

**Monthly Report
of the WRF Program Coordinator
to
Executive Oversight Board**

June-July 2005

1. WRF Model Implementation:

- **Next WRF operational implementations:**
 - (a) **NCEP** – On 28 June 2005 NCEP successfully implemented the WRF-NMM at **5.1-km** and WRF-ARW at **5.8 km** in its operational **High-Resolution Window domains** without convective parameterizations. Display products from the two WRF models will be made available on NCEP's public website by September 2005.
 - (b) **NCEP** – The next WRF operational implementation at NCEP will add **six WRF-based ensemble members** to its 32-km operational multi-model Short Range Ensemble Forecast (**SREF**) system by 30 September 2005. Based on the latest version WRF-2.1, three new members will be based on the WRF-ARW and three on the WRF-NMM, bringing the total members to 21.
 - (c) **AFWA – summer 2005: First operational implementation of WRF-ARW** in AFWA's classified domains remains on track.
- NCEP's implementation of the **North American Mesoscale (NAM) WRF-NMM** in March 2006 remains **on track**. The developmental version of the fully cycled system is undergoing work to improve computational efficiency in preparation for pre-implementation testing.

2. Community Support and Outreach:

- **NCAR has released WRF version 2.1 code**, containing both WRF-ARW and WRF-NMM, for community use. With the release of the new version, NCAR has provided updated **documentation**, "Description of the Advanced Research WRF Version 2" (Tech Note NCAR/TN-486+STR). The document is available at <http://www.mmm.ucar.edu/wrf/users/>
- The **2005 WRF User's Workshop** was held in Boulder, CO, 27-30 June. The workshop was a great success, with over 110 presentations and more than 150 attendees. Papers by attendees from foreign nations grew rapidly to 33. For the first time, the number of presentations from the rest of the community (outside of the WRF partner organizations) significantly exceeded those from the partners. This demonstrates that WRF is rapidly gaining acceptance as the primary community mesoscale model.

- One presenter at the WRF User's Workshop began his talk by stating that he was a 20-year user of the RAMS model, but had recently adopted WRF for his current research. He went on to say that he was delighted to find WRF is **easy to use** and that he was able to set up an end-to-end modeling configuration much more quickly than with other models he had used. To see a collection of other **user comments and "testimonials"** about WRF, go to http://www.mmm.ucar.edu/wrf/WG2/wsf_testimonials.htm

3. WRF Software Development

- **Infrastructure Development:** With recent upgrades at NCAR, **WRF** can now be run optionally as a **stand-alone ESMF component**. WRF supports the standard ESMF-specified "init", "run", and "finalize" component interfaces which are called by the ESMF superstructure. Note that this is really an internal milestone, since running WRF as a stand-alone ESMF component currently is useful only for validating the new interfaces. However, this functionality is now being extended to support coupling of WRF with other ESMF components.
- **Hurr-WRF:** Beginning in June, just in time for an early start to the 2005 hurricane season, NCEP has been running the developmental version of the Hurricane WRF four times daily. Hurr-WRF is based on a version of **WRF-NMM with vortex-following moveable one-way nested-grids** and physics from the GFS. Early results appear favorable and the nested grids have worked flawlessly so far. Hurricane WRF is expected to become operational in 2007 at NCEP. Two-way interfaces for the moveable nested WRF-NMM are expected to be ready by the end of 2005, following the hurricane season.

4. WRF Management

- The next **meeting of the WRF Executive Oversight Board** is scheduled for August 11, 2005, at AFWA. An agenda has been drafted.
- The **new WRF Agreement in Principle**, updated to reflect the inclusion of Army Research Lab, is being circulated for signatures.
- Planning is moving ahead for software experts to meet and develop a strategy for **merger** (integration) of the **WRF software framework and ESMF**. A charge has been developed to guide meeting participants. The charge has been distributed to the WRF Program Office and the meeting will be scheduled for early autumn (probably in September 2005).

5. WRF and DTC – OTC

- **Statistical evaluations** from the **DTC Winter Forecast Experiment (DWFE)** were completed and presented at the 2005 WRF User's Workshop in Boulder. Analysis of the results from the two WRF cores indicated that (a) both models produced solutions that contained considerable fine-scale detail not captured by current operational models, (b) differences between the observations and the model solutions were typically much greater than the differences between the two WRF solutions, (c) precipitation biases for large rain rates was large for both model versions, especially the WRF-NMM, and (d) at least for precipitation, the differences between equitable threat scores were shown to not be statistically significant.
- Formal **release of WRF-NMMv2** for community use is expected in mid/late August. It has been confirmed that the code release will include a one-way interactive nesting capability.
- Planning for the first DTC **tutorial on the WRF-NMM core** for new users has been moved back one month to September 27-29, 2005 to allow further time to complete preparations. The announcement of the tutorial is expected to be posted before the end of July.
- Directors of the Boulder and Monterey nodes of the WRF DTC met at NRL on 20 June to develop plans for **collaborative projects**. Such projects have been envisioned as an important opportunity provided through the **Distributed DTC** concept. Options discussed include joint development and conduct of a tutorial for WRF-COAMPS and joint participation in real-time modeling field studies.

6. WRF and COPC

- At the direction of COPC, representatives of AFWA, FNMOC and NCEP met at Offutt AFB on 22-23 June to continue work on the **WRF Joint Implementation Plan for North America (WJIP/NA)**. The meeting developed a plan for expanding communications to support distribution of WRF model datasets following implementation of NCEP's North American WRF-NMM in March 2006. The meeting also developed a plan for providing contingency capacity and backup to each other in case a catastrophic event knocks one operational center off line. Under the WJIP/NA, AFWA and FNMOC will cease running their limited area models over North America and instead will use NCEP WRF-NMM datasets. NCEP also will supply high-resolution GFS datasets to provide boundary conditions for limited-area models run at the sister operations centers and global ensemble members for mesoscale experimentation with a joint ensemble forecast system.

Glossary of WRF Acronyms
6 June 2005

AFWA	Air Force Weather Agency
AIP	Agreement In Principle
AO	Announcement of Opportunity
ARL	Army Research Laboratory
BAMEX	Bow Echo And MCV Experiment
COAMPS	Coupled Ocean-Atmosphere Mesoscale Prediction System™
COMET	Cooperative Program for Operational Meteorology, Education and Training
CONUS	CONTinental United States
COPC	Committee for Operational Processing Centers
DTC	Development Testbed Center
DWFE	DTC Winter Forecast Experiment
ESMF	Earth System Modeling Framework
ExOB	Executive Oversight Board
FSL	Forecast Systems Laboratory
FTE	Full-Time Equivalent
FNMOCC	Fleet Numerical Meteorology and Oceanography Center
GFS	NCEP Global Forecast System
GSI	Gridpoint Statistical Interpolation
JCSDA	Joint Center for Satellite Data Assimilation
MCV	Mesoscale Convective Vortex
MMM	NCAR Mesoscale and Microscale Meteorology division
NAM	NCEP North American Mesoscale domain
NCAR	National Center for Atmospheric Research
NCEP	National Center for Environmental Predictions
NCOM	Navy Coupled Ocean Model
NOGAPS	Navy Operational Global Atmospheric Prediction System
NOAA	National Oceanic and Atmospheric Administration
NRL	Naval Research Laboratory
NSSL	National Severe Storms Laboratory
NWS	National Weather Service
OAR	NOAA/Office of Oceanic and Atmospheric Research
OST	NWS/Office of Science and Technology
OTC	Operational Testbed Center
POP	Princeton Ocean Prediction model
QPF	Quantitative Precipitation Forecast
RAMS	Colorado State University Regional Atmospheric Modeling System
RTVS	Real Time Verification System
SPC	NCEP Storm Prediction Center
SREF	Short Range Ensemble Forecast
TOR	Terms of Reference
USWRP	US Weather Research Program
WRF	Weather Research and Forecast modeling system and program

WRF-ARW **WRF** **A**dvanced **R**esearch **WRF** dynamical core
WJIP **WRF** **J**oint **I**mplementation **P**lan of **C**O**P**C
WRF-NMM **WRF** **N**onhydrostatic **M**esoscale **M**odel dynamical core
WRF-SI **WRF** **S**tandard **I**nitialization