

NWS SSD Perspectives on Unified Forecast System

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NCEP Production Suite Review

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OCONUS Considerations

- Pacific Region requirements for end-to-end gridded forecasts, including NBM/RTMA expansion
- Ensure Pacific Region is able to provide digital forecasts and derived products and services across their region. They need expanded gridded domains, observations, improved model guidance, and analyses for Hawaii, Guam, American Samoa and Micronesia.
- Minimum Required Guidance:
 - **Hawaii** (LAMP, HRRR, NBM, ARW and NMM)
 - RTMA and URMA
 - **Guam** RTMA (URMA not necessary)
 - **East/West Micronesia** (FV3GFS)
 - **American Samoa** (NBM, ARW, NMM and FV3GFS)
- Analyses: RTMA for Western and Eastern Micronesia and American Samoa
- Observations: Observations are a major limiting factor for any of these improvements as there are few, if any observations upstream of these locations.
- A major part of this milestone will be constructing a plan for these requirements. The actual implementation of the plan will be implemented over 3-5 years.
- PR needs the ECMWF0p25 model (we call ECMWF-Gbl) to become an "operational" model
- UKMET beyond 72 hours

Alaska perspectives

- UFS
 - The solution for Sea Ice is still unclear, especially at the higher resolutions required near coastlines for stakeholder IDSS?
 - OCONUS HiRes Ensemble Solution?
- Improving analyses systems - Especially in data sparse areas and complex terrain
 - Use of remotely sensed data for model data assimilation and analysis (Especially LEO at higher latitudes)
- Marine Gaps
 - Wave guidance in channels, fjords, complex coastline
 - Fractional Ice in Wave and Inundation Models



NWS Regional involvement in UFS

- Determine role of UFS output in CFP and collaborative messaging given NBM will be starting point
- Encourage use of parallel model output in WFOs/RFCs - web based interface
- Assist with evaluations - real time and retrospective
 - Marine & tropical environments
 - Convective, excessive rainfall events (CONUS)
 - Prolonged heavy rain and snow, mesoscale wind
- Encourage (e.g. CSTAR, HWT) academic community to migrate to UFS. Counterexample - this year's CSTAR proposals/LOI. Adjust RFP for UFS?
- Encourage more community investment in Postprocessing
- SRH willing to contribute to METplus V&V activities



Greatest Needs in Construction of UFS

- Enhanced, Coordinated postprocessing focus within entire community
- Enabling HSD (Hierarchical System Development) to become an integral part of UFS - enables researchers to have multiple entry points into development that reflect their areas of expertise
- Stand Alone Regional (SAR) FV3 - enables WoF and RRFS (FACETs)
- Establishing viable RRFS ensemble (CAM Ensemble system) to match and exceed skill of current MME/HREF and extend at least through Day 3.
- Specific targets: Optimize dispersion in GEFS and RRFS to assist messaging of extreme events, tropical systems, and other high-impact phenomena
- Application of machine learning methods to enhance value of high-impact forecasts
- A concurrent plan for model data access and visualization given current NWS challenges (SBN, etc)

End of SSD presentation

Additional Slides follow...

FFO - Unified Forecast System *(closes 2/7/2020)*

NOAA's National Weather Service (NWS) Office of Science and Technology Integration (OSTI) is soliciting research proposals to support NOAA's development of the community-based, coupled, comprehensive earth modeling system, the Unified Forecast System (UFS). The UFS is designed to provide more accurate forecast guidance through operational numerical weather prediction applications. These applications span local and global domains, and predictive time scales from sub-hourly to seasonal. This solicitation favors projects at specific stages of maturity as signified by their readiness level as described in Section 1.A.

There are three competitions from this notification valued at approximately \$2,800,000 for the first year of multi-year (2-year) projects that will advance development of the UFS: 1) Next Generation Global Prediction System (NGGPS); 2) Weeks 3-4 Program; and 3) Hurricane Forecast Improvement Program (HFIP).

Research projects to advance NGGPS will propose accelerating development of improved global weather prediction models; coupling among atmosphere, ocean, land surface and ice system model components; improving data assimilation techniques; improving ensemble techniques; developing post-processing forecast tools and techniques; or improving software architecture, computational performance and system engineering.

Proposals pertaining to the advancement of the Weeks 3-4 program will focus on the development of a coupled UFS system including data assimilation approaches, extending the forecast of the UFS from 3 weeks to seasonal timescales, and developing metrics including validation and verification.

Proposals for the HFIP initiative will relate to research required to improve operational tropical cyclone forecasting to meet societal requirements to effectively mitigate economic disruption.