2023 GLM Science Meeting Chat Logs

GLM Science Meeting - Session 1 (2023-11-13 10:08 GMT-5)

00:08:20.222,00:08:23.222
Clem Tillier: It's L0 so not navigated

00:09:22.397,00:09:25.397
Dan Lindsey - NOAA Federal: thanks Clem

00:15:35.607,00:15:38.607
steve goodman: Maybe Tom and others can provide their acronyms for the final report as there are too many to repeat now

00:18:44.720,00:18:47.720
Eric Bruning: Can you say a bit more about navigated L0 backgrounds in eGRES - what is that? And then on the PPZ flowchart, where does L0 sit? I know it makes it out to GHRC somehow. Where is it available in the various parts of the tree?

00:40:47.692,00:40:50.692
Marion Darvell: Switch screens maybe?

00:57:31.702,00:57:34.702
Jeff Lapierre: Hi Bart. Thanks for the great update. Is there a community for doing data validation for MTG? Earth Networks/AEM is interested in being involved similarly to our involvement with GLM validation.

01:00:35.375,01:00:38.375
Bartolomeo Viticchiè: Dear Jeff, thank you for your question. The LI Mission Advisory Group is the only group of experts outside EUMETSAT that are currently authorized to process LI data to support Cal/Val activities (as you can see in the youtube video in the slides). Soon, with the beginning of the dissemination of LI data, we will be able to expand the forum of collaborators. For any further question, please reach us via email.

01:09:03.545,01:09:06.545

Jeff Lapierre: Understood, thanks. I will do that, can you provide the appropriate email to contact?

01:10:33.145,01:10:36.145
Linda Gilbert: Re: the slides, may have missed it, but will the presentations be shared?

01:10:51.861,01:10:54.861
steve goodman: yes slides on google drive

01:11:17.077,01:11:20.077
steve goodman: Scott hopes to have recordings as well

01:12:18.587,01:12:21.587
Linda Gilbert: Thanks! Can you share the Google Drive link?

01:15:47.688,01:15:50.688
steve goodman: shared :)

01:25:44.791,01:25:47.791
Clem Tillier: Hi Tim, will ISS LIS be returned to the ground, or "abandoned in place" ?

01:35:13.240,01:35:16.240
Geoffrey Stano: John Trostel, we'll look forward to seeing the North Georgia LMA returning!

GLM Science Meeting - Session 2 (2023-11-13 14:00 GMT-5)

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00:02:17.675,00:02:20.675
Katrina Virts: I don't see a presentation...?

00:04:02.535,00:04:05.535
Michael Peterson: Eric: you should ask Daile for one of hers

00:28:28.855,00:28:31.855
Hugh Christian: this again raises the question. What is a flash. 60 flashes per second with a charging rate of say even 10 amps makes for very weak flashes

00:30:55.637,00:30:58.637
Hugh Christian: this is why we need to measure the charging rate

00:31:13.308,00:31:16.308
Eric Bruning: Practically, this talk is a great motivation for shipping group extent density to NWS operations.

00:32:32.062,00:32:35.062
Douglas Mach: Maybe we should focus on the GAPS in the pulses, rather than the "clusters".

00:34:32.326,00:34:35.326
Michael Peterson: Hugh: I'd like to see charging rates in supeerbolt-scale flashes

00:35:16.437,00:35:19.437
Douglas Mach: I'm looking at "long" flashes and although the GLM algorithm classifies them as a "single flash", I see obvious "breaks" in the pulses (but less than 330 ms).

00:35:24.037,00:35:27.037
Michael Peterson: Eric: Agreed. It would be beneficial to ship GED. Also, the GED / FED ratio is excellent for diagnosing problems, per your QF bit work

00:35:52.881,00:35:55.881
Hugh Christian: that would be a challenge. Let us start with single cell storms

00:36:22.161,00:36:25.161
Michael Peterson: Doug: I found a lot of those too. They are pretty easy to identify because the gaps cause "lines" in my plotting software. I exclude those in my analyses

00:36:56.372,00:36:59.372
Michael Peterson: Hugh: I'm moving to the SE. Let's talk when I get in town

00:36:58.208,00:37:01.208
Dan Lindsey - NOAA Federal: I

00:37:51.874,00:37:54.874
Douglas Mach: The 330 ms was not a "written in stone" number. It was actually proposed before we saw any optical orbital lightning data.

00:39:23.106,00:39:26.106
Michael Peterson: Doug: The other thing to think about is threshold. In the "Part 2" paper, I walked through the exercise where artificially increasing the threshold turned a clearly single flash with the LMA / GLM data into clearly distinct flashes because of the missing channel segments

00:39:49.092,00:39:52.092
Dan Lindsey - NOAA Federal: I'm not an NWS forecaster and can't speak for them, but having talked to many forecasters, one thing they often point out is data overload. So I wouldn't necessarily recommend sending more datasets to them unless the new dataset is going to allow them to make notable changes to their decision-making in things like warnings or short-term forecasts

00:40:42.298,00:40:45.298

Michael Peterson: Dan: How would they respond to a "overclustering - degraded flash rates" bit as a quality flag?

00:41:51.444,00:41:54.444
Michael Peterson: Katrina: You mentioned blooming. Did you also see anything with hot pixels? I am familiar with a problematic one over the Pacific...

00:42:03.937,00:42:06.937
Dan Lindsey - NOAA Federal: I'm not really in a good position to answer that question, but we could ask them. I'm guessing they'd ask how this flag would be visualized on AWIPS

00:43:48.996,00:43:51.996
Jason Jordan - NOAA Federal: Dan/All: As a former NWS field forecaster, I would say that having data/products that are much more realistic or closer to reality would be welcome. I would gravitate towards products that make more sense for my workload and if Group Extent Density is better than Flash Extent Density, I would probably move towards using that product. Training and testing in the Testbed also would help in making the transition.

00:44:11.607,00:44:14.607
Jason Jordan - NOAA Federal: Michael: an overclustering/degraded flag would be useful; again, anything that helps the field understand what could be going on with the data that looks unusual helps!

00:44:15.389,00:44:18.389
Michael Peterson: Dan: I'm guessing that's a bigger problem to address. I'd also suggest a "opaque clouds - reduced DE" bit per this work:
https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2020EA001294

00:44:37.400,00:44:40.400
Michael Peterson: Since it got buried: Katrina: You mentioned blooming. Did you also see anything with hot pixels? I am familiar with a problematic one over the Pacific...

00:46:29.397,00:46:32.397
Michael Peterson: I have a lot of cases of "throwing a dart and getting a detection at this lat / lon"

00:47:27.166,00:47:30.166
Michael Peterson: I belive it's a G17 issue...

00:49:23.324,00:49:26.324
Katrina Virts: @Michael Yes, the GLM16 hot pixel produces ~31000 false flashes per day. I didn't mention in my talk, but since those are easily identified, I remove them prior to doing ADE analysis.

00:50:09.382,00:50:12.382
Michael Peterson: Cool. And I was mistaken 17 vs 16.

00:52:07.412,00:52:10.412
Douglas Mach: The 10 min window shows GLM is detecting the storms.

00:53:55.830,00:53:58.830
Dan Lindsey - NOAA Federal: @Jason: if the discussion is replacing a current product with another better one, then that would probably be more palatable

00:54:46.244,00:54:49.244
Michael Peterson: @Monte... there is a lot of cool applicaitons for the virtual network beyond DE / FAR

00:55:43.997,00:55:46.997
Monte Bateman: I'm sure there is. I haven't tried to explore the virtual network beyond use as a reference.

00:56:03.096,00:56:06.096
Michael Peterson: @Monte. I should stop by for a chat

00:57:50.110,00:57:53.110
Michael Peterson: @Sven-erik... What is the most interesting detection you've seen with LI thus far? Also, the Med and coastal SAF are the top hotspots for very lightning-dense thunderstorms. You're going to see them better than anyone

01:01:04.307,01:01:07.307
Michael Peterson: @Sven-Erik.. also, are mean radiances higher in Northern Europe than elsewhere in the FOV? Or have there been no detections so far?

01:07:32.606,01:07:35.606
Oscar Van Der Velde: Bolts from the blue are negative leaders and CG strokes, not positive.

01:08:40.935,01:08:43.935
Michael Peterson: They're also bright from the lack of cloud attenuation rather than channel length

01:09:27.755,01:09:30.755
Michael Peterson: With anvil flashes, the light is often blocked by the anvil cloud entirely so you don't get a detection. That seems to be why GLM sees so many long horizontal stratiform cases compared to anvil

01:10:11.654,01:10:14.654
Michael Peterson: (at least that's my interpreation from the limited data I've seen. Someone correct me if there's more to it)

01:12:30.691,01:12:33.691
Dan Lindsey - NOAA Federal: For anvil CGs where the anvil is quite high, it seems like the GLM farthest away (probably GOES-West in most cases) may sometimes detect them by way of seeing the flash itself

(not thru a cloud) due to the look angle. I'm only guessing here...the geometry may not work out correctly

01:12:46.297,01:12:49.297
Sven-Erik Enno: @Michael: the most interesting/impressive are probably some megaflashes in Africa, have definitely seen 200-300 km long horizontal flashes there

01:13:20.949,01:13:23.949
Michael Peterson: @Sven-erik... so small ones? ;)

01:13:38.721,01:13:41.721
Michael Peterson: The longest I've seen in the region were over the Med by Turkey

01:13:42.727,01:13:45.727
Michael Peterson: That was TRMM-LIS

01:14:35.644,01:14:38.644
Sven-Erik Enno: there are probably longer, but I haven't measured yet, it's my visual estimation, so I better be conservative in terms of their extent

01:15:03.258,01:15:06.258
Michael Peterson: I'm curious whether they big ones are more common over W. Africa versus the Med.

01:15:05.987,01:15:08.987
Sven-Erik Enno: and we have also detected in mid-summer in northern Europe

01:15:23.189,01:15:26.189
Sven-Erik Enno: even to the north of the Artic Circle

01:15:39.876,01:15:42.876
Sven-Erik Enno: in the north of Norway for example, it is around 70 degrees north

01:16:00.754,01:16:03.754
Michael Peterson: Keep an eye on the radiance statistics of those flashes over time. I'd be particularly interesting if anything bright and not a bolide was detected north of the Arctic circle

01:16:19.923,01:16:22.923
Michael Peterson: Especially during the fall / leading into winter

01:19:40.172,01:19:43.172
Jacquelyn Ringhausen - NOAA Affiliate: @Daile: Why do you think NLDN missed CGs in your analysis?

01:28:30.061,01:28:33.061

Daile Zhang: @Jac: It might be a weak one. NLDN did miss 2 CG strokes with cc last year. One of them were seen by ENTLN and the peak current was pretty weak. All CGs were -CGs. ENTLN also missed several CG strokes with cc and according to NLDN, they were pretty weak.

01:30:46.997,01:30:49.997
Kenneth Cummins: @L-M Is the GLM threshold increase due to past light se the same today as it was for pre-acceptance G-16 ?

01:33:27.865,01:33:30.865
tewa kp: Hi Ken, I'm not sure I understand your question, but since G16/17 the detection thresholds for G18/19 has decreased.

01:34:26.633,01:34:29.633
Kenneth Cummins: the issue is the adaptation of threshold due to earlier illuminations - this is a subtle behavior of GLM

01:35:55.678,01:35:58.678
tewa kp: We did change on-board thresholds for G16 due to Bahama Bar effects.

01:36:12.013,01:36:15.013
Kenneth Cummins: this will impact detection of continuing currents

01:41:58.236,01:42:01.236
Kenneth Cummins: I am speaking of the time-variation of threshold for a given pixel, over a period of a few frame-periods

01:43:15.416,01:43:18.416
tewa kp: Yes, we have lower detection thresholds over dark images and higher thresholds over times around solar noon.

01:48:04.334,01:48:07.334
Michael Peterson: TIPPS = NBEs

01:48:13.649,01:48:16.649
Michael Peterson: = CIDs

01:48:20.817,01:48:23.817
Yanan Zhu: how about type 2?

01:49:01.304,01:49:04.304
Amitabh Nag: @Yanan: That is an open question.

01:49:36.016,01:49:39.016
Amitabh Nag: We don't know if all TIPPs are produced by the same type of CID.

01:50:45.479,01:50:48.479
Michael Peterson: @Amitabh. Fair. Just a first order for those not familiar with the lingi

01:51:02.444,01:51:05.444
Michael Peterson: lingo

01:59:42.564,01:59:45.564
Yanan Zhu: @Amitabh, it would be interesting to compare type 1 and type 2 CID waveforms.

02:00:20.192,02:00:23.192
Amitabh Nag: @Yanan: Agreed.

02:00:38.353,02:00:41.353
Amitabh Nag: We should discuss.

02:00:40.882,02:00:43.882
Linda Gilbert: Thanks all!

GLM Science Meeting - Session 3 (2023-11-14 10:01 GMT-5)

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00:11:48.100,00:11:51.100
Kenneth Cummins: great work

00:25:07.576,00:25:10.576
Marion Darvell: What is MFA?

00:25:15.721,00:25:18.721
Christopher J. Schultz: minimum flash area

00:25:25.930,00:25:28.930
Steven Goodman - NOAA Affiliate: minimum flash area- i.e., small flashes

00:25:30.070,00:25:33.070
Marion Darvell: I would certainly be interested... see my talk later?!

00:25:30.329,00:25:33.329
Christopher J. Schultz: the idea is that the smallest flashes will be closest to the convective core

00:26:22.700,00:26:25.700
Christopher J. Schultz: https://www.weather.gov/safety/lightning-toolkits

00:26:37.648,00:26:40.648
Christopher J. Schultz: https://www.noaa.gov/stories/8-tools-you-can-use-to-stay-lightning-safe-summer

00:45:15.181,00:45:18.181
Joseph Ray Patton: you're doing great Chris

00:49:48.718,00:49:51.718
Dan Lindsey - NOAA Federal: Which ski resort is that?

00:51:05.494,00:51:08.494
Dan Lindsey - NOAA Federal: I looked it up: Oberstdorf, Germany

00:51:22.426,00:51:25.426
Linda Gilbert: Any idea though if that data will be shared?

00:51:38.877,00:51:41.877
Christopher J. Schultz: for FY Linda?

00:51:57.054,00:52:00.054
Linda Gilbert: The upcoming Chinese satellites, their data.

00:52:30.321,00:52:33.321
Christopher J. Schultz: Steve/Scott/Dan/Andy probably have the best perspective. We can ask once Steve is done

00:52:44.756,00:52:47.756
Dan Lindsey - NOAA Federal: NOAA and NASA have restrictions getting that data, but sometimes the universities can get it

00:52:56.457,00:52:59.457
Linda Gilbert:

00:57:27.046,00:57:30.046
Linda Gilbert: There hasn't been lightning detected in Antarctica (yet), is that correct?

01:02:22.528,01:02:25.528
Douglas Mach: We have one more year on the task funding for reprocessing.

01:02:40.179,01:02:43.179
John Trostel: I think Antarctica only has a northern coast

01:02:49.621,01:02:52.621
Joseph Berry - NOAA Affiliate: ^^

01:05:44.055,01:05:47.055
steve goodman: for CMA future lightning mapper plans- see WMO OSCAR database- https://space.oscar.wmo.int/satelliteprogrammes/view/fy_4

01:06:59.004,01:07:02.004
Linda Gilbert: Thank you, Steve!

01:11:05.757,01:11:08.757
Douglas Mach: Idea for merging the LIS and ENGLN data: merge and then "cluster". That takes care of "duplicate" flashes.

01:12:19.181,01:12:22.181
Jeff Lapierre: Just a small correction. IITM is a stand-alone system designed by Earth Networks/AEM and owned by IITM, but it is not part of ENGLN (our global network).

01:16:12.284,01:16:15.284
Clem Tillier: If/when GOES-U commissioning is successful, are there any plans for G17 to be transferred to the US Space Force (as were G13 and G15) putting a GLM over India?

01:16:47.338,01:16:50.338
Dan Lindsey - NOAA Federal: I believe the future plans for G17 are TBD

01:18:25.786,01:18:28.786
Christopher J. Schultz: https://servir.icimod.org/science-applications/high-impact-weather-assessment-toolkit/

01:18:41.233,01:18:44.233
Colin Price: There is a new lightning network in India from Anirban Guha...you may want to contact him https://ildn.in/imap.php

01:18:48.782,01:18:51.782
Patrick Gatlin: McCaul, E. W., G. Priftis, J. L. Case, T. Chronis, P. N. Gatlin, S. J. Goodman, and F. Kong, 2020: Sensitivities of the WRF Lightning Forecasting Algorithm to Parameterized Microphysics and Boundary Layer Schemes. Wea. Forecasting, 35, 1545–1560, https://doi.org/10.1175/WAF-D-19-0101.1.

01:24:30.094,01:24:33.094
steve goodman: Jeff, really nice animation of bolides and meteor showers.

01:27:17.791,01:27:20.791
Douglas Mach: Soon we'll have a similar stereo region between GLM16 and LI.

01:29:28.965,01:29:31.965

Timothy Lang: Just a note to future presenters - You can create your own instant meeting on meet.google.com and check whether your browser will let you present in that personal (solo) meeting. I did this to troubleshoot permissions/browsers before I presented yesterday.

01:46:14.707,01:46:17.707
steve goodman: Scott, were able to record the presentations? Some folks have asked already.

01:49:44.370,01:49:47.370
steve goodman: Kelley, how are you thinking of accommodating mesoscale flashes in your departing stoplight? As the system moves away the risk of strikes is non zero.

01:50:02.894,01:50:05.894
Christopher J. Schultz: they automatically update when the stratiform flashes happen

01:50:04.214,01:50:07.214
John Trostel: QR code works

01:50:22.644,01:50:25.644
Christopher J. Schultz: so if a flash goes backward, the time updates back to zero

01:50:37.731,01:50:40.731
steve goodman: thanks Chris

01:52:15.801,01:52:18.801
Joseph Ray Patton: Steve, the Google Meet says it's being recorded in my browser, so I think the recordings are going as planned on Scott's end

01:53:24.342,01:53:27.342
steve goodman: great thanks!

01:57:20.699,01:57:23.699
Linda Gilbert: Looks like a great product!

01:57:35.789,01:57:38.789
Geoffrey Stano: Kelley, very nice presentation. It is exciting to see the evolution of the stoplight alongside the new visualization abilities.

01:58:35.035,01:58:38.035
Kelley Murphy: Thanks Linda and Geoffrey!

01:58:37.179,01:58:40.179
Marion Darvell: Sorry I had to leave due to the time of day it is in the UK...If there is anybody wanting to pick up on anything I said please let me know! Or get in touch.

GLM Science Meeting - Session 4 (2023-11-14 14:01 GMT-5)
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00:00:54.491,00:00:57.491
Linda Gilbert: Oh geez, lol

00:10:12.333,00:10:15.333
Kenneth Cummins: @Scott - I missed what you used to identify the fire start location, and its accuracy

00:13:24.453,00:13:27.453
Linda Gilbert: There's a potential good case study for one fire that started in early to mid October in western North Carolina.

00:15:44.013,00:15:47.013
Linda Gilbert: https://www.citizen-times.com/story/news/local/2023/11/13/wildfires-western-north-carolina-containment-increases-with-no-growth-for-poplar-drive-collett-ridge/71567109007/

00:16:41.150,00:16:44.150
Earle Williams: Scott What about the continuing current issue?

00:17:10.407,00:17:13.407
Earle Williams: Were there many single stroke negatives in that initiating population?

00:21:39.573,00:21:42.573
steve goodman: Kathleen, do you couple the upstream LTG jump with the presence of helicity that might indicate an increase, say in vertical vorticity development?

00:24:03.158,00:24:06.158
Scott D. Rudlosky: Lots of interest in continuing current in both the public and private sector
48/841 or 5.7% were single IC stroke (no CG)
220/841 or 26% were single CG stroke
377/841 had zero or a single "CG" stroke (some had mulitple "IC")

00:27:28.605,00:27:31.605
Kristin Calhoun - NOAA Federal: there is an ENTLN Ltg Jump algorithm in MRMS

00:29:25.907,00:29:28.907
Kristopher White - NOAA Federal: Yes, thanks Kristin!

00:43:30.984,00:43:33.984
Julia Tilles: Levi, when you use stereo GLM observations, is lightning inside the cloud determined to be located right at cloud top (i.e., light scattered out the top of the cloud)? Or do you ever actually locate lightning *inside* the cloud (and have LMA data that confirms the locations). Nice work btw

00:45:15.375,00:45:18.375
Douglas Mach: I do the stereo work and I assume the light is from the top of the cloud, or from the jet leaving the top of the cloud.

00:45:30.714,00:45:33.714
Patrick Gatlin: @Levi: "Less cloud-top temp variability near GJs"..is that spatially or temporally?

00:46:27.797,00:46:30.797
Julia Tilles: Thanks Douglas

00:46:59.859,00:47:02.859
Levi Boggs: Patrick, that is spatially at the moment

00:47:22.977,00:47:25.977
Levi Boggs: Basically just looking at variation of brightness temp pixels near the GJ location

00:47:32.539,00:47:35.539
Colin Price: How does the ELF/ULF model differentiate between sprites, elves, and gigantic jets? The ELF data is primarily from CG flashes in the storm below

00:47:34.121,00:47:37.121
Patrick Gatlin: Thank you

00:48:52.386,00:48:55.386
Levi Boggs: @Colin, we are estimating ELF parameters for confirmed jets, and comparing that to confirmed nonjets (via stereo altitude data).

00:49:20.140,00:49:23.140
Levi Boggs: Technically the nonjet data could be from parent CGs/ICs that produce other TLES

00:53:57.341,00:54:00.341
John Trostel: What's that constant altitude thing in Flash #2? Almost at the edge of the LWA range?

00:59:35.467,00:59:38.467
Michael Stock - NOAA Affiliate: The one that's at low elevation angle? It's a more distant flash that was happening at the same time

00:59:58.658,01:00:01.658
John Trostel: thanks... all squished at max LWA range

01:00:52.421,01:00:55.421
Hugh Christian: Michael Fast and slow antennas for energy

01:02:17.240,01:02:20.240

Michael Stock - NOAA Affiliate: Hugh, there's a fast/slow antenna down in Socorro which triggered on some but not all of these flashes. I've been trying to get something out to the site for a while, but haven't gotten one there quite yet

01:03:06.846,01:03:09.846
Jeff Lapierre: @Mike. very cool to get two flashes so close together. Is there any evidence so far of them influencing the other?

01:05:40.403,01:05:43.403
Michael Stock - NOAA Affiliate: I was looking for that, but there's no obvious cases of interaction.

01:07:08.356,01:07:11.356
Jeff Lapierre: interesting. how close did they actually get?

01:12:09.380,01:12:12.380
Colin Price: @Jonathan Did you try the good old Price and Rind (1992) parameterization?

01:12:35.930,01:12:38.930
Michael Stock - NOAA Affiliate: @jeff very close

01:14:30.844,01:14:33.844
Jonathan Smith - NOAA Federal: @Colin Yes. The GFDL AM4 model uses CTH and lowers the exponent over ocean. Generally the biases are 1-3 order of magnitude (higher in some isolated areas) across the GLM on both G16/17.

01:15:15.135,01:15:18.135
Jonathan Smith - NOAA Federal: *GLM domains

01:16:30.806,01:16:33.806
Jonathan Smith - NOAA Federal: @Colin the correlation coefficients were moderate. 0.5-0.65

01:23:23.483,01:23:26.483
Patrick Gatlin: @Rong: Interesting study. Can you give a reference for the FED obs operator?

01:24:14.381,01:24:17.381
steve goodman: Dan, Alex Fierro scheme used the absence of lightning in his experiments to suppress convection

01:24:29.887,01:24:32.887
Rong Kong: Kong, R., et al., 2022: Development of New Observation Operators for Assimilating GOES-R Geostationary Lightning Mapper Flash Extent Density Data Using GSI EnKF: Tests with Two Convective Events over the United States. Mon. Wea. Rev., 148, 2111-2133.

01:25:06.417,01:25:09.417

Patrick Gatlin:

01:25:28.575,01:25:31.575
Rong Kong: :)

01:37:34.624,01:37:37.624
steve goodman: Amanda, have you done experiments that blend ABI cloud properties and GLM/lightning.

01:41:18.390,01:41:21.390
steve goodman: I'm thinking that ABI and GLM together provide a proxy radar type product in the absence of radar. May be similar to what GREMLIN tries to do.

01:44:08.389,01:44:11.389
Amanda Back - NOAA Federal: Steve, we used GREMLIN in our previous radar ingest framework and got nice results. It's not clear how we can use it in our current hybrid/ensemble assimilation, but I would be interested.

01:54:33.582,01:54:36.582
steve goodman: maybe a useful discussion going forward

01:56:09.859,01:56:12.859
Linda Gilbert: Thanks all!

GLM Science Meeting - Session 5 (2023-11-15 10:03 GMT-5)

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00:10:36.353,00:10:39.353
Kristin Calhoun - NOAA Federal: can we not do both?

00:10:54.028,00:10:57.028
Kristin Calhoun - NOAA Federal: more sensitive and smaller pixels?

00:11:10.187,00:11:13.187
Jeff Lapierre: Phil, this analysis is about pixel size, but nothing about the integration time. Shouldn't the amount of time you allow photons to hit the pixel also play a large role on all of this?

00:12:58.730,00:13:01.730
Elizabeth DiGangi: I'm interested in the "dimmer than you might think" descriptor for smaller pulses. Do you have any thoughts on why these small pulses are dimmer than expected?

00:16:40.825,00:16:43.825

Phillip Bitzer: @Jeff Absolutely! This was assuming just changes in size/sensitivity, but integration will affect it. Shorter integration times will tend to reduce signal to noise (if pulse is longer than integration time).

00:19:31.937,00:19:34.937
Michael Peterson: @Phil I'm not sure you're aware of this but I looked at pulse sizes and energies in the context of FORTE detections. As you will recall, FORTE had a wide field of view sensor and a LIS-like imager https://agupubs.onlinelibrary.wiley.com/doi/pdfdirect/10.1029/2022EA002280

00:20:16.058,00:20:19.058
Michael Peterson: And then also using LIS and GLM with the added dimension of looking at altitude

00:20:29.960,00:20:32.960
Jeff Lapierre: @Phil Agreed. I wonder if there might be unexpected results similar to what you found here when looking at that phase space. i.e, are shorter pulses dimmer than you would expect? Maybe we don't have the proper data to do that analysis? How short integration time does FEGS have?

00:21:03.128,00:21:06.128
steve goodman: Kristin, how deep is the reflectivity profile into the mixed-phase region with those non-lightning cases- Dave Sharp (NWS MLB) wrote a conference paper on TC Josephine and it produced i think maybe one flash which occurred when the radar top was above 5km, around the freezing level.

00:21:10.467,00:21:13.467
Michael Peterson: So there's a 5th sensor that shows the same thing.

00:21:12.754,00:21:15.754
Phillip Bitzer: @Liz- I'm sure Ken and others can chime in as well, but I have the working idea there isn't enough space (and usually time too) to grow a sizable channel structure, leading to less bright.

However! Other work shown at this meeting shows that even ground based LF networks struggle to detect small flashes too. That suggests these have smaller currents, and hence, less light.

00:21:27.298,00:21:30.298
Phillip Bitzer: @Mike-

00:21:42.995,00:21:45.995
Phillip Bitzer: Awesome! Good to know. Thanks for letting me know.

00:22:00.019,00:22:03.019
Elizabeth DiGangi: @Phil That's more or less what I was thinking too--small flashes generally = small peak currents/fewer (or no) k-changes, etc. Thanks!

00:23:42.831,00:23:45.831

Michael Peterson: The problem is complicated by the sometimes severe scattering that broadens even tiny pulses over multiple pixels. By going to smaller pixels without increasing sensitivity you're not just impacting the anount of lightning you're seeing, you're also introducing bosses towards the "smaller than you expect" pulses that occur very near the cloud top

00:24:20.511,00:24:23.511
Michael Peterson: Lower signals have their energy split between multiple pixels, and you can run into situations where none of them are bright enough to trigger and you see nothing

00:24:26.526,00:24:29.526
Phillip Bitzer: @Jeff- FEGS is 10kHz (I think I have that right). I'm not sure if Mason has even looked at how pulse time works in all this, but I think we could.

00:25:26.380,00:25:29.380
Phillip Bitzer: "Lower signals have their energy split between multiple pixels, and you can run into situations where none of them are bright enough to trigger and you see nothing"

No doubt. That's where FEGS can help fill in the detection gap

00:26:25.196,00:26:28.196
Michael Peterson: It's why I'm an advocate for going to smaller pixels but using ROI triggering strategy rather than individual pixel triggering. We should have sufficient computing power on orbit to do it

00:28:01.346,00:28:04.346
John Trostel: I helped do some data analysis for a 1983 paper by Dr. Cecil Gentry on tornadoes associated with hurricanes. He would have been very interested in your work, Kristin!

00:31:44.552,00:31:47.552
Phillip Bitzer: @Michael- Agreed. Dpne correctly, that can get you the benefit of smaller pixels without the hit of losing SNR on bigger. But that doesn't get you more sensitive, which is what you need if you're really wanting to those small pulses.

00:34:48.321,00:34:51.321
Michael Peterson: @Phil Sure, but once you have the sensitivity you're stuck with, ROI detection will ensure you're maximizing your detection capabilities at that sensitivity

00:36:21.375,00:36:24.375
John Trostel: A similar reductioon in lightning is seen over southern Africa. I think there's a cold air intrusion there also.

00:37:12.503,00:37:15.503
Kristin Calhoun - NOAA Federal: @John - we definitely cited that Gentry paper. Not too much work on TC tornadoes out there.

00:48:26.578,00:48:29.578
Michael Peterson: @Stephanie Interesting talk. Are you planning to look at making an altitude climatology / altitude based GLM DEs?

00:49:25.851,00:49:28.851
Michael Peterson:

00:51:57.594,00:52:00.594
Michael Peterson: @Earle Sorry, got sidetracked during your talk. I'm wondering how some measure of total energy compares with the decrease in flash rates during these outbreaks.

00:56:24.784,00:56:27.784
Michael Peterson: @Mason I want to know more about those fast rise time events. Perhaps you can give me an overview offline

00:58:51.411,00:58:54.411
Michael Peterson: @Mason If those isolated 337 pulses are NBEs unrelated to larger flash activity (as seen in prior studies) should they count towards the flash rate for the storm?

00:59:48.143,00:59:51.143
Clem Tillier: @Mason, how wide is the FEGS band pass that observes 337 nm?

01:00:55.892,01:00:58.892
Patrick Gatlin: @MP: Yes...NBEs are driven ultimately by something related to storm state/processes

01:01:36.037,01:01:39.037
Michael Peterson: @PG

01:02:08.450,01:02:11.450
Julia Tilles: Mason, so cool about the large field changes with 337 -- do you think these *are* NBEs? Are you pretty confident that no hot processes were going on concurrently deeper in the cloud?

01:03:30.606,01:03:33.606
Timothy Lang: Passive microwave observations were consistent with tons of ice in the ALOFT storms

01:04:12.210,01:04:15.210
Michael Peterson: I wonder if any of the ALOFT storms are examples of the super high flash rate storms I was looking at

01:05:11.849,01:05:14.849
John Trostel:

01:05:53.749,01:05:56.749
Timothy Lang: @Michael the 6 and 24 July 2024 ALOFT storms were quite intense.

01:06:47.698,01:06:50.698
Michael Peterson: Did the flux capacitor cause any problems with the aircraft instruments? (2024)

01:06:48.462,01:06:51.462
Mason Quick: @M. Peterson - Still optimizing pulse detection and filtering out noise, so not sure how many of those are real. Happy to have a conversation offline if there is something in particular you're looking for.

01:07:46.932,01:07:49.932
Mason Quick: @M. Peterson - good question. We certainly see high correlation between 337 emission and NBEs.

01:08:14.837,01:08:17.837
Mason Quick: @ Clem - CWL 340 nm, 10 nm FWHM.

01:08:16.840,01:08:19.840
Timothy Lang: On 24 July the aircraft went into corona (St. Elmo visible to pilot) and caused upsets to some LIP mills and the EFCM.

01:08:42.134,01:08:45.134
Timothy Lang: Pilot observed what were likely blue starters and even some blue jets.

01:09:20.553,01:09:23.553
Michael Peterson: @Mason The thing about NBEs is that their pattern of occurrence differs between land and ocean. Will likely require some tuning to correlate with convective processes

01:10:07.385,01:10:10.385
Michael Peterson: @TL That is quite the rich dataset

01:10:08.493,01:10:11.493
Mason Quick: @ Julia - We certainly saw NBEs with 337 emission. Haven't dug into the data enough to say much about phenomenology.

01:11:47.244,01:11:50.244
Michael Peterson: @masin, Julia - I'd want to see if you can note a initial behavior consistent with different altitude regimes from the smith LASA paper and how the pulses differ between them

01:12:06.936,01:12:09.936
Michael Peterson: *bimodal, not "a initial"

01:16:16.013,01:16:19.013
Michael Peterson: @Patrick have you thought about retrieving altitudes from the differential scattering in the 337 and 777.4 bands?

01:16:18.715,01:16:21.715
Hugh Christian: if 337 is molecular emission, it is not hot enough for NOX

01:16:42.181,01:16:45.181
Francisco J. Gordillo-Vázquez: It is not LNOX but the cold chemistry of coronas

01:16:51.667,01:16:54.667
Julia Tilles: @Mason awesome. Would be neat if your next campaign had interferometer coverage :) or any chance your 2023 did?

01:18:04.532,01:18:07.532
Timothy Lang: @Julia, the 29 July flight had good coverage by a ground-based interferometer near KSC.

01:18:55.414,01:18:58.414
Mason Quick: @Julia - we had a few flights over Florida and I believe one was in sensitivity range of interferometer

01:19:39.209,01:19:42.209
Julia Tilles: Is that one of Mark Stanley's?

01:19:53.272,01:19:56.272
Timothy Lang: yes

01:20:08.196,01:20:11.196
Julia Tilles: Wow, I had no idea that was still there!

01:20:14.439,01:20:17.439
Julia Tilles: Great

01:21:16.309,01:21:19.309
Dan Lindsey - NOAA Federal: The Tug Hill Plateau is the lake effect snow capital of the world!

01:24:27.276,01:24:30.276
Geoffrey Stano: It was a great place to visit. Snowshoeing to collect sounding instruments was a unique experience.

01:31:31.059,01:31:34.059
Katrina Virts: 14km at equator, 6km at poles

01:31:57.043,01:32:00.043
Douglas Mach: It is where the cloud top is, not the lightning.

01:36:08.409,01:36:11.409

John Trostel: @Doug, isn't GLM assuming that the flash is being seen at the top of the cloud and then navigated down to the ground? So it's assuming it's (GLM) is seeing the flash at ~10km, not at ~5km where the LE cloud top is.

01:39:16.219,01:39:19.219
Kevin Thiel - NOAA Affiliate: @John Trostel: I assumed the southward shift of GLM flashes from low topped convection when referring to Fig 5 in Bruning et al 2019 (https://onlinelibrary.wiley.com/doi/abs/10.1029/2019JD030874)

01:40:01.456,01:40:04.456
Michael Peterson: @Doug I wonder if ground network coincidence can tell us how many SGFs are CGs where all IC pulses are missed by GLM?

01:40:21.803,01:40:24.803
Michael Peterson: And what the group level parameter statistics are

01:40:24.104,01:40:27.104
John Trostel: yeah... Going over my sketch on the whiteboard again, the shift should be about 5 km SOUTH as seen due to the 5km versus 10 km height,

01:41:05.925,01:41:08.925
John Trostel: So, SOUTH makes sense in a parallax sense

01:42:24.129,01:42:27.129
Patrick Gatlin: @MP (re diff scattering): Good point, that is something we plan on doing in the OSSE framework

01:43:04.426,01:43:07.426
Michael Peterson: @PG I'm blanking on the OSSE acronym…

01:46:16.956,01:46:19.956
Dan Lindsey - NOAA Federal: OSSE is usually Observing System Simulation Experiment

01:46:20.681,01:46:23.681
John Trostel: back of the envelope calculation indicates the shift should be about 5 km south. (Assuming at 5 km height rather than 10 km height and about 45 deg angle)

01:48:23.769,01:48:26.769
Michael Peterson: @PG Baded on ASIM, I'd recommend comparing the results using the temporal and spatial modifications separately, and then jointly.

01:48:28.464,01:48:31.464
Patrick Gatlin: @HC (re NOX): energetic electrons in streamer discharges dissociate N2/O2 giving rise to NOx and O3. So detecting streamers/337 should improve LNOx estimate.

01:49:19.501,01:49:22.501
Michael Peterson: *based *variations

01:49:30.620,01:49:33.620
Clem Tillier: We should include GOES fixed grid coordinates in the L2 product

01:49:43.389,01:49:46.389
Michael Peterson: @Clem

01:49:51.772,01:49:54.772
Eric Bruning: +1000

01:50:23.967,01:50:26.967
Dan Lindsey - NOAA Federal: I was in Boulder last week visiting their WFO and we asked about GLM. They said they plot both the GLM grids (non-parallax corrected) and the ground based lightning data, and they've gotten used to and come to expect the parallax shift in GLM

01:50:33.987,01:50:36.987
Douglas Mach: Not putting in the parallax correction at least makes things consistent between ABI and GLM.

01:52:11.936,01:52:14.936
Amanda Back - NOAA Federal: Data assimilation really wants parallax correction, too!

01:53:51.452,01:53:54.452
Kristopher White - NOAA Federal: Parallax correction is most applicable and useful for IDSS activities, which take place on small scales. However, forecasters are generally used to and probably familiar with the degrees of parallax in their domain, based on other data such as ground data and radars.

01:54:07.588,01:54:10.588
Samantha Edgington: If fixed grid coordinates were provided in L2 then lat/long could be recalculated based on ABI cloud height data

01:56:16.765,01:56:19.765
steve goodman: we tried to avoid L2 dependencies of GLM on other obs such as ABI. IT becomes an issue for the HArris Ground Processing Architecture. MAybe nowadays its not a big issue.

01:58:17.459,01:58:20.459
Dan Lindsey - NOAA Federal: ABI could also be used to screen out false alarms

01:58:38.238,01:58:41.238
Francisco J. Gordillo-Vázquez: @PG, the most relevant chemical paths leading the production of NO by streamer corona electrons are N(2D) + O2 -> NO + O2 and N(2D) + O2 -> NO + O(1D) and N(2P) + O2 ->

NO + O. All of them involve electronically excited states readily produced under high electric field ambient of streamer corona heads. However, at the end of the day, NO is not the main gas produced by streamer coronas but O3 and others.

01:58:46.815,01:58:49.815
John Trostel: glad to have stirred up that hornets nest

01:58:51.781,01:58:54.781
Clem Tillier: Yes! I am very supportive of ABI informing GLM in L2 processing

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00:10:12.376,00:10:15.376
Michael Peterson: @Bill Fascinating results. To look for industry effects, have you cosidered breaking the totals down by region. I.e., urban, remote, ocean

00:25:42.207,00:25:45.207
Robert Holzworth: To Bill: Alaska not included in LIMO but it may have the most variable climate regarding lightning

00:28:54.098,00:28:57.098
William Koshak: Michael, thanks ... I have not considered that yet, and I agree it would be a worthy endeavor.

00:29:38.878,00:29:41.878
John Trostel: @Bill I think your microphone is still on

00:29:56.062,00:29:59.062
William Koshak: Bob: good point since Alaska at high latitude. I do try to keep an eye on the lightning-caused wildfires up there.

00:31:09.233,00:31:12.233
Elizabeth DiGangi: Bill and Earle are both still unmuted.

00:33:22.048,00:33:25.048
Robert Holzworth: Bill - you are scratching - might try muting

00:34:44.203,00:34:47.203
Ted Mansell - NOAA Federal: @Scott R. Can you mute Bill?

00:36:11.042,00:36:14.042
William Koshak: I muted.

00:40:31.763,00:40:34.763
John Trostel: @Randy Levi Boggs here is using GLM to look for gigantic jets, similar to bolide detection. Should we be looking for similar artifacts?

01:01:33.757,01:01:36.757
Thomas Edwards: @John: I think it depends on how long and how energetic you expect the signals to be. Happy to chat more!

01:14:35.248,01:14:38.248
Hugh Christian: 501 nm for ionized emissions

01:17:22.130,01:17:25.130
Eric Bruning: Do any of the channels or could the fourth channel be selected to enable channel differencing to discriminate lightning (bands with and without lightning lines)?

01:19:12.715,01:19:15.715
Samantha Edgington: @Eric that is an interesting thought, it would certainly be a good idea to take advantage of multiple spectral channels to discriminate between bolides and lightning.

01:19:51.529,01:19:54.529
John Trostel: I know Levi Boggs might be interested in a band that was sensitive to gigantic jets / blue jets

01:20:15.413,01:20:18.413
Hugh Christian: lightning has a continuum

01:21:23.866,01:21:26.866
Clem Tillier: @John, Is there a good reference paper for the spectrum of gigantic jets / blue jets?

01:22:07.715,01:22:10.715
John Trostel: @Clem Dr. Boggs is he expert. He's busy with a new baby. I'll ask him if he can recommend one.

01:23:06.117,01:23:09.117
Clem Tillier: thanks!

01:35:10.132,01:35:13.132
Sven-Erik Enno: We have some cases with LI observing lightning north of the Arctic Circle last summer, up to ~70 degrees north, i.e. the northern tip of Scandinavia

01:37:44.976,01:37:47.976
Sven-Erik Enno: They were not included in the first public release of LI sample videos simply as they happened too late during the season while the public release was at the beginning of July

01:39:35.092,01:39:38.092
Robert Holzworth: Sven: I'd love to see those data when you get a chance - bobholz@uw.edu

01:42:08.951,01:42:11.951
Jonathan Smith - NOAA Federal: I have to jump off early. Great and informative meeting as always!

01:44:28.843,01:44:31.843
Sven-Erik Enno: @Robert I am probably able to send you a LIL0 demo image with some high latitude detections, in the same style as the public release videos. For LI L2 group and flash data at high latitudes we have to wait the next season...

01:48:37.412,01:48:40.412
John Trostel: @Clem "Blue jets are collimated blue cones of light that extend upward from the cloud top to altitudes
of 40-50 km altitude and last for several hundred milliseconds [7, 8, 5]. They occur at rates of several per minute and have upward speeds of 105 - 106 m s−1. Blue jets have strong emissions in the UV-blue region of the electromagnetic spectrum (< 500 nm), with strong spectral emissions at 337 nm, 391 nm, and 427.8 nm [2, 3, 5]."

01:53:55.356,01:53:58.356
Clem Tillier: @John

01:58:25.751,01:58:28.751
John Trostel: [2] E. Wescott, D. Sentman, H. Stenbaek-Nielsen, P. Huet, M. Heavner, and D. Moudry, “New
evidence for the brightness and ionization of blue starters and blue jets,” Journal of Geophysical Research: Space Physics, vol. 106, no. A10, pp. 21549–21554, 2001.
[3] C. Kuo, H. Su, and R. Hsu, “The blue luminous events observed by isual payload on board formosat-2 satellite,” Journal of Geophysical Research: Space Physics, vol. 120, no. 11, pp. 9795–9804, 2015.
[4] J.-K. Chou, R.-R. Hsu, H.-T. Su, A. B.

01:58:40.974,01:58:43.974
John Trostel: @Clem, Levi suggests 2,3,5