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Scanning temperature measurements with rotational Raman lidar at Hornisgrinde during COPS

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For a comprehensive investigation of atmospheric processes, scanning lidar systems are highly beneficial because they provide volume data of atmospheric key parameters with high accuracy and resolution. The lidar technique of choice to measure temperature in the troposphere is rotational Raman lidar. In addition to temperature, the backscatter and extinction coefficients are provided simultaneously by the instrument [see contribution of S. Pal et al. to this conference]. At University of Hohenheim (UHOH) we have developed the first rotational Raman lidar (RRL) which - in addition to vertical profiling - allows measurements in any direction of interest. Thus truly range-resolved temperature data become available. The system is optimized for temperature measurements in the planetary boundary layer and lower free troposphere but shows also high performance up to the middle stratosphere. It transmits laser radiation at 355 nm and is thus eye-safe for distances larger than 400 m which facilitates its deployment. In contrast to many other rotational Raman lidars, our system shows also very high performance in daytime. The range resolution is large enough to investigate temperature lids and their development; the large range allows to study the diurnal cycle of atmospheric stability.

The UHOH RRL is implemented in a mobile truck. It is deployed from June to August 2007 in the field campaign COPS (Convective and Orographically-Induced Precipitation Study) on top of Hornisgrinde [see contribution of V. Wulfmeyer et al. to this conference], the highest peak in the Northern Black Forest, at an elevation of 1161 m above sea level. At this site which was named Supersite H, an unprecedented suite of scanning remote sensing instruments are collocated. First measurement results of COPS will be presented at DACH.