Introduction

The Raman lidar uses the scattering properties of molecules and aerosols to derive profiles of water vapor and other species, aerosols and temperature with a high vertical and temporal resolution. Raman lidars can cover an altitude range from a few hundreds of meters to the lower stratosphere. The most important application is the profiling of aerosols and water vapor and it is one of the few instruments, that can resolve the high spatial and temporal variability of water vapor.

Recent progress in lidar research brought Raman lidars into a nearly operational state and they are becoming suited for meteorological applications. The number of operational water-vapor and multi-wavelength Raman lidars is still very small. However commercial nitrogen Raman lidars have recently been developed for the detection and the characterization of atmospheric aerosols and more than 10 Nitrogen raman lidars are deployed over the world.

Raman LIDAR Fundamentals

Raman LIDAR Operational use

Raman LIDAR Error characteristics

Raman LIDAR Practical aspects

Raman LIDAR Sensor synergy

Key references:

- Water vapor and aerosol: Whiteman, 2003a, Whiteman, 2003b, Ansmann et al.,1990

- Temperature: Vaughan et al.,1993