

Monthly Report of the WRF Program Coordinator

October 2004

1. WRF Development

- **Next WRF operational implementations:** NCEP's **six-member WRF ensemble** system is on track for operational implementation by 31 March 2005 in the High-Resolution Window domains. **AFWA's first WRF implementation** remains on track for April or May 2005.
- **FNMOCC** announced at the Fall COPC (Committee of Operational Processing Centers) meeting that it will **fully migrate COAMPS into a streamlined WRF infrastructure by FY07**.
- Due to a delay in acquisition of its next IBM CCS hardware upgrade, NCEP's implementation of the 10-km **North American WRF-NMM** to replace the 12-km Eta has been delayed six months to **March 2006**.
- NCAR is beginning to **re-write the WRF Standard Initialization (SI) code**, based on requirements collected from the community and partners. Objectives are to make the code more reliable, install multi-processing to improve computational efficiency, and to provide some extension of functionality.
- **Documentation of WRF Infrastructure:** The WRF infrastructure documentation effort is continuing. A complete version is expected for release by the end of 2004. The **URL** for NCAR's on-line infrastructure documentation is http://box.mmm.ucar.edu/wrf/WG2/software_2.0/
- **Streamlined Infrastructure Development:** A list of **joint requirements** for building a streamlined WRF infrastructure, based on contributions from six of the WRF partners, plus OU, was distributed on 12 October. The requirements list is quite comprehensive, indicating that users desire to retain broad functionality in a streamlined infrastructure. Responses reflect a strong interest in code readability, logical modularity, efficiency, easy interfacing to new codes, more versatile I/O, and compatibility with ESMF.

Following a 2-3 month review of the current infrastructure and new ESMF codes, NCEP has committed resources to lead the **development of a prototype streamlined infrastructure** designed to be consistent with most of the joint infrastructure requirements. The working prototype is expected to be ready for internal evaluation by March 2005, with public release likely by mid-summer. At that time a **joint workshop** will be held with the WRF partners to examine the prototype's functionality, supportability and understandability, as described in the requirements. If the prototype is generally acceptable and successful,

development will continue toward fully integrating the existing WRF cores and physics by September 2006. NRL has expressed strong interest on integrating COAMPS into a successful streamlined infrastructure. NCEP invites the participation of interested partners in building, testing and evaluating the streamlined infrastructure at all stages of development.

- **Nesting for WRF:** NCAR has recently developed an initial moving nest capability for WRF-ARW. The two-way interactive, moving nest option has been demonstrated with a successful 4-km simulation of Hurricane Ivan. The additional overhead for moving the nest was found to be under 2% of total run time.
- **Upcoming releases of WRF-NMM codes:** NCEP is working to upgrade WRF-NMM to be compliant with **version 2** structure requirements. A **one-way nested version** of WRF-NMM has been developed and will complete its testing in November. Release of two-way nesting and a moveable nest option for WRF-NMMv2 are expected by June 2005.
- **Development of the NCEP Hurricane-WRF model:** A version of WRF-NMM especially configured for operational prediction of tropical storms is progressing rapidly at NCEP. An un-nested prototype version of **Hurricane-WRF with GFS physics was run in real time** on a number of hurricanes during the 2004 season. A **moveable nested-grid** capability is now under development for the Hurricane-WRF with assistance from NCAR. Other features will include more advanced GFDL physics, a new tropical 3DVar initialization, assimilation of airborne Doppler radar data, and coupling to the Wavewatch 3 and HYCOM models. The Hurricane version of WRF will be ready for operations in FY07.
- **Experimental Real-Time Hurricane Forecasts:** Successful real-time, cloud-resolving forecasts of Hurricanes Charley, Frances, Ivan and Jeanne were carried out by NCAR during the active months of August and September. Forecasts for each case to +48 h were made using the new WRF-ARW Version 2.0's nesting capability, with a **4-km grid nested within a 12-km outer grid**. For Hurricanes Ivan and Jeanne, longer 5-day predictions were made at 12-km resolution. The results demonstrated WRF-ARW's ability to predict the intensity and track of such storms.
- **Tutorial for Hurricane version of WRF:** A tutorial workshop was held in October at NCEP to provide training on the design and use of the new Hurricane WRF-NMM. About **25 investigators and students** were invited. Feedback was very enthusiastic. Discussions have begun with the Development Testbed Center to gradually take over WRF-NMM documentation and support to the user community.

2. **WRF and DTC - OTC**

- Preparations for the Central DTC's **WRF Winter Forecast Experiment** are now well advanced. Final code readiness and product distribution steps are being addressed. Forecasts are planned to begin 1 December 2004 and continue through 31 March 2005. Collaboration among the various participating agencies (NCAR, DTC, FSL, NCEP, NWS) has been very positive.
- Progress has been made on negotiation of the **draft TOR** for the Distributed DTC, although response is still being sought in some cases.

3. **WRF and COPC**

- The Committee of Operational Processing Centers (COPC) held its Fall meeting at NCEP on 27 October. The Program Coordinator delivered a partial draft for the **WRF Joint Implementation Plan**, covering implementation of the North American WRF-NMM at NCEP. The next phase will be to add sections on telecommunications for delivery of WRF-NMM forecast fields to FNMOC and AFWA.