

Development of Rayleigh Doppler lidar for measuring middle atmosphere winds

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Interpretation of most of the middle and upper atmospheric dynamical and chemical data relies on the climatological description of the wind field. Rayleigh Doppler lidar is one instrument which monitors wind profiles continuously (though continuity is limited to clear meteorological conditions) in the middle atmosphere. A Doppler wind lidar, operating in incoherent mode, gives excellent wind and temperature information at these altitudes with necessary spectral sensitivity. It observes atmospheric winds by measuring the spectral shift of the scattered light, due to the motions of atmospheric molecules with background winds and temperature by spectral broadening.

The presentation is about the design and development of Incoherent Doppler lidar to obtain wind information in the height regions of 30-65 km. The paper analyses and describes various types of techniques that can be adopted viz. Edge technique and Fringe Imaging technique. The paper brings out the scientific objectives, configuration, simulations, error sources and technical challenges involved in the development of Rayleigh Doppler lidar. The presentation also gives a novel technique for calibrating the lidar.