observation time because measurements cannot be taken in windy conditions. Automated configuration with independent roof opening installed on the roof of the scientific station is a possible solution. Such a solution, however, will require considerable funding, efforts and cooperation with other research institutions or organizations. We are making efforts to find potential cooperation partners and funding.

Preparation of a new project within the framework of GAW CH is ongoing. The project aims at developing and installing at HARS Jungfraujoch a new instrument for monitoring water vapor and background concentration of atmospheric methane. Space-averaged concentrations will be derived from the measured over distances of 1.1 and 2.3 km absorption of a near IR laser beam. The instrument has already been built and is ongoing tests at EPFL. The installation is previewed for the end of 2011. Long term comparison of the data from the instrument with regular methane observations carried out at HARS Jungfraujoch by EMPA is previewed.

Key words:

Differential Absorption Lidar, Aerosol, Raman lidar, Tropospheric Ozone, High Altitude Research Station Jungfraujoch, Climate Change, Stratosphere Troposphere Exchange, Long-Range Ozone Transport, methane, TDL open-path.

Internet data bases:

http://eflum.epfl.ch/

Collaborating partners/networks:

EARLINET – European Aerosol Research Lidar NETwork
Federal Office of Meteorology and Climatology - MeteoSwiss
Institute of Atmospheric Optics – Tomsk, Russia

Scientific publications and public outreach 2010:

Conference papers

V. Simeonov , T. Dinoev , B. Calpini , S. Bobrovnikov , Y. Arshinov, P. Ristori , H. van den Bergh , and M. Parlange, " A Raman lidar as operational tool for water vapor profiling in the Swiss Meteorological Office", 25th International Laser Lidar Conference, 5 - 9 July 2010, St. Petersburg, Russia.

T. Dinoev, I. Serikov, V. Simeonov, Y. Arshinov, S. Bobrovnikov, B. Calpini, H. van den Bergh, M. B. Parlange, "Temperature and aerosol backscatter ratio measurements with the Swiss Raman Lidar for meteorological applications", 25th International Laser Lidar Conference, 5 - 9 July 2010, St. Petersburg, Russia.

M. Froidevaux, Ch. Higgins, V. Simeonov, I. Serikov, H.van den Bergh, R. Calhoun, P.Ristori, E. Pardyjak, and M. Parlange, "Turbulent Atmospheric Boundary Layer Evaporation (TABLE) experiment: preliminary results", 25th International Laser Lidar Conference, 5 - 9 July 2010, St. Petersburg, Russia.

Theses

Marcel Bartlome, "Development of the Jungfraujoch UV DIAL lidar to observe the vertical ozone distribution in the context of Stratosphere -Troposphere exchange and long range transport", Thèse EPFL, no 4636 (2010).

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