

EMC claims that HWRF forecasts are bit-wise reproducible for the operational configuration

- 1: Do test runs confirm that this is the case?
- 2: Is this true for the HWRF-x configuration?
- 3: What about alternative configurations?
- 4: What happens when the forecast extends past 0Z?
- 5: Can we isolate the likely sources of forecast variations?

Which HRS Physical Parameterizations result in bitwise reproducible forecasts?

Micro- Physics Schemes	
None	YES
WSM-5 class	YES
Ferrier *	YES
WSM-6 class graupel **	YES
Thompson et al	YES
Long-wave Radiation Schemes	
None	YES
RRTM **	YES
GFDL *	YES
Short-wave Radiation Schemes	
None	YES
Dudhia **	YES
Goddard	YES
GFDL *	YES

* NCEP Configuration

** HWRF-x Configuration

Surface Layer Schemes	
None	YES
Monin-Obukhov	YES
Janjic *	YES
NCEP GFS **	NO
Land Surface Schemes	
Noah	YES
NMM * **	YES
Boundary Layer Schemes	
None	YES
YSU	YES
Mellor-Yamada-Janjik TKE *	YES
NCEP GFS **	NO
Cumulus Convection Schemes	
None	YES
Kain - Fritsch	NO
Betts – Miller – Janjic *	YES
Grell – Devenyi	YES
Arakawa – Schubert (SAS) **	NO

Results of test runs

- NCEP configuration results in bit-wise reproducible forecasts for most time ranges.
- There seems to be a bug when the forecast spans 0Z.
- HWRF-x configuration is not bit –wise reproducible due to the cumulus convection and boundary / surface layer schemes

Hurricane Inner-core Data Assimilation Test Case **(insert snappy acronym here)**

At last month's meeting, we discussed the possibility of working on a single TC case as a focus for future development.

HRD would make aircraft and other data available.

15 'groups' are interested. A few are not yet ready, but this is a good way to focus efforts to be ready shortly.

[Possible 2009 HFIP demo project]

List of groups, in no particular order

- | | | |
|--|---------|---------------------------------|
| 1. SUNY-Albany
EnKF | WRF-ARW | Ryan Torn
ready 01 May |
| 2. COAPS/FSU
Use H*Wind surface analysis to build a vortex upward | WRF-ARW | Henry Winterbottom
ready now |
| 3. Oklahoma
EnKF | ARPS | Xuguang Wang
ready now |
| 4. Oklahoma
3DVAR | ARPS | Xuguang Wang
ready now |

5. AOML/HRD
EnKF

H-WRFX

Altug Aksoy
ready 01 August

6. ESRL/PSD
EnKF

GFS

Jeff Whitaker
ready now

7. ESRL/PSD
EnKF

FIM

Jeff Whitaker
01 June

8. PSU
EnKF

WRF-ARW

Fuqing Zhang
ready now

9. Utah
3DVAR

WRF-ARW

Zhaoxia Pu
ready now

- | | | |
|-----------------------------------|-------------------------|---------------------------|
| 10. Utah
4DVAR | WRF-ARW | Zhaoxia Pu
ready now |
| 11. ESRL/GSD
LAPS | WRF (either ARW or NMM) | Steve Albers
ready now |
| 12. ESRL/GSD
STMAS | WRF (either ARW or NMM) | Yuanfu Xie
01 June |
| 13. ESRL/PSD & EMC
GSI (3DVAR) | WRF (either ARW or NMM) | Yuanfu Xie
01 June |

14. Colorado State	Milija Zupanski
Maximum Likelihood Ensemble Filter (MLEF)	
WRF-ARW	01 July

15. RENCI	Brian Etherton
TBA	

Summary:

1. 15 separate tests
2. 6 ensemble techniques, 4 variational (3 3DVAR, 1 4DVAR), 1 hybrid, 1 vortex initialization, 3 others
3. Global, regional, and hurricane models all included

Next Steps

1. Let me know of anyone else who might be interested, or changes to the above list.
2. Participants will get together (e-mail, conference call?) to choose a case.
3. Participants will decide whether to use real-time or quality-controlled data and formats
4. HRD will make data available.
5. During this time, participants will also discuss evaluation metrics.

HFIP 2009 Demo Project

1. 01 August to 31 October, real-time
2. DA system for regional models beyond what is run operationally.
3. Real-time aircraft and operational data available