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Abstract

The measurement of the global tropospheric wind field would address one of the key unmet observational requirements for understanding and predicting the future state of the earth-atmosphere system. Accurate, global tropospheric wind data are needed for several key unresolved climate questions. A space-based Doppler wind lidar (DWL) would provide accurate, global tropospheric wind data for both climate studies and weather forecasting. Various types of DWL have been proposed in polar and International Space Station (ISS) orbit.

In this paper advantage and disadvantage comparison among direct detection, coherent detection, the Optical Autocovariance Wind Lidar (OAWL), polar orbit, ISS orbit will be discussed.

In order to evaluate DWL, Observing System Simulation Experiment (OSSE) have been conducted. Using OSSE is the most reliable strategy today to assess the quantitative impact from prospective observing systems. OSSE were conducted using Joint OSSE Nature Run produced by the European Center for Medium-Range Weather Forecasts (ECMWF). DWL data were simulated by Simpson Weather associates. A simulation of basic observations for control experiments was completed by the National Centers for Environmental Prediction (NCEP) and Joint Center for Satellite and Data Assimilation (JCSDA and shared with the Joint OSSE community.