# Impact Assessment of Aeolus Wind on NOAA Global NWP Analyses and Forecasts

Kayo Ide*†[1], Hui Liu[2], Kevin Garrett[3], Katherine Lukens[2], and Ross Hoffman[2]

[1]University of Maryland – College Park, MD, United States
[2]NOAA and University of Maryland – College Park, MD, United States
[3]NOAA – College Park, MD, United States

**Abstract**

The Aeolus mission, launched by the European Space Agency in August 2018, provides the first observations of vertical wind profiles from a space-borne Doppler wind lidar (DWL). The Aeolus Atmospheric LAser Doppler Instrument (ALADIN) measures both molecular and Mie (e.g., aerosol, hydrometeor) backscatter to derive Horizontal Line of Sight (HLOS) winds throughout the troposphere and lower stratosphere. Since the data have been made available to the Aeolus cal/val teams in December 2018, NOAA has been evaluating the quality of the HLOS winds, characterizing random and systematic errors, integrating the observations into the NOAA Finite-Volume Cubed-Sphere Global Forecast System (FV3GFS) numerical weather prediction (NWP) model, and iterating on refinements to maximize the impact on medium-range forecasts. Several Observing System Experiments (OSEs) have been performed for different periods of the Aeolus record, and with various optimizations including the reprocessing of the Aeolus Level 2B data using the FV3GFS background and refinement of the observation operator components. In each case, the assimilation of Aeolus HLOS winds has shown positive impact on FV3GFS forecasts. In this study, we will provide a summary of the optimized data assimilation configuration for the FV3GFS including approaches to quality control, bias correction, and observation error specification, and draw some preliminary conclusions on the overall impact of Aeolus on NOAA global forecasts.

**Keywords:** 3Dwind impact assessment

*Speaker
†Corresponding author: ide@umd.edu