

**Abstract Title:** *Filling gaps in the observation network for thermodynamic profiling by a ground-based microwave radiometer network*

**Abstract Short Title:** *Thermodynamic profiling by ground-based microwave radiometer network*

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**Abstract Submission:**

*Atmospheric boundary layer processes strongly influence the local weather conditions but are difficult to capture from satellite and in-situ sensors. With numerical weather prediction (NWP) moving towards finer resolution, the more favorable geometry of ground-based remote sensing is well suited to provide the relevant atmospheric quantities with sufficient vertical resolution. Microwave radiometry is particularly suited for continuous thermodynamic profiling, i.e. temperature and humidity, also under cloudy conditions. Temperature profiling based on elevation scanning provides high accuracy profiles with best vertical resolution close to the ground and has shown potential for monitoring of mixing layer height. In addition, cloud liquid water path can be retrieved, which is important for precipitation formation and the radiation budget. Rapid technological development within the last decade brought forward a generation of commercially available microwave radiometers (MWR) that can operate continuously with high temporal resolution under nearly all weather conditions except precipitation. Today, 100+ MWR are operated worldwide by different institutions and several weather services started to setup networks. However, up to now no international standards for operation have been established. In order to connect the various MWR users an International Microwave Radiometer network (MWRnet) was established in 2009 by the EG-CLIMET COST Action. It facilitates the exchange of information to ultimately establish an operational network sharing knowledge, software, procedures, formats, and quality control. New observational modes like spatial mapping of water vapor and clouds are explored. The follow-up COST Action TOPROF also fosters data assimilation into NWP models.*