HFIP Team Telecon Minutes
1400 EST, Wednesday, 26 October 2011
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Bob Gall led the HFIP telecon held on October 26, 2011 from 1400 -1500 EST. The following items were discussed:

- Real time reservations
- Computing
- Presentations: 1) William Lewis (Performance and Development of the UW-NMS in 2011 2) Stan Goldenberg (Detailed Verifications in Support of HWRF Model Improvements)
- Next telecon is scheduled for **November 16, 2011 @ 1400EST**

Participants from NHC, NESDIS, ESRL, GFDL, NCAR, NRL, DTC, AOML, EMC, Oregon, HRD, University of Wisconsin, Craig Tierney (tjet), Dave McCarren (NUOPC), University of Albany, URI, and Penn State were present.

Reservations

Bob informed the team the real time reservations are scheduled to end on Monday October 31, 2011 at 11 am EST, tentatively. The will allow the machine to be used for other work. If there are any active storms, this will be postponed until Tuesday. Bob stated the GFS EnKF reservations take up half of the machine. There were no objections to bringing it down if there are no storms present. One reservation (EMC) will continue to run passed October 31, 2011. Vijay will email Craig the exact name of the reservation.

Computing

Bob provided a status on the Tjet computing. The new system is expected to be up and running by mid-November. The upgrades will increase total storage (double) and core capacity. Currently we are saturated on first system (600 – 700 TB). Craig will work with Bob to determine the best approach to allocating space on the two systems. He stated the users will have their directory created on the new file system and given a window of time to migrate their data (30 days). He will provide users with instructions on how to move jobs to new system. Bob asked users to send in their preferences for the system allocations.

University of Wisconsin Presentation

Will Lewis presented “Performance and Development of the UW-NMS in 2011” which focused on stream 1.5 configuration, 2011 demo performance, stream 2.0 modifications and performance. Slide 3 provided a summary of the stream 1.5 configuration which consists of two grids (40 km spacing and 8 km spacing). Both grids use Kuo cumulus parameterization. There is a 1-moment micro and 2-moment micro for rain/snow and pristine crystals, respectively. Radiation RRTM and NOAH LSM is used. Also have a 1.5 layer ocean model and a 1.5 order TKE closure. The Kwon and Cheong bogus and Andreas sea spray parameterization are also used. The dataset initial and boundary conditions come from the deterministic GFS analysis and the SST fields come from the

FNMOC GHRSST 9-km (slide 4). They use 1° climatology for subsurface ocean thermal structure, TCVITALS to drive bogus generation and data assimilation was not used in the studies.

Question: Is the 9-km SST analysis from the Operational? Yes

Will stated that they were seeing problems with the spin up and began to explore alternative to GFDL (slide 5). The Kwon and Cheong method was selected to allow the inclusion of a secondary circulation and it was fairly easy to code. Wisconsin uses a Kurhara filter for background vortex removal while Kwon and Cheong uses a spectral filter. The Kwon and Cheong algorithm works by interpolating the GFS field to the native model grid, identifying and removing the background vortex, constructing the bogus and modifying the moisture field towards saturation (slide 6). The Andreas scheme for surface flus was used to determine the impact of sea spray (slide 7). There was no spray effect below about 15kt and the spray was fully included above 25 kt. An example comparing the interfacial flux vs. the spray was provided in slide 8.

Will continued his presentation discussing the results of four tropical storms for 2011 as a means to illustrate performance of the Wisconsin model and outline issues. He presented track and intensity data (non-interpolated) for Irene (slides 10-11), Katia (slides 12-13), Nate (14-15) and Ophelia (slides 16-17). Performance for the Wisconsin model was compared to the GFDL and HWRF models. In general, the track performance of the Wisconsin model was comparable to HWRF. The GFDL model outperformed both models for Katia and was slightly better for Nate. The intensity performance for the Wisconsin model varied from storm to storm. It outperformed the other models in intensity bias for Irene. For Katia, it did not have the increasing bias throughout as seen with the other models. The intensity performance for Ophelia was pretty poor. The stream 1.5 TCMT analysis demonstrated the Wisconsin model is the most likely model to produce the best or worst forecast (slide 18). Will evaluated the intensity performance of weaker (<64 kt) vs. stronger storms (>64 kt) to try to understand the TCMT results (slides 19 – 24). The GFDL had large separation in performance in forecast intensity between weak and strong storms while there was little separation with the HWRF model and very large separation with the Wisconsin model after 12 hrs. The GFDL and HWRF models had small separation in performance for intensity bias after 60 and 80 hrs, respectively. However, there was a large separation for intensity bias seen with the Wisconsin model after 12 hrs. Will reconstructed the TCMT report and the presented the intensity forecast rank histogram for 2011 YTD (slides 25 – 27). The same split personality for the model performance was seen in which the weak storms had poor performance at 24 hrs, slightly better performance at 48 and 72 hours and good performance at 120 hrs. While the stronger storms (hurricane level), the model produced the most likely forecast between 72 – 120 hours. Will summarize the 2011 performance by stating the intensity forecast is different than other models (HWRF and GFDL) and the error evolution for initially weak storms is

different than well-developed storms which may be related to the role of the bogus and surface fluxes (slide 28). Modifications including constraints for RMW and humidity modifications were made to address bogus initialization and improvement in performance (slide 29). Results from stream 2.0 modifications demonstrated improved performance for forecast bias and error for several storms when compared to stream 1.5 (slides 30 – 33). Will concluded his presentation with an overview of the future work scheduled which included changes to the bogus vortex, threshold intensity, grid dimensions and creation and utilization of the cycling initialization (slide 34).

> **Question**: Do you reinitialize each time? Yes, we will try reinitializing from the 12 hr forecast with some manner of vortex relocation and possibly some tweaking of the intensity as well. Greg Tripoli suggested starting with previous 12 hrs and nudging the entire domain towards the GFS rather than initializing the domain and at the same time maintain an applied grid to the hurricane assimilation and make sure it moves with the TCVITALS.

Mark DeMaria also suggested Will may want to stratify his results by SST and SST changes in shear to evaluate the behavior since the storms this year were being driven by thermodynamics. He also informed Will that he has a diagnostic tool that he may use.

> **Question**: Do you agree that your issues seem to be related to initialization? Yes, first priority is to improve.

> **Question**: Have you thought about data assimilation? Yes data assimilation will be included in the future.

HRD presentation

Stan Goldberg presented “Detailed Verifications in Support of HWRF Model Improvements”. Gopal introduced the talk by stating the motivation behind the presentation was to evaluate the output of HWRF output, identify the strengths and weaknesses and conditions to improve the model. Stan informed the team the presentation will include three different case collections 1) HWRF (9:3 km) 87 cases 2) H3GP (27:9:3 km) 597 cases from 2008 – 2010 and 3) H3GP (27:9:3 km) 208 cases from 2011. The track forecast skill is compared to Clipper and the intensity forecast skill is compared to DSHP for all the data presented. The HWRF results from Gopalakrishnan et al. 2012 demonstrate marginal skill for numerical models (slide 2). When the data is stratified and you look at the initially hurricane strength storms vs. the weaker storms you see the models have a harder time with the weaker storms (slide 3). The H3GP model performed better than the HWRF for track and intensity with a larger case size (slide 4). Stan stated the track forecast skill consistently degrades with interpolation but performance is the same or improved for intensity. Stratification illustrated the H3GP improved over HWRF for intensity for initially hurricane strength

and there was no significant skill for any model with the weaker storms (slide 5). The track forecast skill for H3GP was comparable with HWRF and slightly worse than GFDL for the 2011 real time runs while there was mixed performance for intensity forecast (slide 6). The stratified intensity forecast with H3GP for the initially strength storms improved over HWRF and GFDL but there was no significant skill with the weaker storms (slide 7). Stan presented the data from the early models only to demonstrate H3GP improved over HWRF and GFDL for intensity forecast (slide 8). In summary, the track and intensity performance for H3GP was 1) better/comparable than HWRF 2) comparable to GFDL and 3) interpolation degraded track slightly but generally improved intensity forecast (slide 9).

> **Question**: Can you verify what data is being compared when you discuss interpolated vs not interpolated data? Yes. The interpolated data is at the same time as the non-interpolated data for the model. It was also explained that it is not the same run.
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> **Question**: Has there been any word about funding? Not officially

Upcoming HFIP Telecon

There next telecon is scheduled for the November 16, 2011 1400 – 1500 EST.