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Oral
Given the diversity of cloud forcing mechanisms, it is difficult to classify and characterize all cloud types through the depth of a specific troposphere. Importantly, different cloud families often coexist even at the same atmospheric level. The Naval Research Laboratory (NRL) is developing a machine learning based cloud forecast model for fusing numerical weather prediction model and satellite data. These models were built for the dual purposes of understanding numerical weather prediction model error trends as well as improving the accuracy and sensitivity of the forecasts. The framework implements a Unet-Convolution Neural Network with features extracted from clouds observed by the Geostationary Operational Environmental Satellite (GOES 16) as well as clouds predicted by the Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS)#. The fundamental idea behind this novel framework is the application of Unet-CNN for 5 separate variable sets extracted from GOES and COAMPS to characterize and predict a broad families of clouds: stable, unstable, deep precipitating, mid-tropospheric and upper tropospheric clouds. A quantitative assessment and evaluation based on an independent data set show that Unet-CNN improves not only the accuracy but also the equitable threat score. Results from this independent data set also suggest that the models capture the complexity and error trends of combined data from GOES and COAMPS, and also improve forecast accuracy and sensitivity for all cloud types for the 3 to 12 hour forecasts. An overview of frameworks and comparative assessments of results for all 5 cloud types will be presented
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