2021-06-24

CRTM Monthly Meeting Protocol

Core Topic of the Meeting:

Date: 2021-06-24 Time: 15:00h

Location: Virtual (Google Hangouts)

Invited Speakers: -

Meeting Chair: Benjamin Johnson (JCSDA)

Keeper of the Minutes: Patrick Stegmann (JCSDA)

Attendees: Benjamin Johnson, Patrick Stegmann, Cheng Dang, Nick Nalli, Andrew Tangborn, Shih-wei Wei, Yingtao Ma, Mariusz Pagowski, Igor Polonsky, Quanhua Liu

Age	Introduction by Ben
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Disc ussi on:	Introduction by Ben:
	Ben: Kevin and Ming planned to participate. The main things we want to talk about are some technical things. Coefficient Generation and CRTM v2.4.1. I will start talking about version 2.4.1 and our goal is to push this out mid to end July. This release will be for internal testing first, so we can get some feedback from EMC and GMAO. It's mostly bug-fixes and some coefficients from aerosols and some instrument coefficients. I think most of you have seen the presentation
	Ben: Yingtao, Can you give us an update on the ABI coefficients?
	Yingtao: I removed the cutoff of the original code.
	Ben: Was that the GOES-T coefficient?
	Yingtao: Oh, I was talking about the NLTE. The Wisconsin people were also talking about some differences. I generated the coefficients for GOES-R 16 and 17. They are comparing 16, 17 and 18. The Ozone channel 12 has some differences.
	Ben: Let's coordinate on that because I am getting questions on that but I have no knowledge on it. So, you are the point of contact?
	Yingtao: Yes, that's me. We can talk about that in the meeting on Tuesday.
Res ult:	N/A
Tas ks:	N/A
Res pon sible Peo ple:	N/A
Dea dlin e:	N/A

Agenda Item 2:	Update from Cheng
Discussi on:	Ben: Cheng?
	Cheng: I have added some new aerosol coefficients and the other thing I have been working on is using CRTM and RTTOV within JEDI.
	Ben: I think the goal is to check what kind of differences there are.
	Yingtao: Cheng, for the new table, are all those properties calculated using the Mie code?

	Cheng: No, I used existing tables. For GOCART they were using Mie, but for NAAPS are based on scaling.
	Yingtao: So, the properties are based on observation?
	Cheng: They are very much bulk aerosol properties.
	Nick: The CRTM-RTTOV comparison, I am not up to speed on that.
	Cheng: Eventually I would like to do AOD and BT, but based on the existing setup I only did the BT.
	Ben: It's the clearsky BT.
	Nick: Ok, I'd be interested to see that kind of stuff.
	Yingtao: Isn't the aerosol effect more intense in the visible band.
	Cheng: You are right. But for RTTOV it's only clearsky now.
	Yingtao: For IR and MW the aerosol effect is almost unnoticeable.
	Nick: So, you are looking across the spectrum?
	Cheng: No, only sounding channels right now.
	Ben: Right now, they have the clearsky version from RTTOV implemented. Jake Liu also implemented the scattering version.
	Nick: You can see the aerosol effect in the IR but for smoke you probably won't see much.
	Ben: I know that Mariusz and She-wei worked on this.
	Mariusz: Another issue for aerosol is that for UV, normally the 550 wavelength is provided, but for the planned PACE mission they have a broad spectral measurement. 550 is really very crude with little constraint on aerosol. Multispectral AOD would thus be of interest to us.
	Cheng: That's it.
Result	N/A
Taske	
Responsi ble People:	N/A
Deadline:	N/A

A g n d a lt e m 3:	KK-Analysis Update by Nick Nalli
D is c u s si o n:	Ben: Ok, thanks Cheng. Nick? Nick: Ok, I have been able to successfully do this KK analysis to derive the temperature-dependent properties for all datasets that I have available. The whole swath of datasets using the KK analysis, and they are now available. The next step is to take them into the IRSSE model to replace the old properties. This will be the second update of the version 2 update. This is the most rigorous way of doing this. This is theoretically the most rigorous way of producing these properties. For this reason, an RTTOV comparison would be interesting. The other problem that I see is that the Newman dataset was not in the laboratory but in the field. I try to handover the LUTs next week to Ming Chen. If not, it will rerun into the system by Jim Yung. I think after these tests I will probably submit a letters or IEEE. This has been a pretty good result that we have been able to do this. Ever since the last ITSC meeting we haven't been able to come up with something new, but now we have the methodology available to use a state-of-the-art interferometer in the laboratory. This sets us up to come up with our own reflectance measurements, like the ones Pinkley published in the 70's. After that we can look at snow and ice. Ben: It would be nice to have a look at something like this in the laboratory. Nick: The data we get in the field, we can't do better than this. The MERI is set up like on a ship. They can put it up nadir over water. You have to make sure the water is flat and you need a good handle on the water temperature. Then you can just come up with the ratio of the reflectance measurements. Once you have the KK-analysis, you can derive the optical properties from that.
R e s ul t:	N/A
T a s k s:	N/A
R e s p o n s i b l e P e o p l e:	N/A
D e dl in e:	N/A

A g e n d a lt e m 4:	Update by Yingtao
D is c u s s is o n:	Ben: Thanks Nick. Yingtao? Yingtao: Recently we received cloud properties from Yang Ping. They have one more dimension for the MW graupel because the current CRTM doesn't have a temperature dependence for graupel and the new table is for the ice particles from 0.2 to 1. In terms of density. For the snow they use two habits with a plate and snowlfake. For the graupel they use a conical shape. We are working on including that in the current CRTM. The table is way too big. We have developed our own coefficient generation table, also working on hyperspectral MW instrument coefficient. I am also working on the further investigation of the ABI discrepancies. Ben: Is the format of Ping Yang's table binary? Yingtao: It's not binary. We haven't decided yet what format it will be. It's text file. Ben: We should probably have it in netCDF. Mariusz: netCDF4 or 3? Ben: 4! Yingtao: It's 4 right now, right?
R e s ul t:	N/A
T a s k s:	N/A
R e s p o n si bl e P e o pl e:	N/A

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A ge n da Ite m 5:	Introduction of Igor Polonsky
Di sc us si on:	Ben: Since you mention Igor, this is his first time in the CRTM team. Igor: Hi, I am Igor and I am contractor in this project and right now I am working under the supervision of Kevin Garrett. My expertise is line-by-line and in IR I am responsible for OSS technology, which was developed by Jean-Luc Moncet and is also in the CRTM if I am not mistaken. Right now, I am working on implementation of coefficient generation procedure of MW in the CRTM. I got some hickups. It's a new area to me in terms of definitions and assumptions. Lealing that I am your despet to the and to submit my version of the coefficient generation procedure of MW in the CRTM.
	Ben: Thank you, it's nice to see that you are modernizing this area. This is great, glad that you are on board. Anybody has any specific questions for Igor.
R es ult:	N/A
Ta sk s:	N/A
R es po ns ibl e P eo pl e:	N/A
D ea dli ne:	N/A

Age nda Ite	Update by Andrew Tangborn
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Disc ussi on:	Mariusz: I was hoping that Isaac was joining today because we started this backscatter. So, I was interested in coding this total backscatter forward operator for CALIPSO in JEDI. We hope to continue with that. Another question to Isaac, I listened to his talk and I saw the correlation between channels, how do you obtain these correlations? If you have any insights I'd be glad.
	Ben: I could think of a variational approach where you vary one channel and look at the response in other channels. On the backscatter in CALIPSO I gave Isaac the code from Barbara and also my code for cloud particles. Ok, Andi, Shih-Wei?
	Andrew: We decided to make some change in direction to have a new workflow to be more in line with the forecasting efforts at EMC and have a little bit more control over the future. This one is not ready for DA but when you have aerosols and forcing from the meteorological analysis, every 6 hours you have an update coming in. We can put this in JEDI and this is relevant because we can put it in in a way that we can either have NASA or CRTM LUTs. So that's what I am going to push for.
	Ben: That sounds awesome. CRTM v2.4.1 should be able to work with JEDI, which means you can use GEOS, NAAPS and GOCART tables.
	Andrew: Ok, the other things was on Tuesday with this bug fix, what they had looks like it was consistent with the NASA LUTs.
	Mariusz: Yes, when they were really taking the NASA GOCART implementation into the GFS, the UPP verification had a bug and now they have to retune the model again. I believe it is now fixed, so UPP will use the GOES AERO properties. There are just two ways of calculating AOD, one is using CRTM and the other one is using NASA tables. Since Cheng has implemented the NASA tables in the CRTM, this is a complementary option now.
	Ben: My understanding of the UPP bug was that something was double-counted.
	Andrew: Yes, that's correct.
Res ult:	N/A
Tas ks:	N/A
Res pon sibl e Peo ple:	N/A
Dea dlin e:	N/A

Age nda Item 7:	Brief Updates from Mingjing, Sheh-Wei and Quanhua Liu
Disc ussi on:	Ben: Mingjing, Is there anything you wanted to ask or discuss?
	Mingjing: I am from NASA GMAO and this is my first time in this meeting. Right now, I am testing the CRTM 2.4 soon and also, I am interested in the hydrometeor LUT that Yingtao mentioned from Ping Yang. I don't know what your expectation is. Maybe we can talk about that.

Yingtao: Yes, you have my email.

Mingjing: Thank you.

Ben: Great, make sure you have the structure right for REL-2.4. Shih-Wei, you would like to say something?

Shih-Wei: I am a PhD student working for Sarah Lu. My work is forecasting and DA of aerosol loading, like dust, sea sult and carbon aerosol. Based on my current experience is that IR BT from the CRTM can be reduced by aerosols. It's not really that aerosols can be ignored. Dust aerosols may not spread everywhere on the globe. Only the Atlantic region can be affected. That's why I wanted to push forward to see if we can assimilate these data.

Ben: There is a specific advantage in the tropical jet region where aerosols have an impact on the circulation there because this can affect hurricane development.

Shih-Wei: I would like to mention that the paper I prepared on idealized CRTM development I will share it next week.

Ben: Any other topics we need to discuss. Mark joined us late.

Quanhua: I just came from another meeting from NOAA with HPC. Just one question, you have scheduled to release 2.4.1 in July?

Ben: I am aiming to mid-July, but it's not going to be a full public release. I do the JEDI testing part.

Quanhua: Ok, last time the release to 2.4 was very short.

Ben: Yes, I learned my lesson.

Quanhua: Another thing, for the testing Mingling and Yingtao were talking about Ping Yang's table?

Yingtao: Yes, we are at the very early stage because their table has another dimension, which is temperature. Also, they want to do some evaluation of the table, like some model validation, or O-B.

Ben: So, if we can get that as netCDF we can run the evaluation in the JEDI framework. We're running realtime 3DVAR right now, but it's not 4DVAR yet. MPAS is still one cycle at a time.

Yingtao: For this comparison we are looking at some high-quality dataset, not just some DA output.

Quanhua: Ben, do you have the new release dataset from Ping Yang.

Ben: No.

Quanhua: You should probably also have access to that.

Ben: I'm just being respectful of the contract between Ping Yang and STAR.

	Quanhua: So maybe I wasn't clear, Ping Yang was funded by OAR.
	Ben: In my personal communication with Ping Yang he was happy to collaborate.
	Quanhua: You should probably use the same dataset as STAR.
	Ben: Ok, we can discuss that at the technical meeting on July 1st. Let's wait for this meeting.
	Quanhua: Sure, because I always think that STAR and UCAR should work as one team.
	Ben: We're getting there. This helps a lot. Any other topics? Ok, feel free to reach out to me.
Res ult:	N/A
Task s:	N/A
Res pons ible Peo ple:	N/A
Dea dline:	N/A

15:59h Final end of meeting.