

HAFS Coordination Meeting
May 26, 2021, 2-3 pm ET
(All times in ET)
Minutes/chat

HAFSv0.2A (Regional HAFS) - Bin Liu, EMC

- HAFSv0.2A regional and ocean-coupled real-time experiment is based on the 2020 HAFSv0.1A with 3-km regional Extended Schmidt Gnomonic (ESG) grid and CMEPS-based HYCOM ocean coupling.
- HAFS physics suite optimized for hurricane forecasting and latest infrastructure and dynamics advancements of the HAFS application.
- The HAFSv0.2A real-time experiment will also serve as a baseline/control experiment for other HAFS-based real-time parallel experiments.
- Model configurations in three phases starting with baseline, phase 2 and 3 configurations with added FV3ATM components.

HAFSv0.2B (Global-HAFS) - Andrew Hazelton, AOML

- Real-time demo planning for 168h forecasts 4x daily
- Grid config: with 13-km global resolution (C768), Static 3-km nest covering most of the tropical Atlantic, L75 vertical level, expand the eastern edge, coupled to HYCOM.
- Physics config: PBL: modified EDMF-TKE used in 2020, compared with set of hindcasts using Hybrid-EDMF, MEDMF-TKE, convection turn on for the nest
- Ocean coupling to tropical-channel HYCOM at ~9 km to the global domain
- Products displayed at AOML model viewer:
<https://storm.aoml.noaa.gov/basin/?projectName=BASIN>.
- Exp guidance will be available for NHC for evaluation.

Q. Are you tracking files outside of the domain? yes.

HAFSv0.2D (HAFS DA) - Li Bi, EMC

- Configuration - FV3ATM 3-km 91L FV3 regional ESG-grids, GFDL microphysics, RRTMG radiation; scale-aware SAS convection, Noah LSM, GFS surface layer, scale-aware SAS, TKE-EDMF PBL scheme, orographic GWD turned on but convective GWD turned off; NSST component turned off.
- CMEPS based ocean coupling with HYCOM, 1/12-degree resolution NATL domain with L41, Ocean IC from RTOFSv2 and persistent oceanic LBC.
- 6-hourly hybrid 3DnVar by using GDAS 6-h ensemble forecasts and 3-hourly FGAT.
- All sky assimilation not considered, bias correction from GDAS; occlusion and conventional observations included.
- Pre-experiment results: no vertex relocation, track errors reduced, mixed results with intensity (expected)
- DA job takes less than 30 mins and forecast is 5 hrs.

HAFSv0.2E - Zhan Zhang, EMC

- This is the second year of HAFS ensembles testing in real-time.
- Ensembles have gained 10% improvement in both track and intensity forecast
- Hafs ensembles configuration is based on HAFSv0.2A as a baseline while the host model is GFS for IC and BC.

- Initial results shows that results are comparable upto day 4, while day 5 sample size is very small to make an assessment.
- For pre-processing jobs (IC/BC), plans to run 21 members that take 10 min, for forecast/post/product jobs with 21 members will take 320 min.
- The ensemble members may be run in different platforms - jet and orion.

T-SHiELD - Morris Bender, GFDL

- The initial testing of 2021 T-SHiELD with modified entrainment/detrainment in shallow convection scheme showed significantly reduced excessive cloudiness found in 2020 T-SHiELD at the lower model levels.
- Furthermore, T-SHiELD has demonstrated much reduced positive east-west track bias with modified shallow convection. This east track bias was very significant in 2020.
- There is small improvement in overall track skill (~3%) over a multi-season evaluation but 10% reduction in track error compared to the Version 15 GFS. Reduction in track error was larger for 2020 season (~10% at day 5).
- 2021 T-SHiELD had mostly a neutral impact on Intensity Skill comparable to 2020 version, which was already producing very skillful intensity forecasts.

Chat log

Frank Marks - NOAA Federal 2:11 PM

@Bin how does H2PC do on 34-kt radii?

For PBL schemes it is critical to evaluate the structure to see any gains.

Frank Marks - NOAA Federal 2:13 PM

@Bin on the track performance did you see a change in the strength of the ridge that was an issue for track bias the last two seasons?

Andrew Hazelton - NOAA Affiliate 2:16 PM

@Frank, the vertical levels seem to matter for R34 as well. Our L75 + modified EDMF-TKE for HAFS-B last year didn't have the same initial large bias

Evan Kalina - NOAA Affiliate 2:16 PM

Does the phase 3 configuration produce similar results to H2PC?

Bin Liu - NOAA Affiliate 2:18 PM

https://www.emc.ncep.noaa.gov/gc_wmb/vxt/bliu/stats2020/ALAL1821_H2PC_AL1821_lset3/stats.php

@Frank more stats figures:

Bin Liu - NOAA Affiliate 2:19 PM

https://www.emc.ncep.noaa.gov/gc_wmb/vxt/bliu/stats2020/ALAL1821_H2PC_AL1821_lset4/stats.php

Morris Bender - NOAA Federal 2:21 PM

Frank you will see in my talk a huge reduction in our large east bias in 2021 T-SHiELD by reducing detrainment of liquid water into the grid-scale cloud water. It reduced a large low level excessive cloudiness.....

Frank Marks - NOAA Federal 2:22 PM

@Bin Thanks.

Xuejin Zhang - NOAA Federal 2:22 PM

Different from last year, will HAFSv0.2a use ESG grid? Do you plan to run 7-day forecasts? @Bin

Bin Liu - NOAA Affiliate 2:22 PM

@Evan We are just about to kick off the HAFSv0.2 phase3 configuration right now. We are hoping it should be similar to or better than HAFSv0.2 phase2 configuration. We update the progress in the future.

Evan Kalina - NOAA Affiliate 2:23 PM

Exciting. Thanks Bin.

Lew Gramer - NOAA Affiliate 2:23 PM

Seconding @Andy: @Dan Rosen has been and continues to be a huge help. Thank you, Dan!

Bin Liu - NOAA Affiliate 2:23 PM

Yes HAFSv0.2A uses ESG grid. Will probably cannot afford extending the forecast to 7-days for this year.

@Xuejin, the 5-day forecast now already need 5 hour wallclock time.

Frank Marks - NOAA Federal 2:32 PM
@Li are you testing any ocean DA?
Lew Gramer - NOAA Affiliate 2:32 PM
@Frank +1
Yonghui Weng - NOAA Affiliate 2:32 PM
Frank, no, we are just working on ATM DA now.
Evan Kalina - NOAA Affiliate 2:34 PM
@Li Do you update the LBC @ t=0h? Any concerns about discontinuities between the t=0h LBC and the DA analysis?
Frank Marks - NOAA Federal 2:34 PM
Thanks @Yonghui
Yonghui Weng - NOAA Affiliate 2:35 PM
Evan, no, we will add the bc update step into the workflow later.
Evan Kalina - NOAA Affiliate 2:35 PM
Ok, thanks Yonghui
Zhan Zhang - NOAA Federal 2:35 PM
@Li will assimilating enhanced AMV data add more computer resource, i.e. longer run time?
Frank Marks - NOAA Federal 2:36 PM
@Yonghui @Hyun-Sook is working with @Andy and @Lew to couple HYCOM to HAFS - 02B and also doing some development of ocean DA.
Yonghui Weng - NOAA Affiliate 2:37 PM
@Zhan, currently the most time spent on HAFS-GSI is loading ENS members, the AMV's part shouldn't take much times.
Hyun-Sook Kim - NOAA Federal 2:37 PM
@Frank, Once RTOFS DA package is available to us, which is any day, I will work on implementing the DA.
Frank Marks - NOAA Federal 2:38 PM
Thanks @Hyun-Sook. I just want @Yonghui to be aware of your efforts so we can coordinate with EMC.
Yonghui Weng - NOAA Affiliate 2:39 PM
Thanks, @Frank and @Hyun-Sook.
Frank Marks - NOAA Federal 2:41 PM
@Zhan can we add some diagnostics to the ensemble on structure, e.g., RMW and R34 uncertainty? This would be very useful to have for the storm surge folks to evaluate.
Frank Marks - NOAA Federal 2:42 PM
@Zhan any diagnostic for rainfall from the ensemble would also be interesting to see. I think the WPC folks working on HAFS rain evaluation would find that usefull
Hyun-Sook Kim - NOAA Federal 2:43 PM
@Zhan, Can you consider perturbing NSST in your ensemble?
Zhan Zhang - NOAA Federal 2:48 PM
@Frank we have not done evaluation and diagnostics for rainfall yet, this is important and is in our to-do list.
Frank Marks - NOAA Federal 2:49 PM
@Zhan how about the structure metrics?
Zhan Zhang - NOAA Federal 2:51 PM
@Hyun-Sook yes, we can. do you suggest we perturb NSST at initial time? (or very integration time step)
Hyun-Sook Kim - NOAA Federal 2:52 PM
@Zhan, I would suggest perturbing from t=0.
Frank Marks - NOAA Federal 2:53 PM
@Morris nice result. Is the east Atlantic low cloud low bias an affect from reducing the stratocu over the cooler water?
Frank Marks - NOAA Federal 2:55 PM
@Andy we might want to test the change in detrainment in HAFS-B.
Zhan Zhang - NOAA Federal 2:55 PM
@Frank the structure metrics may be difficult, because the TC centers from each ensemble members are not collocated, and TC sizes may be different as well. Need to come up an optimal way to do TC ensemble structure presentation

Andrew Hazelton - NOAA Affiliate 2:55 PM

@Frank yeah

I will talk to Morris and Kun

Jun Zhang - NOAA Affiliate 2:57 PM

@Morris, entrainment/detrainment in the shallow convection scheme is coupled with the EDMF PBL scheme. The mass flux component of the PBL scheme has a some similarity with the shallow convection scheme.

Timothy Marchok - NOAA Federal 2:57 PM

@Zack ... Matt Morin had a nice suite of ensemble-based size & structure plots from our old GFDL ensemble system.

Frank Marks - NOAA Federal 2:58 PM

@Zhan I think just a presentation of the spread in the radii among the members relative each members center would be useful. What I think the surge folks want to know is the spread of the radii from the model relative to the climatological spread they are currently using in P-Surge.

Zhan Zhang - NOAA Federal 3:00 PM

@Frank Good idea! Thanks for the suggestion.

Frank Marks - NOAA Federal 3:01 PM

@Zhan I think having a similar metric for center and intensity spread would be interesting to them as well.

Morris Bender - NOAA Federal 3:01 PM

Frank we are going to look more what it is doing to the ridge