Christina Holt - NOAA Affiliate <christina.holt@noaa.gov>

Available to meet tomorrow (3/8) at 10:30?

Ben Green - NOAA Affiliate <ben.green@noaa.gov>   Wed, Mar 9, 2016 at 10:08 AM
To: Christina Holt - NOAA Affiliate <christina.holt@noaa.gov>
Cc: "Henry R. Winterbottom" <henry.winterbottom@noaa.gov>

Thanks! Once I get repository access, I will work on setting up a development branch and running a test of my "fix". The real proof in the pudding will be a comparison of the files after DA (or even, before DA but after the vortex step) from what you ran (corrected GDAS vortex) and what I will run (uncorrected GDAS vortex).

On Wed, Mar 9, 2016 at 10:04 AM, Christina Holt - NOAA Affiliate <christina.holt@noaa.gov> wrote:
> Ben,
>
> As to your question about who to verify that you are correct...seems that you've done a pretty thorough job following the code yourself. I would suspect that is probably as much understanding about that portion of code as anyone might be able to provide. My advice: if you think you've nailed down the logic, assume you're right.
>
> You might also try to run a case with extra print statements in the scripts to let you know what files are being create so there isn't as much assuming of the script logic. I will get you repository access as we discussed so that you can grab the top of trunk for further tests. If you do decide that you'd like to continue working on fixing this, I can make a development branch for you, too. Just let me know (submit a ticket to hwrf-help@ucar.edu).
>
> Henry, I have to agree, and as I told Ben in person, if you want to have complete control over exactly what is happening, you have to have a deep level of understanding of how HWRF and EMC operate, especially within the relocation procedures. The interdependencies in the workflow are quite complex and developmental focus is given mainly to the operational workflow. It's not often that HWRF would cold start in the middle of a more intense storm like you guys are aiming to do for this research study, so I'm not surprised that this path through the logic does not behave the way it was meant to for the "standard" case.
>
> If I can be of any more help in figuring this out if you do decide to continue on with improving the relocation scripts, let me know.
>
> Christina
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> On Wed, Mar 9, 2016 at 9:28 AM, Henry R. Winterbottom <henry.winterbottom@noaa.gov> wrote:
>> "**Bottom line:** I think it's likely that when you want to do a cold start without vortex correction, there actually **is** vortex correction -- at least once. In other words, regardless of what initopt is set to, the GDAS vortex is **always** corrected. So my question to you is, who should I talk with to verify that my understanding is correct -- and to find out if this is a feature or a bug?"
>>
>> It's likely not a bug. This is why we abandoned the EMC workflow and designed our own which has more flexibility and enables us to turn off things hard-wired in the EMC (i.e., operational) workflow.
>>
>> I'd be weary of just turning things on and off. The EMC workflow has a *__TON__* of inter-dependencies and turning 'off' something will likely cause a bunch of things to break -- at least based on my experience.
>>
>> -H
>>
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>> On 3/9/16 9:24 AM, Ben Green - NOAA Affiliate wrote:
>>> Hi Christina,
>>>
>>> I've been digging through the HWRF code (slightly more fun than I had anticipated), and I've figured out the following:

1.) initopt =1 does seem to turn off vortex correction (of structure and magnitude) **in the raw fortran code** (/sorc/hwrf-utilities/vortex_init/hwrf_pert_ct.f90) although probably not in the most elegant way. Good news there!

2.) The python scripting gets a bit hairy. Here's what I think is going on in the python script ush/hwrf/relocate.py for the particular case with a cold start and initopt = 1:

    A.) In the first real check for initopt = 1 (Line 1784), there is a call to weak_cold_run and then gfs_flag is set to 0.

    B.) In weak_cold_run (Line 1818), gfs_flag is set to 0 and then there is a call to pert_ct_weak

    C.) In pert_ct_weak (Line 1977), there is a call to the external fortran code hwrf_pert_ct. But in this call, it turns out that initopt = **0** is hard-wired to be passed to the fortran code (see Line 1996 of the python script)!!! So that's a bad sign. But maybe there's hope -- read on.

    D.) When hwrf_pert_ct is called from pert_ct_weak, one of the output files is storm_pert_new (cf. Line 2007). Let's assume that the fortran code creates this file.

    E.) **Next,** after weak_cold_run has gone through (e.g., A-D), the scripting flow goes back to Line 1789 to check if storm_pert_new was created. Let's assume that it was (see D above), which means that the script calls cycled_or_weak_run (Line 1791).

    F.) In cycled_or_weak_run (Line 1832), there is a call to anl_4x(**case=1**) on Line 1836.

    G.) In anl_4x (Line 1855), one of the variables passed to the fortran code /sorc/hwrf-utilities/vortex_init/hwrf_anl_step2/hwrf_anl_4x_step2.f90 **is** INITOPT, and looking through that fortran code, when INITOPT = 1 then there is no vortex correction (good). The problem, though, is that the vortex file being passed to the fortran code may have been corrected earlier (cf. C and D above).

Bottom line: I think it's likely that when you want to do a cold start without vortex correction, there actually **is** vortex correction -- at least once. In other words, regardless of what initopt is set to, the GDAS vortex is **always** corrected. So my question to you is, who should I talk with to verify that my understanding is correct -- and to find out if this is a feature or a bug?

Thanks again for all of your help! I tremendously appreciate it!

-Ben

On Tue, Mar 8, 2016 at 11:14 AM, Christina Holt - NOAA Affiliate <christina.holt@noaa.gov> wrote:
> The relocate script is here:
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>
> ush/hwrf/relocate.py
>
>
>
> If you want to look at the exact code that I ran with, it's here:
>
> /pan2/projects/dtc-hurr/Christina.Holt/hwrf_physbaseline
>
>
>
> Christina
>
>
> On Tue, Mar 8, 2016 at 10:26 AM, Ben Green - NOAA Affiliate <ben.green@noaa.gov>

wrote:
I put together some slides based on my understanding of the HWRF documentation. They should be helpful for our meeting in a few minutes. Thanks!

-Ben

On Mon, Mar 7, 2016 at 9:01 AM, Ben Green - NOAA Affiliate <ben.green@noaa.gov> wrote:
Thanks!!! Enjoy your day off!

On Mon, Mar 7, 2016 at 8:59 AM, <christina.holt@noaa.gov> wrote:
That works. Put it on the calendar.

Christina

Sent from my iPhone

> On Mar 7, 2016, at 6:50 AM, Ben Green - NOAA Affiliate <ben.green@noaa.gov> wrote:
>
> Hi Christina,
>
> I first want to thank you yet again for all of your patience and help -- it's been fantastic.
>
> I read through the entirety of Section 1 of the HWRF documentation about 3 times this weekend to try to better understand the HWRF initialization and DA process. Needless to say, it's really confusing at first! But I am much more confident about understanding the terminology and the basics of what's going on during vortex "correction".
>
> Looking at your calendar, it says you're free after 9:30 AM tomorrow. So I was wondering if I could stop by around 10:30 AM to discuss the next steps? If not, is there another time that works for you?
>
> Thank you so much!
>
> -Ben
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> --
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