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THE US NOAA 3KM HOURLY HRRR WEATHER MODEL IN 2019-2020 – RECENT INNOVATIONS IN DATA ASSIMILATION AND PHYSICAL PROCESSES

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Résumé :

Short-range weather prediction has focused on improved forecasts fast-changing atmospheric phenomena with severe weather of all seasons. The NOAA Research ESRL / Global Systems Division in Boulder, CO, in collaboration with the larger meteorological modeling community (including NCAR) and the National Weather Service, has developed an increasingly complex and accurate set of hourly updating weather models culminating in the current well-known HRRR model. The accuracy of the High-Resolution Rapid Refresh (HRRR) model has a consequence of constantly improving data assimilation methods and representation of atmospheric processes including clouds, transport in the boundary-layer, and mesoscale dynamic processes.

Recent HRRR key changes includes introduction of a 3km ensemble data assimilation with 36 members in testing since 2018 and improved representation of subgrid-scale clouds and lakes. The best possible short-range weather prediction is now needed by many applications including aviation/transportation, renewable energy, hydrology, and public safety from severe weather. These uses will be described, along with highlights of the HRRR forecasts from 2018-2019.

Finally, the transition of the HRRR model into use of the alternative FV3 dynamic core (instead of WRF-ARW) has already begun as part of the NOAA transition to its Unified Forecast System (UFS). Planned continued development of this Rapid Refresh Forecast System (RRFS) toward implementation in 2023 will also be described.