

2020 HFIP Annual Workshop Chat - Day 2 (Nov 18):

Mark DeMaria - NOAA Federal12:09 PM

Is RTOFS initial condition similar to Navy NCODA?

Hyun-Sook Kim - NOAA Federal12:11 PM

@Mark, no. But, RTOFS uses a 48-hr prior Navy NCODA driven restart for daily products after a 2-day spin-up.

Xuguang Wang - NOAA Affiliate12:14 PM

@ Jason Sippel @ Avichal: Very glad the ground based radar radial wind assimilation is now in operational HWRF as a result of collaboration among many entities!!!

Scott Sandgathe12:14 PM

Is there aircraft verification of EPAC intensity? Do we know whether the error is in the BT or in the model intensity?

Hyun-Sook Kim - NOAA Federal12:14 PM

@Mark, From Dec, 2020, EMC produces daily RTOFS using its 3DVar DA (similar to NCODA).

Michael Brennan - NOAA Federal12:15 PM

@Scott - there is very little aircraft data available in the EP. There were a few recon flights into Douglas in the central Pacific this year, but that was about it.

Jun Zhang - NOAA Affiliate12:16 PM

@Avichal, does the new drag (Cd) formula in HMON based on COARE 3 have the setup for Cd to level off at wind speeds higher than hurricane-force wind speed?

Frank Marks - NOAA Federal12:19 PM

@Avichal how did HWRF and HMON do with RI cases?

Ghassan Alaka - NOAA Federal12:20 PM

Amazing job by the EMC hurricane team!

Ligia Bernardet - NOAA Federal12:20 PM

@Avichal, GFS v16 is more cyclogenetic than GFS v15. Does that affect HWRF/HMON?

Dorothy Koch12:20 PM

@Avichal: To what could intensification successes be primarily attributed?

Ghassan Alaka - NOAA Federal12:22 PM

@Frank, HWRF RI was very well-calibrated this year. The 95th percentile of 24-h intensity change was 30 kt/24 h. I will show this later today.

Frank Marks - NOAA Federal12:23 PM

Thanks @Gus

Jason Sippel - NOAA Federal12:23 PM

@Ligia - it caused problems in the MDR for HWRF

more false alarms

Peter Black - NOAA Affiliate12:23 PM

Avichal- How do you separate improvements from better sonde data from Model physics improvements?

Ligia Bernardet - NOAA Federal 12:24 PM

@Jason, Sorry what is MDR? I was referring to GFS v16 creating more new storms. Then those storms might enter the HWRF/HMON domains.

Frank Marks - NOAA Federal 12:24 PM

@Pete better physics leads to better DA because the model and observations are more consistent in the DA step.

Jason Sippel - NOAA Federal 12:26 PM

@Ligia - yes, GFS appears to be more moist in the lower-mid troposphere, which is causing storms to be more intense. We noticed that HWRF run off GFS16 has a much higher intensity bias at the longer lead times for storms in the main development region (MDR)

Jason Sippel - NOAA Federal 12:26 PM

@Ligia - yes, GFS appears to be more moist in the lower-mid troposphere, which is causing storms to be more intense. We noticed that HWRF run off GFS16 has a much higher intensity bias at the longer lead times for storms in the main development region (MDR)

Ligia Bernardet - NOAA Federal 12:27 PM

@Jason, yes, I was thinking that would be the case.

Jason Sippel - NOAA Federal 12:27 PM

That was the primary reason for the increase in intensity bias that Avichal noted... it's coming from storms out of the MDR, not elsewhere

Ghassan Alaka - NOAA Federal 12:30 PM

@Ligia @Jason, HWRF intensity forecasts for invests (at the initial time) has a slight positive bias at short lead times and actually had a negative bias at longer lead times. I will show this later. HWRF intensity forecasts for TCs in the MDR had a positive bias, as Jason noted.

Jason Sippel - NOAA Federal 12:32 PM

@Vijay is the right-of-track bias a result of a change in intensity bias?

Peter Black - NOAA Affiliate 12:35 PM

What is the latitude cutoff for the new COSMIC RO observations? Any prospects for a second COSMIC satellite to better cover the tropics?

Evan Kalina - NOAA Affiliate 12:35 PM

I also wonder if the right-of-track-bias could be related to differences in convective distribution around the TC center in the model versus observations. The storm center can be pulled in the direction of the convection in situations with weak steering.

Evan Kalina - NOAA Affiliate 12:36 PM

A slower-moving storm, on average, in GFSv16 implies weaker steering currents on average.

Jason Sippel - NOAA Federal 12:36 PM

Yeah I was thinking of the beta effect... if storms are bigger/stronger, they're going to tend to go right more

Ligia Bernardet - NOAA Federal 12:36 PM

Could the right-of-track-bias be attributed to a weak or misplaced subtropical high?

Stanley Goldenberg - NOAA Federal12:36 PM

How consistent is the right of track bias? Is it dominated by a few storms or is it somewhat consistent. It would be easy to do an FSP on bias

Evan Kalina - NOAA Affiliate12:37 PM

@Jason Yeah that's a possibility as well.

Mrinal Biswas12:37 PM

Is the right track bias dominant for only weaker storms?

Stanley Goldenberg - NOAA Federal12:39 PM

Stratifying samples for verifications in various ways can really help to understand what is really happening. Overall averages can smear results and misleading

Oops - mine should have ended with can lead to misleading conclusions

Peter Black - NOAA Affiliate12:39 PM

Can new SWH (Sig Wave HT) data from P3s be added to HDOBs in order to assimilate with other HDOB parameters.

Jason Sippel - NOAA Federal12:40 PM

@gopal/vijay - or is it related to intensity bias changes

Ghassan Alaka - NOAA Federal12:41 PM

@Ligia, great question. We have been trying to look into biases in the subtropical high with HAFS.

Alan Brammer - NOAA Affiliate12:41 PM

Are the track data (adecks) from the GEFS reforecast available without processing the whole dataset ourselves?

Eric Blake - NOAA Federal12:41 PM

Hi Vijay- thanks for the talk. It does concern me to see that there are no more GFS updates until 2024. One thing I noticed on the parallel GFS is that it has false alarms, even in a busy year like 2020. It does concern me in the next quiet year that there could be an issue, not to mention the robust intensification that the GFSP has been showing. Thanks!

Avichal Mehra - NOAA Federal12:41 PM

@Pete: We are not yet set up to assimilate SWH in the wave component. But plan to do so in the future.

Peter Black - NOAA Affiliate12:43 PM

Thanks, Avichal. After the next model update in 2014?

Jun Zhang - NOAA Affiliate12:43 PM

@Vijay @Avichal, coupling of the GFS ensemble system to wave ensemble system is impressive.

Ligia Bernardet - NOAA Federal12:44 PM

@Gus, what methodology are you using? It might be interesting to do some composites to show the average strength and location of the high in the model vs analysis. That is, if we can trust the analyses over the AL...

Peter Black - NOAA Affiliate12:45 PM

@avichal. Thanks

Ghassan Alaka - NOAA Federal12:45 PM

@Ligia, we haven't begun our evaluation yet. We are planning to dig into this once the season ends. As you mentioned, we will likely compare forecast composites with analysis composites to identify if there is a "drift" in the high throughout the forecasts.

Keep in mind this is for the 3km nest in HAFS-globalnest (HAFS V0.1B)

Andrew Hazelton - NOAA Affiliate 12:47 PM

@Ligia, we have the full global fields archived for HAFS-globalnest (HAFSV0.1B) this year as well

So we can and plan to try to evaluate large-scale skill

Ligia Bernardet - NOAA Federal 12:49 PM

@Gus and @Andy This sounds like a great plan. It would be also good to look at the GFS v16 forecasts with that methodology. It sounds like this is outside your scope, which focuses on HAFS

Ghassan Alaka - NOAA Federal 12:52 PM

@Ligia, I would like to include GFS v16 in our evaluation to see if the nest feedback on the global domain is important. But, yes, our priority is HAFS.

Dorothy Koch 12:56 PM

600% - go hurricane team!

Ghassan Alaka - NOAA Federal 12:58 PM

@Vijay, the older partitions really limit us on Jet. Those older partitions account for most of the unused allocation (tjet/ujet/sjet). DA tasks can't even run on those partitions, so it is nearly impossible to run a cycled system there.

Frank Marks - NOAA Federal 1:00 PM

@Dorothy & @Youngsun I think we need to come up with a plan for Jet usage moving forward. We may need to prioritize getting HAFS working on as many of the JET systems as possible. That may mean investing in the upgrades Vijay mentioned. We can always use the JET systems for real-time stream 2 experiments.

Andrew Hazelton - NOAA Affiliate 1:00 PM

Similar issues with HAFS - several of the steps (chgres, for example) can't run on tjet/ujet/sjet

Frank Marks - NOAA Federal 1:01 PM

@Sikchya I think we need an action item to address the JET refresh issue.

Xuguang Wang - NOAA Affiliate 1:02 PM

@Frank @Youngsun @ Dorothy Allowing access to Orion by international students/postdocs would be still critical for HAFS

Sikchya Upadhyay - NOAA Affiliate 1:02 PM

Yes Frank, I got that in the notes

Frank Marks - NOAA Federal 1:07 PM

@Xuguang my understanding is that it will stay as is.

Xuguang Wang - NOAA Affiliate 1:07 PM

@Frank Great!

Lew Gramer - NOAA Affiliate 1:08 PM

@Hyun-Sook, is the format of the new HYCOM post products documented publicly yet?

Frank Marks - NOAA Federal 1:08 PM

@Mattheiu and @Gustavo this is the HAFS that we need to work with for ocean coupling and DA.

Matthew Onderlinde - NOAA Federal 1:08 PM

+

Matthieu Le Henaff - NOAA Affiliate 1:08 PM

@Frank Ok

Zhan Zhang - NOAA Federal 1:09 PM

@Frank can we transfer the restricted files to Orion now? or the issue is still pending?

Dorothy Koch 1:10 PM

@Frank - we are looking into the aging Jet. Maoyi is also helping with this. I don't know what can effectively run on the old portion.

Frank Marks - NOAA Federal 1:10 PM

@Lew @Hyun-Sook and @Mattheiu will be leading the AOML HAFS ocean coupling and DA effort, likely starting with the HAFS-vA configuration.

Hyun-Sook Kim - NOAA Federal 1:10 PM

@Lew, no. But, I can share a Python package that I have built for HAFS. Let's talk offline.

Avichal Mehra - NOAA Federal 1:10 PM

@Zhan: access to restricted data on Orion is coming in a few weeks.

Lew Gramer - NOAA Affiliate 1:11 PM

Thank you @Frank and @Hyun-Sook!

Dorothy Koch 1:11 PM

@Xuguang - I wasn't aware that international students/postdocs can't use ORION

Zhan Zhang - NOAA Federal 1:11 PM

Thanks Avichal. It will be helpful to our HAFS DA development on Orion.

Frank Marks - NOAA Federal 1:12 PM

@Bin you should show performance as a skill relative to H220 so we can really get a feel for how it improves the guidance.

Xuguang Wang - NOAA Affiliate 1:12 PM

@Dorothy It can now. But just want to make sure it will stay the same

Sundararaman Gopalakrishnan - NOAA Federal 1:14 PM

@Bin @Frank @Sikchya. We recommend skill relative figures for our report too so that we know how well or how far behind we are in terms of HWRF..

Avichal Mehra - NOAA Federal 1:15 PM

@Bin: 5 minute warning!

Andrew Hazelton - NOAA Affiliate 1:15 PM

@Bin, is the improved track for HAFS-S more due to the SA-SAS or moving west? I would expect that moving the western boundary west would improve this year's tracks given all the cases in the Gulf. Is it possible to separate that out from the SA-SAS impact?

Ghassan Alaka - NOAA Federal 1:15 PM

@Bin, I have the same question as @Andy. He beat me to the punch.

Man Zhang - NOAA Affiliate 1:15 PM

@bin which saSAS you used? I am guessing GFS saSAS without HWRF namelist

Youngsun Jung - NOAA Federal 1:16 PM

Avichal, we need to give a verbal warning. They may not see message while they are presenting.

Avichal Mehra - NOAA Federal 1:17 PM

ok

Zhan Zhang - NOAA Federal 1:17 PM

@Gopal@Frank There is a slide in my HAFS-E presentation which compares all HAFS experiments forecast skills against the operational HWRF in skill space

Frank Marks - NOAA Federal 1:17 PM

Thanks @Zhan

Evan Kalina - NOAA Affiliate 1:20 PM

@ Bin, but are localized spots of R34 in strong rainbands unrealistic? This wouldn't be represented in the ATCF R34 since that is meant to describe the circulation as a whole.

JungHoon Shin - NOAA Affiliate 1:21 PM

@Gus @Andy, I think the SA-SAS has more big impact on the track improvement than domain shifting. I ran the 72-W centered domain without the SA-SAS for several Gulf of Mexico storm cases. Although Laura (13L), Sally (19L), Nana (16L) showed some improvement in track forecast, other cases (Beta: 22L and Gamma 25L) there was no improvement.

Frank Marks - NOAA Federal 1:21 PM

@Evan I think that is one of the biggest issues for R34 verification. It is not clear that the model diagnosed R34 is done the same way Best track R34 is defined.

Ghassan Alaka - NOAA Federal 1:21 PM

Thanks @JungHoon!

Hyun-Sook Kim - NOAA Federal 1:22 PM

@Gus, note that there is intensity forecast skill improvement with saSAS due to the track improvement.

Evan Kalina - NOAA Affiliate 1:24 PM

@Frank completely agree.

Bin Liu - NOAA Affiliate 1:25 PM

@Frank @Gopal, I will send you over the skill stats against H220 over email. Will also add those stats in the google slides for my presentation.

Frank Marks - NOAA Federal 1:27 PM

Thanks @Bin. I know @Gopal wants to use them for the HFIP Annual Report.

JungHoon Shin - NOAA Affiliate 1:27 PM

@Evan, I think the localized spot of R34 in the outer rainbands could be realistic, because a strong outer rainband could generate the localized strong wind area. But those localized strong wind areas could cause the over-estimation of 34-kt wind radius.

Sim Aberson - NOAA Federal 1:29 PM

Slide 6: HWRF was best, but also had the highest bias

Ghassan Alaka - NOAA Federal 1:29 PM

@JungHoon @Evan, it might be worth altering the way the 34-kt wind radius is determined from the model so that it ignores these values that aren't connected to the main circulation. I guess that would require a change in the tracker...?

Evan Kalina - NOAA Affiliate 1:29 PM

@JungHoon Well, it might mean we need to change the way we calculate the model R34. Somehow we need to ignore these small isolated spots of R34 and only track the R34 associated with the circulation as a whole. Then it will be more consistent with the Best Track R34 (I think).

Kate Musgrave - NOAA Affiliate 1:30 PM

For r34 is it using a point value or does it need to meet a minimum size for region of impact?

Evan Kalina - NOAA Affiliate 1:31 PM

@Gus Ha, right there with you. Yeah, I think this falls under the purview of the GFDL tracker, so this would be in Tim's wheelhouse. He might be able to provide more details on how it calculates R34.

Timothy Marchok - NOAA Federal 1:32 PM

@Kate, it is a point value. This came from discussions long ago with NHC specialists in order to match how they identify R34 values in observations.

JungHoon Shin - NOAA Affiliate 1:32 PM

@Guss, @Evan, I agree. Perhaps, a 9-point smoother could be applied to the 10-m wind field before the GFDL tracker estimates the 34-kt wind radius. Smoothing could remove noisy patterns from high resolution model output. (Just my personal opinion)

Frank Marks - NOAA Federal 1:32 PM

@Evan, @Gus, @Kate, & @Tim should we make this issue an action item?

Jason Sippel - NOAA Federal 1:32 PM

@Andy - it was hard even with vortex-scale DA

Evan Kalina - NOAA Affiliate 1:33 PM

@Tim that's good to know. I have to wonder how we would observe a small patch of R34 in a rainband though.

Kathryn Sellwood 1:33 PM

GFDL tracker determines R34 from the center outward though doesn't it?

Lew Gramer - NOAA Affiliate 1:33 PM

#SneakyShear

Timothy Marchok - NOAA Federal 1:34 PM

@Frank, sure. We would need to include NHC specialists in any discussion related to this.

Bin Liu - NOAA Affiliate 1:34 PM

@Andy and @Gus, we (JungHoon, Biju, and myself) actually first conducted the domain shift test (domain shift 10-degrees westward) for those GOM storms. It produced slightly better track forecasts for longer lead times, but not much, meanwhile not much impact for intensity. We then went ahead further turning on the SASA convection scheme, which produced huge improvements for both track and intensity, as well as for storm structure. So, the SASAS scheme probably played a more important role here.

chunxi zhang - NOAA Affiliate 1:34 PM

@Kathryn Yes, it starts from 500 km

chunxi zhang - NOAA Affiliate 1:36 PM

I will show the GFDL algorithm for R34 in my presentation tomorrow

Timothy Marchok - NOAA Federal 1:37 PM

@Kathryn... yes, Chunxi is correct, initially using a 500 km limiting range, but if the R34 is found very close to that 500 km range, the algorithm iterates, expanding the range 50 km at a time to allow the possibility that the R34 extends further out. Max possible R34 using this iteration is something like 1100 km (can't recall the exact value).

Bin Liu - NOAA Affiliate 1:37 PM

@Man, yes GFS SASAS in HF1S.

James Franklin - NOAA Affiliate 1:37 PM

NHC R34 estimates routinely will have very large errors because of lack of, and irregularity of, the available obs. Probably good only to plus or minus 25%. If R34 is less than the distance recon flies (standard 105 nm) then the rainbands are likely captured. If outside that distance, then it would be very hit or miss. At the longer radii, probably need something large enough to be captured by a scatterometer.

Man Zhang - NOAA Affiliate 1:39 PM

Thanks @Bin. We at DTC have found that GFS saSAS and HWRF saSAS make big difference too.

Hyun-Sook Kim - NOAA Federal 1:39 PM

@Andy, let me know if you like to have an ocean model coupling.

Andrew Hazelton - NOAA Affiliate 1:40 PM

@Hyun-Sook definitely! That's a high priority. It just needs to be something that will work in a global-nested framework (with the global and nest running together)

Frank Marks - NOAA Federal 1:40 PM

@Hyun-Sook and @Andy I think getting the same HYCOM version in HAFS vA into HAFS vB should be done.

Hyun-Sook Kim - NOAA Federal 1:42 PM

@Andy and Frank, let me know if you like to have a discussion.

Andrew Hazelton - NOAA Affiliate 1:43 PM

@Hyun-Sook, sure, maybe we can set up a meeting soon to discuss the details

Stanley Goldenberg - NOAA Federal 1:54 PM

Thanks for showing verifications as skill Vs. HWRF. Makes it much easier to see what's happening.

Joel Cline - NOAA Federal 2:04 PM

Frank it seems not only the number of levels are important to look at but also where those extra levels are located. The earlier talk noted that 11 more levels in the PBL greatly aided the forecast versus the last talk that mentioned them in the mid levels for track improvement.

Andrew Hazelton - NOAA Affiliate 2:05 PM

Yeah I think studies have shown more levels in PBL or upper troposphere help intensity more, while mid levels may matter more for track

Frank Marks - NOAA Federal2:08 PM

@Joel and @Andy I also think the increased # levels in the upper troposphere and stratosphere are more important for satellite DA. I think @Vijay can provide more on that. I also think that the increased levels above 54 km is to address other NWS requirements.

Ghassan Alaka - NOAA Federal2:09 PM

@Zack, why does HFMN and HEOF degrade the intensity bias relative to the individual member (HF00)?

Scott Sandgathe2:10 PM

@Joel & @Andy: The frustrating part is that halving horizontal resolution costs almost a factor of 10 in compute resources, where doubling vertical resolution is merely a factor of 2, but improves both track and intensity. Why not 150 levels??

Xuejin Zhang - NOAA Federal2:15 PM

@Scott, in general, vertical and horizontal resolutions both should be increased. Vertical resolution is always under-represented. Therefore, increasing vertical resolution in the current model always results in better forecasts/simulations.

Sundararaman Gopalakrishnan - NOAA Federal2:15 PM

@Zack, @Bin, @Andy @Jili @Gus Sikchya and I will be seeking figures from you for the report mostly on HWRF relative skills. As we transition to HAFS we may have a baseline for HAFS for further improvements vs HWRF. Our target is to do better than HWRF, if not today, perhaps in a year or two..

Bin Liu - NOAA Affiliate2:17 PM

@Gopal, @Frank, @Sikchya, I have just added all the related skill figures in the HAFSv0.1A presentation (google slides). Feel free to let me know if you need any additional figures.

Sundararaman Gopalakrishnan - NOAA Federal2:17 PM

@Bin Great! Thanks..

Scott Sandgathe2:18 PM

@Xuejin: Yes, we always increase horizontal resolution first. Vertical resolution is sorely lagging.

Xuejin Zhang - NOAA Federal2:19 PM

Increasing horizontal resolution always costs more because the grid number increases & time step reduction. Doubling horizontal res will be 2^3 times more expensive.

Jason Sippel - NOAA Federal2:24 PM

@everyone - be cautious about how much you blame on resolution. CTCX runs at a lower resolution than HWRF and is very skillful

Joel Cline - NOAA Federal2:32 PM

might just be the recurvers and not much to do with location

Jason Sippel - NOAA Federal2:36 PM

@Gus - you didn't have too many cases at the extended times. Your poor track results later on could be dominated by outliers (e.g, Isaias)

and not reflective of what you'd see in a larger retro

Zhan Zhang - NOAA Federal2:39 PM

@Gus In general, when you average Vmax over all members, there is a good chance you smooth out the peak values. Actually HEOF is able to recover the bias degradation by weighting less to the outlier members.

Frank Marks - NOAA Federal2:41 PM

@Gus & @Andy I think as we evaluate the HAFS vB global forecast we should hone in on the north of 30 deg synoptic evolution issue that HWRF-B is seeing.

Lew Gramer - NOAA Affiliate2:43 PM

@Gus, thank you :)

Frank Marks - NOAA Federal2:44 PM

@Sikchya in the last session Vijay will lead the two overview talks and I will try to lead the panel discussion.

Sikchya Upadhyay - NOAA Affiliate2:49 PM

@Frank, sounds good!

Eric Blake - NOAA Federal2:54 PM

nice music choice Dorothy! boo Jason

Levi Cowan - NOAA Affiliate2:55 PM

This conference has got tunes?

Nick Lybarger2:55 PM

lol

Dorothy Koch2:55 PM

I'm searching for best hurricane hits

Youngsun Jung - NOAA Federal2:59 PM

Good to have some music during break :-)

Frank Marks - NOAA Federal3:06 PM

@Dorothy try Rock you like a Hurricane by the Scorpions.

Sim Aberson - NOAA Federal3:08 PM

Like a Hurricane by Neil Young. Good cover by Roxy Music.

Frank Marks - NOAA Federal3:10 PM

@George Did you turn on TKE advection in MYNN?

Jonathan Vigh3:21 PM

Actually, Jonathan Lin is from MIT.

Bin Liu - NOAA Affiliate3:37 PM

@David, how does the intensity bias look like compared to HWRF?

Mark DeMaria - NOAA Federal3:38 PM

Do you convert the HWRF forecast to a probability for the comparison?

Ghassan Alaka - NOAA Federal3:39 PM

@Jennifer, the keyboard will toggle the slides forward/backward

You3:41 PM

@Dave can you use the layerwise relevance propagation to look at vertical coherence of the wind field that we see in RI cases?

David Gagne3:43 PM

My email is dgagne@ucar.edu if you have more questions.

Jason Sippel - NOAA Federal3:49 PM

@Zhan - one thing we need to take a look at is where the track errors are coming from. If they're predominantly from weaker systems, there are some DA changes we can make to address that

Jason Sippel - NOAA Federal3:51 PM

@Zhan - we could turn off VM over land

Hyun-Sook Kim - NOAA Federal3:51 PM

@Zhan, Are these based on H221 runs?

Peter Black - NOAA Affiliate3:51 PM

@vijay: quick message for you

Jason Sippel - NOAA Federal3:52 PM

@all - to be clear, that's only verification over water. if you include land, the impact of mis-timed landfall near conus blows up the hwrp errors

Zhan Zhang - NOAA Federal3:52 PM

@jasom Even VR is problematic for inland TC

@Hyun-Sook Yes, they are based on H221, but we see similar pattern for previous version of HWRF

Ghassan Alaka - NOAA Federal3:55 PM

@Jason, thanks for clarifying!

Jason Sippel - NOAA Federal3:56 PM

@Zhan - it'd be really nice to have the ability to completely turn off VR/VM in HWRF due to things like this

Zhan Zhang - NOAA Federal3:59 PM

@jason technically, we need to identify inland storm based on TC centers in tcvital when we trigger HWRF run.

Jason Sippel - NOAA Federal4:00 PM

@Jim - HWRF was horrific for Epsilon as well

no data = bad forecast

Ghassan Alaka - NOAA Federal4:01 PM

@HAFS PIs -- did HAFS show similar issues for storms over land? This might provide insight into whether or not the HWRF errors over land are in fact associated with vortex initialization issues.

Jason Sippel - NOAA Federal4:02 PM

HWRF also has physics issues over land... its track forecasts after landfall are miserable even if they're initialized over water

the land issues in hwrp contribute significantly to its track error

in seasonal statistics

Andrew Hazelton - NOAA Affiliate4:03 PM

@Gus I haven't looked at that specifically

That would be interesting to check

Ghassan Alaka - NOAA Federal4:03 PM

Oh I know about the HWRF physics issues over land. That is likely why HWRF-B had such bad track forecasts at higher latitudes.

Matthew Kucas 4:03 PM

The probabilistic intensity forecast plots from COAMPS-TC ensemble are VERY helpful for determining timing and duration of intensity change events like RI, post ET reintensification etc. Very hard to determine timing / duration with a limited set of deterministic solutions.

Zhan Zhang - NOAA Federal 4:03 PM

Yes, PBL scheme does not work well when TC moves to inland

Jason Sippel - NOAA Federal 4:03 PM

@Zhan - that's low-hanging fruit

Avichal Mehra - NOAA Federal 4:04 PM

Good points Gus & Jason. HMON showed significant improvements in 2020 on landfall when we increased the levels and updated physics.

Jun Zhang - NOAA Affiliate 4:04 PM

@Jason, @Zhan, yes the vertical turbulent mixing is too weak over land.

Jason Sippel - NOAA Federal 4:04 PM

@Jim - RI onset mis-timed = huge errors. This happened to HWRF in Sally, where it had the right idea at the wrong time

Weiguo Wang - NOAA Affiliate 4:04 PM

we need to look at LSM and surface layer also. HWRF has large T2m bias over CONOUS. old issue.

James Franklin - NOAA Affiliate 4:05 PM

Didn't DeMaria and Kaplan show many years ago that RI didn't tend to start until higher intensities were reached?

Ghassan Alaka - NOAA Federal 4:06 PM

@Jun, any thoughts on how the HWRF PBL scheme behaves at low resolution over land?

@Weiguo, I thought those T2m issues are diagnostic. Do you think T biases over land impact the forecast?

Jun Zhang - NOAA Affiliate 4:06 PM

@Weiguo, is the T2m problem associated with the post-processing part or the model code?

Peter Black - NOAA Affiliate 4:06 PM

Why was Epsilon such an outlier for all models. Does it represent a class of TCs: "The Unforecastables"

Xuejin Zhang - NOAA Federal 4:06 PM

@Jason, Zhan, Gus, etc. Most of the issues come from the bias in the land surface model. Of course, the initialization of LSM is a much more complicate issue.

Jun Zhang - NOAA Affiliate 4:07 PM

@Gus, the vertical mixing is small which would lead to high bias in the intensity.

Lew Gramer - NOAA Affiliate 4:07 PM

@Weiguo - same question as Jason, Gus, and Jun :) We've seen some large errors but attributed them to postprocessing

Jun Zhang - NOAA Affiliate4:07 PM

Winds would decay slower than reality over land.

Michael Brennan - NOAA Federal4:07 PM

There wasn't a huge sample at days 4-5, so not surprising that a couple of storms could result in a big change in verification results.

Jason Sippel - NOAA Federal4:07 PM

@Jun - yes, this work has already been done and it just waiting to be transitioned

Ghassan Alaka - NOAA Federal4:08 PM

@Jun, I'm talking about how the PBL scheme behaves in D01 away from a storm (e.g., midlatitudes over North America)

Jason Sippel - NOAA Federal4:08 PM

that's why i call it low-hanging fruit

Zhan Zhang - NOAA Federal4:08 PM

Yes. it's getting important to improve the HWRF performance for inland TCs. We see increasing trend in recent year NHC requests more HWRF runs for inland TCs.

Weiguo Wang - NOAA Affiliate4:08 PM

@Jun, T2m over land from model is fine.

Jun Zhang - NOAA Affiliate4:09 PM

@Jason, great to hear the mixing problem is solved. Thanks!

Peter Black - NOAA Affiliate4:09 PM

@Lew: what sort of post-processing?

Jun Zhang - NOAA Affiliate4:10 PM

@Gus, I think a different alpha tuning parameter is used in D01 from that in D03. We can check the exact numbers.

Ghassan Alaka - NOAA Federal4:10 PM

@Pete, conversion of WRFOUT NetCDF files to GRIB2 format via the Unified Post Processor

Jason Sippel - NOAA Federal4:10 PM

@Jun - Zhaoxia Pu did some work on this issue, so EMC could work with her to test out her modifications

Weiguo Wang - NOAA Affiliate4:11 PM

HWRF phys need tuning for land. We focused more on water in the past.

Jason Sippel - NOAA Federal4:11 PM

sure - at the time we had bigger fish to fry :)

Ghassan Alaka - NOAA Federal4:12 PM

@Weiguo, I am very interested in what tuning could be tried. I could run some experiments with HWRF-B, where the problem may be exacerbated.

Jun Zhang - NOAA Affiliate4:12 PM

@Jason, this is great. Thanks. FYI. I got a JTTI funded project with Zhaoxia on physics and DA interaction tests over land.

Jason Sippel - NOAA Federal4:14 PM

Is this a new project or something that's already been ongoing? i was aware she had one JTTI project already, i didn't know you were working with her

Jun Zhang - NOAA Affiliate4:14 PM

@Gus, I think you can test the alpha parameter in D1 in HWRF-B. Make it larger over land.

Eric Blake - NOAA Federal4:14 PM

Julian it would be nice to see 168h forecasts operationally. We will be making 6/7 day forecasts soon and would like to see them in real-time too

Jun Zhang - NOAA Affiliate4:15 PM

@jason, this the ongoing JTTI project. It's been almost a year.

Zhan Zhang - NOAA Federal4:15 PM

@Jun Yes, I saw the JTTI project of Zhaoxia and you are doing. Wish we can do another successful R20 soon.

Jason Sippel - NOAA Federal4:15 PM

ok, so you have the expertise to work with EMC to get the code changes into ops

Jun Zhang - NOAA Affiliate4:17 PM

@Zhang, thanks.

Weiguo Wang - NOAA Affiliate4:20 PM

@Gus you can try coac option=10 in HWRF-B to use flow-dependent mixing length, which could help tracks for some storms. (if you are using the latest HWRF version)

Jason Sippel - NOAA Federal4:20 PM

@jun - check your gchat

un Zhang - NOAA Affiliate4:21 PM

Thanks, Jason.

Ghassan Alaka - NOAA Federal4:23 PM

@Weiguo, thanks!

Eric Blake - NOAA Federal4:25 PM

Linus thanks for the talk. The decreasing number of members that show genesis as time approaches is a real operational challenge - Laura wasn't the only storm that exhibited that tendency this year. I also don't understand what changed in the Ensemble system to make it overly certain this year- it was fairly unexpected and any changes weren't supposed to have a significant impact on TCs

Peter Black - NOAA Affiliate4:32 PM

@linus- Great to see and hear you. Time flies. Can't wait to make my second visit to ECMF and the UK.

Cheers- Pete

Linus Magnusson4:32 PM

@Pete, Thanks, looking forward to meeting up!

Jason Sippel - NOAA Federal4:33 PM

@vijay - no transition to using BUFR drops yet, correct?

Julian Heming4:34 PM

Eric - do you mean model fields or track forecast data? If the former we can discuss offline. If the latter see bulletin FXXT04 EGRR. It contains 6 hourly tracks to 168h. It also contains wind radii.

Linus Magnusson4:34 PM

@Eric, it is not sure that the lower spread this year was due to any system change, but rather an inability to catch the year-to-year variability of predictability. To be investigated.

James Doyle4:36 PM

@Linus. Going forward, will ECMWF consider a mixed resolution ensemble, some coarser resolution members, some high-res members, which allow for more members with the high-res members helping to fill out the tails

Dorothy Koch4:37 PM

@vijay I fully agree - we need better control on experiments to answer the why

Linus Magnusson4:37 PM

@Jim: yes that is the idea to have a high-resolution ensemble for the medium-range and a separate low-resolution extended-range ensemble.

James Doyle4:37 PM

@Vijay - I believe this was a recommendation coming out of the most recent IWTC too

Eric Blake - NOAA Federal4:39 PM

Jim/Linus: I suspect that the smaller storms are the hardest for genesis. We seem to miss those the most, but Laura is a good example of something that wasn't small but still a real challenge.

Sim Aberson - NOAA Federal4:44 PM

I think he was talking about ACARS data,

Jason Sippel - NOAA Federal4:44 PM

he's talking about commercial

Eric Blake - NOAA Federal4:45 PM

Frankly I thought the forecasts were pretty good considering the loss of aircraft data from commercial flights. No records, but solid performance all around for a challenging hurricane season with excessive rapid intensification

Eric Blake - NOAA Federal4:46 PM

What is the real possibility of an operational HWRF/HMON/CTCX ensemble?

Bin Liu - NOAA Affiliate4:49 PM

@Jim, in your presentation, it is mentioned that CTCX now initializes directly off of the GFS with no bogus for storms < 50 kts. In this case, does it still have data assimilation after being initialized from GFS, or it's just cold-starting from GFS analysis?

Matthew Kucas4:50 PM

A comment about operational structure forecasts: The current JTWC consensus for wind radii forecasting includes data from the GFS, ECMWF, UKMET office, HWRF and COAMPS-TC models (all discussed today). I mistakenly stated yesterday in response to a question that the only dynamic models in that consensus are globals, but the mesos are included as well (HWRF and COAMPS-TC are also members of JTWC's current intensity forecast consensus, but not the track forecast consensus).

William Ramstrom - NOAA Affiliate4:51 PM

Since commercial aircraft follow particular tracks each day (e.g. North Atlantic Tracks), the reduction of flights due to covid may just reduce oversampling of those heavily-travelled routes. That could explain why we don't see a large drop in analysis quality.

Pat Fitzpatrick4:51 PM

ZETA unexpectedly rapidly intensified at landfall in Louisiana

Jason Sippel - NOAA Federal4:52 PM

For HAFS, it's really necessary to run something like a 6-km DA ensemble... the desire for an ensemble is a natural extension of that

Pat Fitzpatrick4:52 PM

actually, intensified, not RI, but borderline Cat 3

Jason Sippel - NOAA Federal4:52 PM

could select a subset of members to run forecasts with

Ghassan Alaka - NOAA Federal4:58 PM

A regional dynamical model ensemble (e.g., HWRF/HMON/CTCX/...) might be a fairly low cost way to provide more informative guidance to the forecasters. Jason Sippel has shown that HWRF errors have regional dependence. If we can weight these models appropriately based on the situation (location, initial intensity, etc.), it would be great. My two cents...

James Doyle4:58 PM

@Bin CTCX just cold starts off the GFS for storms at 50 kt or weaker

Bin Liu - NOAA Affiliate4:59 PM

Thanks, @Jim!

Eric Blake - NOAA Federal4:59 PM

If you want better TC Vitals, the operational centers need more data! scatterometer, invest dropsonde missions etc. sometimes there is just nothing. UAS would help this

Jason Sippel - NOAA Federal5:00 PM

@Jim - do you guys do any inner core DA at all?

Dorothy Koch5:01 PM

Another excellent day!

James Doyle5:01 PM

@Guss I agree that it would be nice to push ahead on the HWRF/HMON/CTCX ensemble.

Bin Liu - NOAA Affiliate5:01 PM

There were also discussions on the need of more frequent tcvitals (from 6hourly to hourly), which will also be useful for DA.

Matthew Kucas5:01 PM

One thought about TC vitals - JTWC procedure regarding when to start sending vitals for developing systems is based on development (probability) classification level (in-house). But forecasters don't really have visibility on when / if vitals are "most needed" - maybe forecasters need some automated info /

guidance regarding when vitals would be most impactful for developing systems (and could send vitals based on "model need" rather than in-house procedures).

Michael Brennan - NOAA Federal 5:01 PM

A better understanding of how to optimally deploy obs such as drops, aircraft, TDR, soundings, for the various modeling systems would be really helpful. We have an idea of how this works in the EMC models, but less for other systems.

James Doyle 5:03 PM

@Mike One result we found for atmospheric rivers is that continued drops over several days has more impact than just one or two flights. I suspect that might be the case for TCs too since the impact seems to be greater for multi-day periods of drops. Just a thought.