

## HAFS Coordination Meeting Minutes/chat log

July 21, 2021, 2-3 pm ET

**Participants:** Kyle Ahern, Ghassan Alaka, Maria Aristizabal, Morris Bender, Li Bi, Mrinal Biswas, Xiaomin Chen, Bantwale Enyew, Michael Erickson, Sundararaman Gopalakrishnan, Lew Gramer, Matthew Green, Andrew Hazelton, Tara Jensen, Youngsun Jung, Evan Kalina, Hyun-Sook Kim, Bin Liu, Frank Marks, Avichal Mehra, Matthew Morin, Linlin Pan, Jonathan Poterjoy, William Ramstrom, JungHoon Shin, John Steffen, Biju Thomas, Sidney Thurston, Sikchya Upadhayay, Weiguo Wang, Xuguang Wang, Fanglin Yang, Chunxi Zhang, Jun Zhang, Xuejin Zhang, Zhan Zhang, Lin Zhu, Ping Zhu.

EMC ([HAFS DA Project Update](#), Zhan Zhang)

- Assimilated corrected tempdrop data, METAR data and enhanced GOES-R Atmospheric Motion Vector (AMV). TC vitals are also assimilated in HAFS.
- Substantial bugfix on workflow and source code in collaboration with community developers.
- New HAFS workflow includes DA and coupling components while some other components such as EnVar, sky radiance are not added yet.
- Tested enhanced GOES-R AMVs for hurricane Dorian, AMV data improved track forecast before day 3 but degraded after 4.
- Storm size verification comparison shows improvement with meso-sector AMV data.
- HAFS-D realtime experiment model configuration is same as HAFS-A, DA options are 6-hourly hybrid 3DEnVar by using GDAS 6-h ensemble forecasts and 3-hourly FGAT. TDR and GOES-R data not included due to jet memory and HYCOM coupling.
- Comparison between HAFS-A and HAFS-D tested with Hurricane Claudette shows slightly left bias in track forecast in HAFS-D. Similar comparison with Hurricane Elsa shows slight right track bias in HAFS-D compared to HAFS-A.

Q. Are you running with EMKF with ocean coupling? Yes.

OU ([OU HAFS DA research and development](#), Xuguang Wang)

- Developing self-cycled dual resolution HAFS hybrid EnVar DA system from both workflow and source code
- Added capabilities such as FGAT, EnVar, 4DEnVar, and HAFS ensembles.
- Resolved significant bug issues in HAFS hybrid EnVar DA system.
- Developing GOES-16 ABI all sky radiance data assimilation in HAFS.
- Exp. design includes 40 member ensembles, dual-resolution 3DEnVar with 3 km ESG grid and assimilated obs.
- Test results for Laura: compared to radar composite from HRD, analysis is closer to the observations than the background.
- Finished initial cycling, preliminary results only: comparable HAFS intensity results to HWRF and better track forecast compared to HWRF.

- Continued development of ABI all sky radiance DA capabilities, and development of bias correction methods for ABI all sky radiance assimilation and also development of 4DVar for HAFS.

UMD ([HU-2: Accelerate the development of the Hurricane Analysis and Forecasting System](#)).

Jon Poterjoy)

- Model config is the same as EMC and OU using 6-km grid spacing.
- Three different comparisons bias options considered- two ongoing, third starting from scratch. Continue comparison of EnKF vs. E3DVar and local PF (particle filter).
- Exp. period of Aug 11 - Sept 18 shows negative bias.
- Local particle filter and EnKF, can do large scale DA without computation cost.
- Numerous experiments currently underway - testing of HAFS components (Var, EnKF, etc.), optimize clear-air DA, explore potential for non-stop sequential DA, new filter methodology.

**Chat:**

Andrew Hazelton - NOAA Affiliate2:11 PM

Odd that the HAMV assimilation make the track error worse at long range. Any idea why?

Frank Marks - NOAA Federal2:23 PM

@Zhan great work. It appears that the static nest allows the DA system to provide the best IC for HAFS. I am hoping that we can get similar results with the moving nest development.

Xuguang Wang - NOAA Affiliate2:25 PM

HAFS: no coupling on DA. coupling at model level.

Hyun-Sook Kim - NOAA Federal2:27 PM

Xuguang, I understand that there is no coupled DA. My question is not about it.

I was asking about the HAFS ensemble!

Zhan Zhang - NOAA Federal2:32 PM

@Frank Yes, with all the recent bug fixes, the HAFS DA system seems working properly now. We will focus our work on the inner-core initialization and DA for the telescopic nest

Frank Marks - NOAA Federal2:32 PM

Great!

Frank Marks - NOAA Federal2:34 PM

I also hope we can get the new observation viewer you developed for HWRF running for HAFS so we can see what obs are in each cycle. I really like that diagnostic, and I think that so will NHC.

Zhan Zhang - NOAA Federal2:39 PM

@Frank We will include the DA awareness plots in the HAFS-D workflow after the TDR memory issue is resolved.

Li Bi - NOAA Affiliate2:42 PM

In the CRTM 2.2.6 for the current HAFS DA workflow, there is no cloud fraction, how do you handle the all sky assimilation for ABI @Xuguang

Frank Marks - NOAA Federal2:44 PM

@Xuguang very nice progress.

Xuguang Wang - NOAA Affiliate2:45 PM

Thanks Frank

Xuguang Wang - NOAA Affiliate2:56 PM

@Li Bi we can talk about this Fri. We add hydrometeors in HAFS

Li Bi - NOAA Affiliate2:58 PM

The CRTM 2.2.6 code doesn't have cloud fraction option, this is not HAFS related. We can talk about this Fri. Thanks.

Xuguang Wang - NOAA Affiliate2:59 PM

We can chat Fri.

Frank Marks - NOAA Federal3:01 PM

@Jon I am really interested in the comparison of the different solvers and the PF approach, particularly for satellite obs. The hybrid approach looks promising.