

Reinvigorating the Activities of the UFS Physics Working Group to Address NOAA's Operational Needs

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Charge to the physic working group

- **Development of the physics parameterizations in the coupled UFS with advanced ideas and state-of-the-art techniques**
- **Short-term objectives: 1) Diagnose major deficiency in the GFSv16 physics suite, and 2) an incremental upgrade of the model physics suite with more advanced ideas and techniques to target the implementation in the GFSv17**
- **Long-term objective: deliver an advanced physics suite through an overhauled development that will be implemented in the GFS component of the coupled UFS beyond GFSv17**

A strategy for engagement and coordination

- **Two-tier task teams will be established.**
- **The NWS and OAR Co-Leads will form a task team to tackle the upgrade of the physics suite in the GFSv16, consisting of the developers, diagnostic experts, and subject-matter experts.**
- **A broader NOAA-led task team will be set up by expanding the smaller task team mentioned above, which consists of sub-task teams headed by the lead experts of individual parameterization components in the coupled UFS.**

Charge to the first task team

- **Focus on mitigating the major deficiencies of the GFSv16 physics suite through physical process diagnosis**
- **Based on the findings and enhanced understanding from the diagnosis, carry out an incremental improvement of the moist physics suite in the GFSv16**
- **Further enhancements in the physics development to better represent fluxes at the interfaces of the UFS component models, targeting the coupled reanalysis and reforecast project for GFSv17/GEFSv13 planned to begin in FY2022**

General tasks to achieve the long-term objectives

- **Form the second task team for achieving the long-term objectives, consisting of members selected by the UFS Physics Working Group Co-leads across the UFS community**
- **Based on the scientific and technical insight obtained by the first task team, develop other components of the moist physics suite with advanced ideas and technology to complement and interface with the new microphysics scheme**
- **Targeting for the implementation in the coupled UFS beyond the GFSv17/GEFSv13**
- **Harness community support by a close task coordination across the UFS deterministic and stochastic physics development teams**

Additional charge to the physics WG

- There is a need for providing guidance on the development of physics for SRW/CAM and Hurricane Applications.**
- The high-resolution nature of these applications demand physics development focused on specific severe weather conditions.**
- A selected team of scientists (Hi-Res Physics Task Team) should work in tandem with the task teams to accomplish these short term goals for RRFS and HAFS.**
- The team members for the Hi-Res Physics Task Team could be drawn from the global physics task teams.**

The final delivery will be a unified physics suite applicable across the MER, S2S, CAM and Hurricane forecast applications.

Next steps for the physics WG

- **Meet more regularly (at least once a month)**
- **Select the task teams for specific goals (short-term global, Hi-Res, and long-term)**
- **Continue interacting with HSUP, UFS-R2O and other funded physics projects**
- **Use the confluence space for Physics WG to document the interactions and communications**
- **Provide guidance to cross-cutting application teams and other WGs related to physics developments**