

Submission Title:

Boundary Layer Data Assimilation and Interaction with Parameterizations in the NASA GEOS Model

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Abstract

The NASA Global Modeling and Assimilation Office develops the Goddard Earth Observing System (GEOS), which assimilates a wide range of observations to support medium range and seasonal forecasts and production of reanalyses like MERRA-2. In this talk we report on recent efforts to assimilate boundary layer (PBL) height observations derived from radiosondes, GNSS radio occultation, space-based lidar (CALIPSO, CATS, IceSat-2) and ground-based lidar (MPLNET). A novel component of this project includes examining the influence of model parameterizations on PBL profile estimates. We will discuss physics-based parameterizations of the PBL and how they may benefit or distort representation of PBL profiles in data assimilation. In particular, we consider the tendency of PBL parameterizations to compensate for analysis updates of state variables, effectively reducing the information retained from observations. We will present efforts to reduce this compensation in GEOS by using the PBL height analysis to adjust length scales used in the model PBL parameterizations.