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Title: *Lidar observations of short-term changes in water vapour mixing ratio over the Polish Polar Station at Hornsund*

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Water vapour is one of the key greenhouse gases in the Earth's atmosphere. Its distribution is highly variable in space and time. Since October2009, aground-based Raman lidar system has been deployed to perform a regular, night-time, vertical sounding of water vapour content in the lower and middle troposphere above Hornsund Station (77.00°N, 15.55°E,10 masl). Water vapour mixing ratio is obtained up to an altitude of6 kmfrom two inelastic Raman backscattering signals. The signals come from laser light of wavelength 355 nm scattered in Raman process from nitrogen (at 387 nm) and water vapour molecules (at 407 nm). For calibration, data from an automatic meteorological station were used.

Due to the high temporal and spatial resolution of lidar measurements and the ability of carrying out a continuous sounding, it is possible to detect short-term changes of water vapour content in the atmosphere. From all measurements performed in years 2009-2012, the most interesting cases of changes in water vapour mixing ratio will be presented. The origin of air masses observed by lidar was determined using Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT).