**Improving WRF Model Performance using Satellite Data Assimilation Technique for the Uintah Basin**

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***Abstract:***

In this study we investigate the applicability of Moderate Resolution Imaging Spectroradiometer (MODIS) satellite data assimilation to improve meteorological model (WRF) performance in simulating the physical processes occur in the interface of land and the atmosphere in the Uintah Basin. The accuracy of photochemical model, such as CMAQ, in simulating gaseous and aerosol species in the atmosphere is greatly affected by how their deposition rates and the energy fluxes at the ground surface are estimated. Leaf Area Index (LAI) and vegetation fraction (VF) are crucial parameters for determining such energy fluxes and deposition rates. In comparison with satellite observed data, WRF commonly overestimates vegetation covers which causes overestimation of dry deposition rate, i.e., lesser of chemical species in the air. To overcome this limitation, we assimilate the LAI and VF data retrieved from the MODIS satellite to WRF model simulation for high ozone episode in winter 2018-2019 in the Uintah Basin and examine for improvements in the model’s performance. This study serves as our first step into exploring the applicability of satellite data assimilation technique and the potential benefits of advance satellite products, such as those of the Landsat and Sentinel. In near future, we will perform assimilations of satellite observed data of snow cover and chemical species into our air quality modeling study in the Basin.