HFIP Diagnostics Workshop Summary and Recommendations

Agenda Summary

- Operational input from NHC
- Atmospheric diagnostics
  - EMC, NESDIS, CSU, GFDL, ESRL
- New verification techniques
  - JNT/NCAR
- Land surface, ocean, flux studies
  - GFDL, ESRL, EMC, URI, RSMAS

Model Diagnostic Work Matrix

	Models	Diagnostic Types	Tools
NESDIS/CIRA	HWRF	Large-scale atmos., Ocean, atmos. Energetics and PV, synthetic IR imagery	IDL, fortran
NCEP/NHC	HWRF, GFS, GFDL	Large-scale, Vortex scale atmos.	N-AWIPS
NCEP/EMC	HWRF, GFS, HyCOM, POM	Large and vortex scale atmos and ocean, CD/CE sensitivity	grads-based HPLOT
OAR/GFDL	HWRF, GFDL, GFS	Rainfall and vortex verification, Land surface models	fortran, grads
OAR/ESRL/NCAR	GFS, FIM, ECMWF	Large-scale, Vortex scale atmos., advanced verification tech., synthetic IR imagery	"Open-grads" application, DTC model evaluation toolkit
AOML/HRD	HWRF-X	Large-scale, vortex scale, convective scale atmos.	Java/Worldwind/grads interpolation/visualization/ diagnostic package
URI	POM, Wave Models	Ocean state variables	Fortran, grads, IDL
RSMAS	HyCOM	Taylor diagrams	Various
FSU	ARW	Large-scale, vortex scale atmos., PV, dQ/dp, ang mom, div eqn.	Fortran, grads

NHC Needs That May Require More Attention

- Guidance on Guidance
- Forecast reliability
- Predictability
- Ensemble applications
- *TC Genesis tracker, verification and diagnostics, with input from NHC*
- Methods to transition research tools to operations if appropriate

Discussion Issues and Recommendations

1. HFIP Baseline:
   - 20% improvement at all forecast intervals in 5 years
   - 50% in 10 years
   - Need to be defensible and reasonable
   - **Recommend using the current 3-year (2006-2008) NHC operational consensus (TVCN, ICON) error statistics**
   - **Recommend pursuing more research to identify predictability limits**
   - **Recommend running historically bad forecast storms with reanalysis**

2. What data sets do we need to share and how do we do it? Who is responsible for what?
   - Archive HWRF (GFDL?) grib files for atmosphere & ocean
   - Current EMC capacity – run every 6 h, keep 6 h output with 1 h for rain
   - HWRF-X available in HRD database/visualization system
   - Need to keep fields for lifecycle – pre-storm, invest, mature, landfall
   - Spatial domains, resolution -
   - Temporal resolution – 6, 3, 1, 0.5 h
   - Where do we keep it?
   - **Recommend forming working group to come up with approach to address the needs within resource limitations (ESRL, NESDIS, NCEP, HRD, ?) – DeMaria, Rogers, Tallapragada, Kim, Fiorino, Pasch, Nance, Surgi, Yablonsky**

Discussion Issues and Recommendations (continued)

3. Need to address Tracker issues (how do we distribute tracker code to community

- **Recommend support for implementing the tracker for the demo project this summer** – How do we support running tracker on any models we want to run this summer? Fiorino and Marchok will be focal points to coordinate use of tracker for demo project.
- **Recommend including tracker with HWRF release to repository through DTC in February 2010**

4. What fields should we save?

- No limitations for grib2 – can save anything we can imagine – not a technical issue
- Limitations for operational model due to time and space available – may be able to turn on extra variables
- **Recommend making available variables not in current operational grib files (vertical radiation profiles, vertical microphysical profiles for each species, non-hydrostatic pressure), and ocean model output (HYCOM and POM).**

Discussion Issues (continued)

5. Software tools – How do we share and utilize (for operations, research)?

- Open source, AWIPS-II (Red Hat Enterprise Linux, Java, netCDF4, HDF5) compatible – need to be consistent with NHC plans – grib2 converted to netcdf4 for AWIPS II
- NHC has beta version of AWIPS II under development - Chris Lauer POC
- **Recommend adherence to NHC operational path for model fields and applications to be demonstrated at NHC**
- POC for software tools – to insure no duplication of effort
  - HPLOT (GrADS)– Tallapragada & Marchok
  - HRD visualization system – Gopal (Thiago)
  - Diapost GrADS scripts - Rogers
  - OpenGrADS extensions – Fiorino
  - COAMPS tools – Hao
  - DTC MET – Brown
  - Ocean model tools (MatLab/Octave) – Kim & Yablonsky
  - Recommend developing openGrADS extension library for as many of the GrADS applications (HPLOT, HRD Diapost, ESRL extensions) – Fiorino, Rogers, Marchok
- **Recommend involvement in AWIPS II beta program – DeMaria POC**

Discussion Issues and Recommendations

6. Collaborations and responsibility
   - Ensure no duplication of effort
   - Ongoing collaborations and coordination already on-going
     - EMC – weekly HWRF meetings (telecon) includes J.-W. Bao, Ginis, HYCOM team – noon-1 PM EST – POC Tallapragada
     - HRD – monthly model meeting 3rd Thursday every month (VTC, telecon, GotoMeeting) – coordinate with EMC HWRF weekly meeting. Includes ESRL, DTC, FSU, RSMAS, NPS, NHC, ? – POC Gopal
     - HRD monthly DA meeting 4th Thursday every month (VTC, telecon, GotoMeeting) - 11-noon – POC Aberson
   - **Recommend quasi-quarterly verification/diagnostic team telecon/GotoMeeting – DeMaria, Marchok**
   - **Recommend we get HPC involved – Bob Kelly/Dave Roth**
7. How do we report to HFIP? Demo?
   - Review current HFIP milestones and insure we are on track
   - Inform HFIP leadership for quarterly status reports and provide input to Annual Operating Plan and milestone development for FY10
   - Coordinate with other 10 teams – November HFIP team meeting
   - **Recommend annual team meeting at NHC early in the Spring – TBA (avoid HWRF tutorial, IHC, AMS tropical meeting, WMO course)**