Weather discussion email list

From:	Weather discussion email list
Sent:	Monday, September 2, 2019 1:41 PM
To:	MAP@LISTSERV.ALBANY.EDU
Subject:	Re: Dorian differences between FV-3 and EC

David,

Of course this is but one of many aspects of a model, and there are many error sources. But early on, when it appeared that Dorian may meet its maker on the mountainous terrain of Hispaniola, there was a sudden northward jump and redevelopment in the center location, and the storm even passed east of Puerto Rico. This was a surprise to many, and the observed track fell outside of at least some ensemble envelopes. I wondered at the time, and I've head others mention since, that St. Lucia (with peak elevation > 3000 feet) could have played a role in this northward jump, and subsequent more easterly track. My guess is that St. Lucia is barely represented, if at all, in the GFS.

This would be possible to test: Compare the output of high-resolution WRF runs with and without St. Lucia to see if there are differences. Perhaps a mini-ensemble with each would be needed to ensure robust results.

But my main point in asking was related to the degree of weakening when a storm is very near the coast in a model simulation. Having an accurate representation of the coastline location then becomes critical to the intensity forecast. I'm fairly sure that this was an issue during forecasts of Irma when it brushed the northern coast of Cuba, but I've not done any model experiments to confirm.

Best wishes,
Gary

On Mon, Sep 2, 2019 at 1:28 PM Knight, David <dknight@albany.edu> wrote:

> Honestly, do you think changing topography, and coast lines, would have made this forecast better?
>
> > On Sep 2, 2019, at 12:33 PM, Gary Lackmann <gary@NCSU.EDU> wrote:
> >
> > Hi Vijay, Arun and all,
> >
> > Thanks for sharing this news - it is great to hear that HWRF has this upgrade ready to go, and I hope that it can be implemented soon.
> >
> > Can you confirm that the HMON does have higher-resolution land-sea mask and terrain relative to HWRF? It would help in interpreting model output.
> > Thanks and best wishes,
> > Gary
> >
> > On Sun, Sep 1, 2019 at 10:22 PM Vijay Tallapragada <000000fd2b3126e5-dmarc-request@listserv.albany.edu> wrote:
> > In the current operational HWRF land-sea mask for the inner-most (1.5km) domain is using land-sea mask defined at parent domain's resolution (4.5km), however, the terrain that is linked to dynamics (mass adjustments) is done at the highest resolution. With the revised land-sea mask, high resolution terrain is used to define coast lines (without additional step of interpolation), which has significantly improved the representation of land interactions. We will be implementing these changes into operations at the next available opportunity.
> >
> > <ejiclihhkobfpijo.png>

>
> Thanks,
> Vijay
>
> On 9/1/2019 6:21 PM, Arun Chawla - NOAA Federal wrote:
>> The land sea mask for HWRF has been corrected almost a year ago and is being used in development work. However, we were in a moratorium and could not have any implementations this year. The upgrade along with other features should be scheduled for the next upgrade. For any questions feel free to contact Vijay Tallapragada or Avichal Mehra
>> ----------
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>> On Sat, Aug 31, 2019 at 12:52 PM Mike Fiorino <000000b0483059db-dmarc-request@listserv.albany.edu> wrote:
>> hi Gary,
>>
>> there was a thread on the tropical storms <tropical-storms@tstorms.org> list regarding the HWRF land mask back in October of 2016 (you made a similar comment to the list at that time)... apparently, three years later, it has not been corrected? wow...to this modeler it's simply a bug.
>>
>> HMON, on the other hand seems to have a correct land-sea mask, but putting on my JTWC TDO (Typhoon Duty Officer) hat, the model has to get the track right before I look at the structure forecast...especially at the longer lead times (126 h in your plot is a very long way out)...
>>
>> the first plot below gives the position error stats for 05L as of 2019083100...it's hard to take HMON seriously with position errors 30-50 % greater than ECMWF/GFS particularly in the early stages (2019082612-2019082712) when the model failed to take the storm out of the Caribbean (see subsequent plots). Also, the 2019082912 HMON forecast of a 148 kt storm 70 mi east of Miami is impressive...but at least the track was consistent with the other models...
>>
>> an animated gif of the tracks is at:
>> https://www.dropbox.com/s/i7i54hgligm6brf/hmon-hwrf-ecmwf-gfs-2019082400-2019083100.gif?dl=0
>>
>> Finally, I agree that the main point of downscaling a high-resolution global model with an even higher-resolution limited-area model is to add value by including the effects of detailed land-sea contrasts, topography and maybe even better high-wind physics... I'm not seeing evidence of value addition...
>>
>> Best /R Mike
>>

>> <mjbehjlbphiloila.png>
>> 2018082712 forecasts -- HMON only makes it out to 48 h...the other models put it off the coast of S FL in 120 h
>> <ohbhnlebgadajccp.png>
>>
>> 2019082912 forecasts -- HMON has an impressive 148 kt Vmax...notice how ecmwf stall the storm off the coast...first indication of possible northward turn...
>>
>> <dlbmhlofkkbknjfk.png>
>>
>> 2019083100 forecasts (last night) stronger poleward drift because of beta?
>>
>> <kjhpibgcpmmlocml.png>
>> On 2019-08-31 07:18, Gary Lackmann wrote:
>>> All,
>>>
>>> With hats off to the HWRF team for improvements in recent years, a remaining technical challenge with this model is the low-resolution coastline and terrain used in the moving nest (which presumably matches that used in the parent domain). Does the coast/terrain in the HMON model have higher resolution than HWRF? It seems that way from the graphics.
>>>
>>> A key advantage of higher resolution could be to better handle interactions with small-scale terrain features (e.g., small but tall volcanic islands in the Caribbean) and complex coastlines. This limitation was likely evident in HWRF forecasts when Irma brushed the northern coast of Cuba. As we know, small track deviations can lead to large intensity errors in those situations. I see evidence of this issue with the latest HWRF runs for Dorian (see below). But HMON looks as if perhaps it has higher coastal and terrain resolution?
>>>
>>> This is a complex issue, and I understand the technical difficulties in addressing it, but until it is dealt with the full benefit of a high-resolution hurricane model will not be realized, especially when it counts most, when the storms are near populated coastlines. Perhaps someone from the HWRF team or EMC could comment on whether this issue is on the to-do list for HWRF, and whether this been addressed in HMON, meaning that it would be a better choice to examine in these situations?
>>>
>>> Thanks and best wishes,
>>> Gary
>>>
>>>
>>> <image.png>
>>> <image.png>
>>>
>>> On Fri, Aug 30, 2019 at 4:19 PM Mike Fiorino <000000b0483059db-dmarc-request@listserv.albany.edu> wrote:
>>> hi Cliff,
>>>
>>> here is the latest forecast for Dorian - the big N turn for the two ECMWF tracks is interesting and a bit surprising given that HWRF should handle the land-sea contrasts over FL a least differently... also, last nights forecast had the storm making landfall and then dissipating... the points colorized with red are the 72 and 120 h positions. TECM4 uses 0.25 deg fields whereas EMDT comes from the ECMWF tracker (taken from public bufr files)... note the intensity offset of about 7 kts -- the effect of the tracking scheme

and using native (higher) resolution fields in EMDT (~0.10 deg)
>>>
>>> /R Mike
>>>
>>> a loop of the forecasts is at:
>>>
>>> https://www.dropbox.com/s/6ih7k9zcnniie02/dorian-05l-hwrf-ecmwf-avno-2019082400-083012.gif?dl=0
>>>
>>> 2019083112:
>>>
>>>
>>> 2019083100:
>>>
>>>
>>>
>>> On 2019-08-29 08:48, Clifford Mass wrote:
>>>> Shades of Sandy. Major difference between the 120 h deterministic forecast of the European Model and FV-3. Euro takes the storm into southern Florida, FV-3 way to the north. Big difference in strength as well. Interestingly, the FV-3 deterministic is a northern outlier in the GFS ensemble, while the EC run is more in the pack--but in the southern portion (as shown by Professor Brian Tang's graphics). Thus, the EC and GFS ensembles are more alike than the deterministic runs....cliff
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> --
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