



IMS-IITM National Seminar

22 December 2022 | 4 pm to 5 pm

Venue : Meghdoot Auditorium, IITM, Pashan Road, Pune-411008

Title of the Talk

Development of NOAA's Community-based Coupled Unified Forecast System (UFS) for Research and Operations- Current Status and Future Plans



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About the Speaker

Dr. Vijay Tallapragada is the Senior Scientist (ST) and Chief of the Modeling and Data Assimilation Branch at NOAA's Environmental Modeling Center (EMC), leading and advancing the development and operational implementation of community-based numerical weather and climate prediction systems within the Unified Forecast System (UFS) framework. He is also serving as a co-lead of the UFS Research to Operations (UFS-R2O) project, and development manager of the Hurricane Forecast Improvement Program (HFIP). He has received many awards and honors including two Gold Medals from the US Department of Commerce, one for HWRP model implementation in 2013 and another for FV3GFS model implementation in 2019.

Dr. Tallapragada received his M.S. (Meteorology), M.Tech. (Atmospheric Sciences), and Ph.D. (Tropical Meteorology) from Andhra University, India. He has more than 130 publications in peer reviewed journals and book chapters, and was the recipient of AMS Banner Miller Award in 2019 along with AMS Weather and Forecasting Committee Distinguished Scientific Achievement Award, and has been recently elected as Fellow of the American Meteorological Society in 2022.

About the Talk

The next generation NWS/NCEP operational GFS and GEFS systems, GFSv17 (for medium-range deterministic predictions) and GEFSv13 (for subseasonal ensemble predictions), as well as the future seasonal forecasting system, SFSv1, are being developed as fully coupled atmosphere/land/ocean/sea-ice/wave/aerosols UFS applications in collaboration with several partners from the community. The final coupled system will consist of the FV3 dynamical core and CCPP atmospheric physics package, Noah MP land model, MOM6 ocean model, CICE6 sea ice model, WAVEWATCH III wave model, and GOCART aerosol model. To date, eight coupled UFS prototypes (P1-P8) with increasing complexity, number of components, and component refinement have been constructed towards that target. Deterministic forecast skill and biases are evaluated, and deficiencies needing developers' attention in subsequent iterations are identified for the aforementioned operational targets. In addition, the new ensemble system has been adapted from a fully coupled prototype (version 5; P5) with updated stochastic schemes for sub-seasonal forecasts out to 35 days. A 2-year experiment (Oct. 2017 - Sep. 2019) compared to current operational un-coupled GEFS demonstrates that the UFS based fully coupled GEFS has a comparable or better forecast skill in terms of extratropical extended weather and subseasonal predictions, and tropical subseasonal predictions, such as MJO. The same system has been extended at reduced horizontal resolution for both atmosphere and ocean, out to 9 months and 41 ensemble members, for seasonal prediction to demonstrate the ENSO prediction capability, systematic model errors and forecast uncertainty of seasonal time-scale. Some notable achievements of this new global coupled system demonstrated by these prototypes will be discussed along with significant challenges which must be addressed by future prototypes/configurations.



https://youtu.be/L3j7s7_btp8