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The forthcoming Global Forecasting System GFSv17/GEFSv13 will be the first global forecast applications to become operational under the Unified Forecast System (UFS) infrastructure. As such, they will be the first versions of the GFS/GEFS that are fully coupled earth system models, including atmosphere, ocean, waves, land, and sea ice component models (with the addition of an aerosol component in GEFS). This development has been achieved through a collaborative effort involving NOAA and the broader numerical weather prediction community under the UFS and the UFS Research to Operations (R2O) project. The GFSv17/GEFSv13 includes innovations in physics, dynamics, coupling, and initial condition generation, which have been included in so-called “coupled prototypes” within the UFS in a stepwise manner. In this presentation we will provide a concise overview of the incremental changes introduced to the model physics during the prototype phases spanning from GFSv16 to the forthcoming GFSv17/GEFSv13. GFSv17 is targeted for medium range weather forecasts at 9 km horizontal grid-spacing. GEFSv13 is targeted for sub-seasonal forecasts at 25 km resolution. The model physics developed for GFSv17/GEFSv13 is also the starting point for the atmospheric component of the UFS Seasonal Forecast System (SFSv1), which will run for seasonal lead times at 50 km resolution. We will present challenges and successes in development of scale adaptive parameterizations for varying grid-sizes and target lead times, and in parameterization development for the coupled earth system.
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Bengtsson-Lisa.pdf
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