

Technology and data utility challenges for a Doppler Wind Lidar on the International Space Station

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Abstract

The International Space Station (ISS) offers an existing and available platform designed to accommodate significant science payloads. This is especially true for research instruments looking for a spacecraft (bus) with adequate power, weight and volume allowances to conduct instrument demonstrations and/or short term (several years) science investigations. A Doppler Wind Lidar (DWL) is an example of such technology that has no space heritage and yet promises radically new observations of the atmosphere. While the expectations are for DWLs to be a component of the future operational suite of space-based observing systems, there is merit to using the technology for basic research to develop the basis for data utility within NWP and to provide extended evaluation and validation of current performance simulation models and OSSEs. Most recently, a proposal has been forming to deploy a research version of Global Wind Observing System (GWOS) on the ISS to focus upon tropical weather and tropical to extratropical transitions. The concept has been undergoing detailed feasibility studies funded by multiple agencies (NASA, NOAA and DoD). We will present a description of the hybrid (coherent and direct detection) Doppler Wind Lidar concept which is proposed for the GWOS that is being evaluated by NASA for possible space-based operations. We will also discuss some of the major issues being addressed such as the ISS attitude variations, high frequency vibrations, environmental contamination and data quality/data utility from an ISS perspective. Results from simulation experiments for the GWOS on the ISS using a Lidar Simulation model will be also presented.

15th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS). AMS annual meeting, January 25, 2011, Seattle, WA.