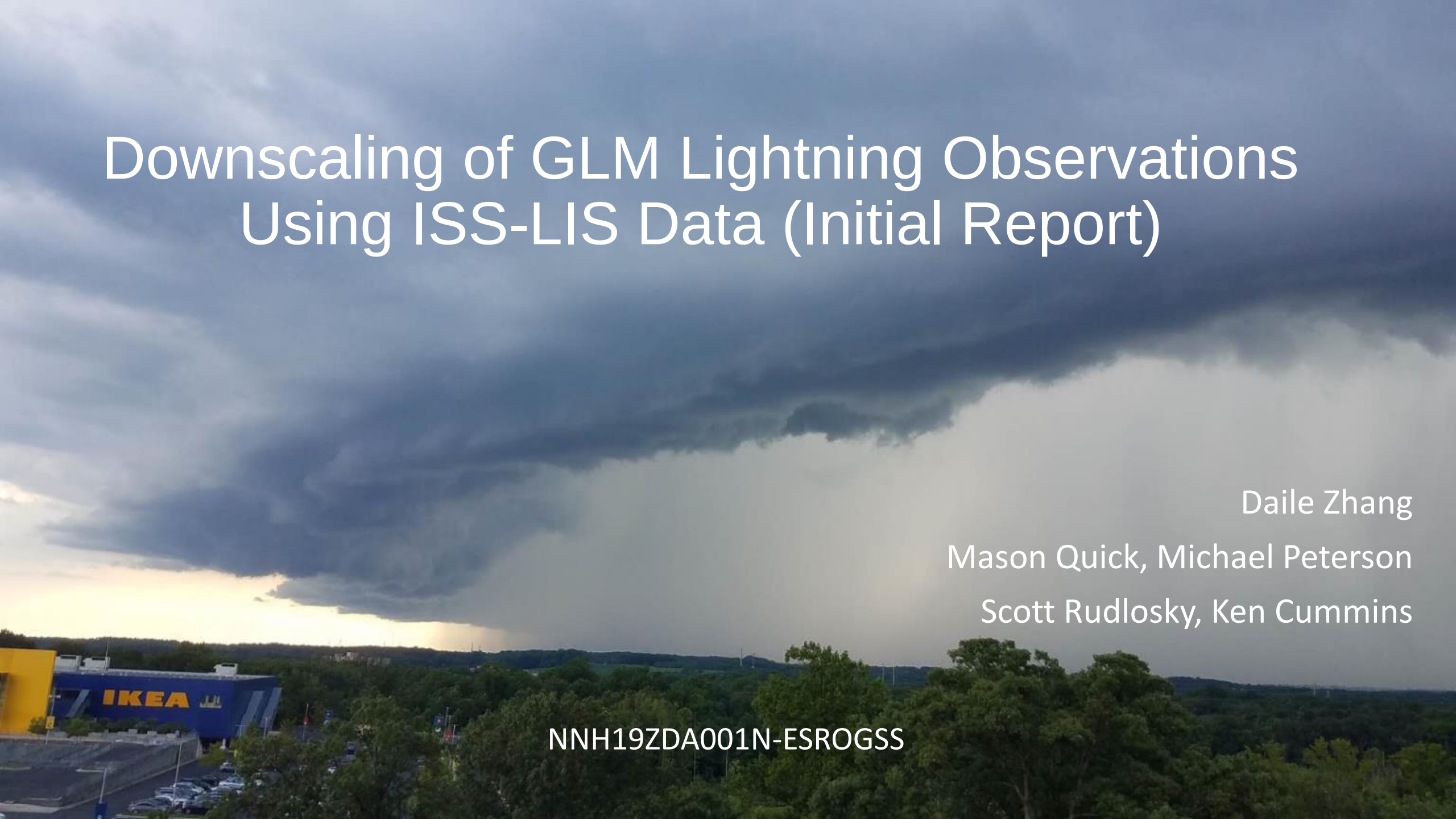

Downscaling of GLM Lightning Observations Using ISS-LIS Data (Initial Report)

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NNH19ZDA001N-ESROGSS

Overview

Background

- GLM coarser resolution (8×8 km^2 at nadir and 14×14 km^2 at edges) and LIS finer resolution (~4.5×4.5 km^2)
- Lower GLM detection efficiency for short and/or small flashes

Primary Goals

- Merge ISS-LIS and GLM datasets by developing a statistical model to downscale GLM resolution
- Increase space-based total lightning detection efficiency by combining the two observations
- Improve GLM optical areas and energy estimation

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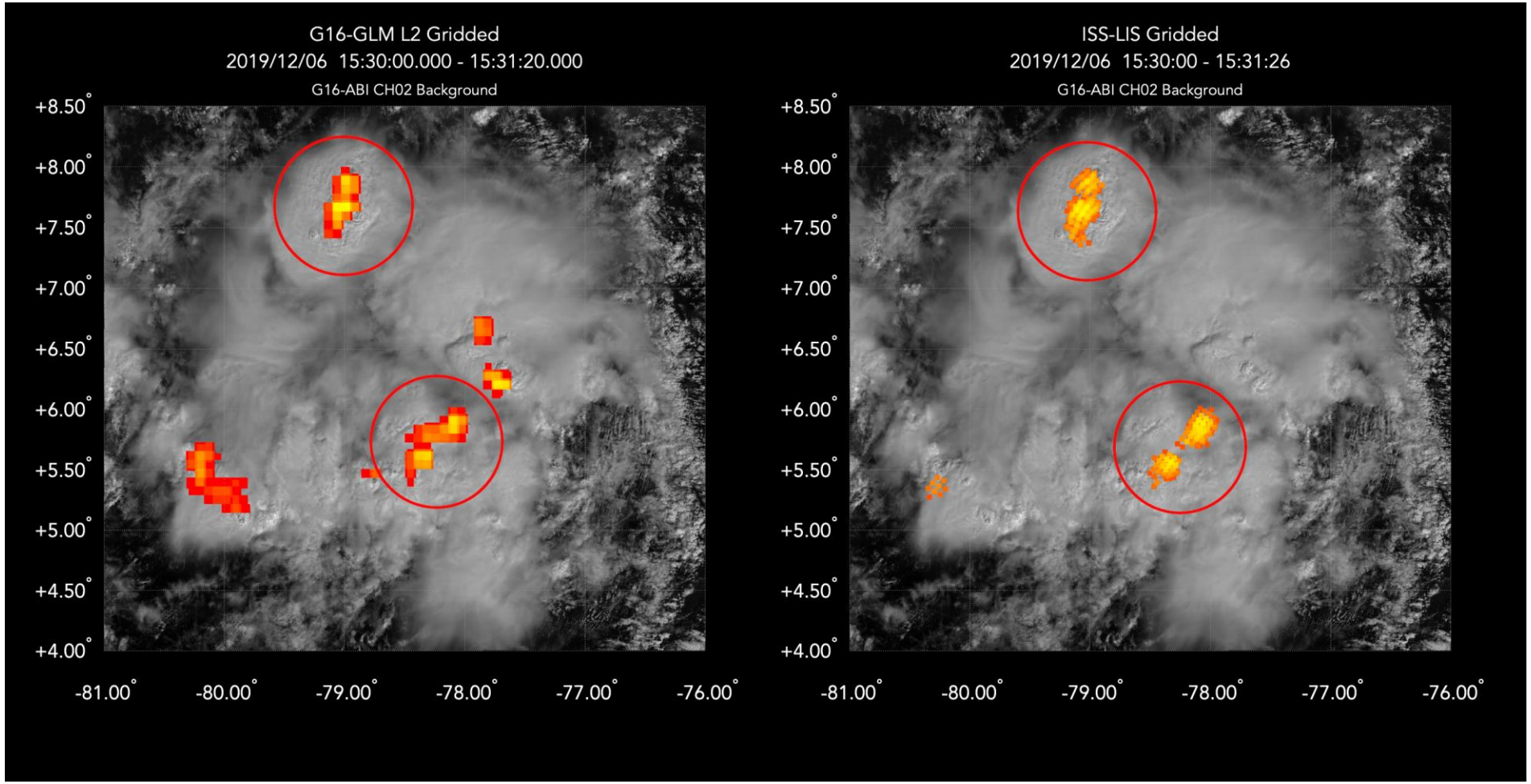
GLM vs. ISS-LIS Ex 1: Tropical (no parallax)



- Overall patterns are similar, GLM shows no offset
- GLM detected more flashes than LIS

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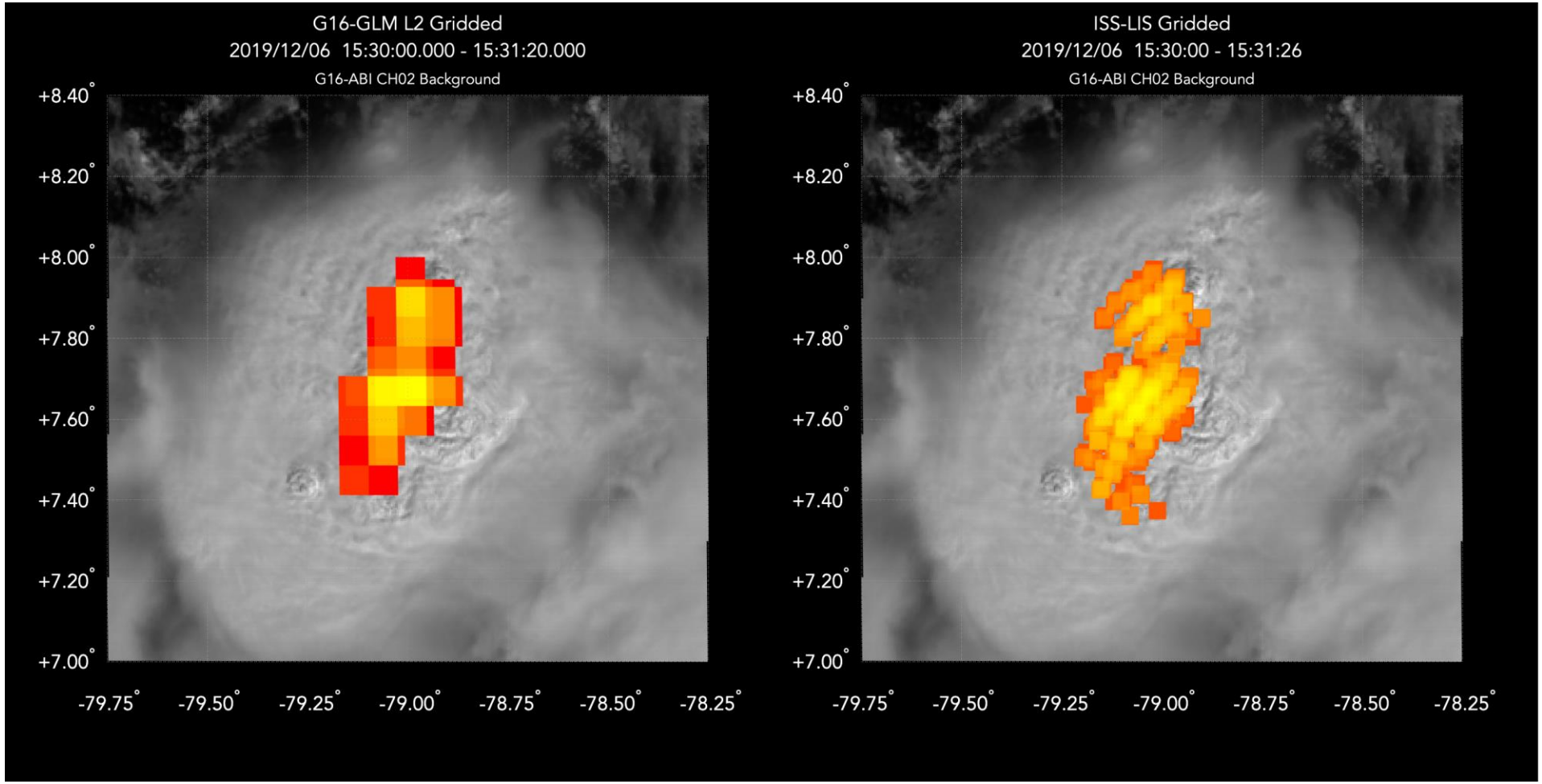
GLM vs. ISS-LIS Ex 1 (zoom-in view)



- GLM and LIS are similar
- LIS shows more information

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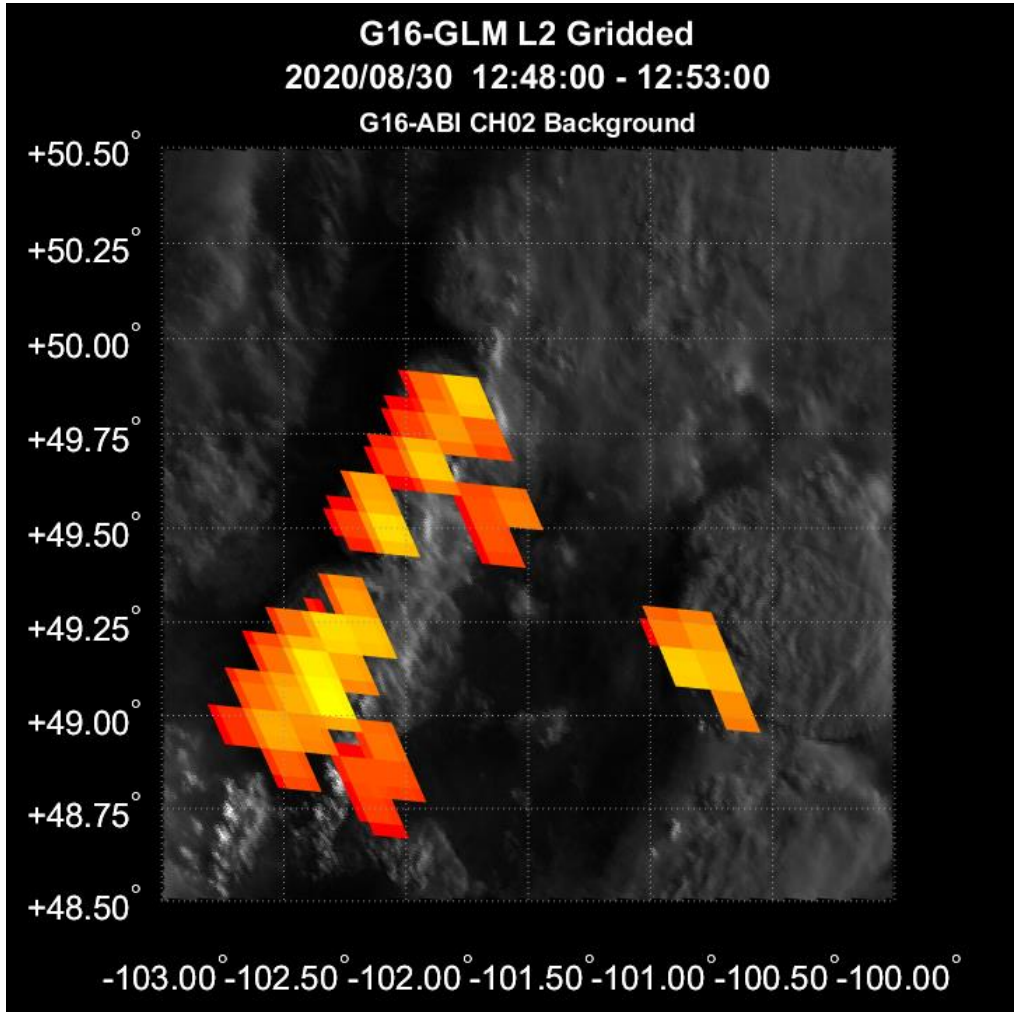
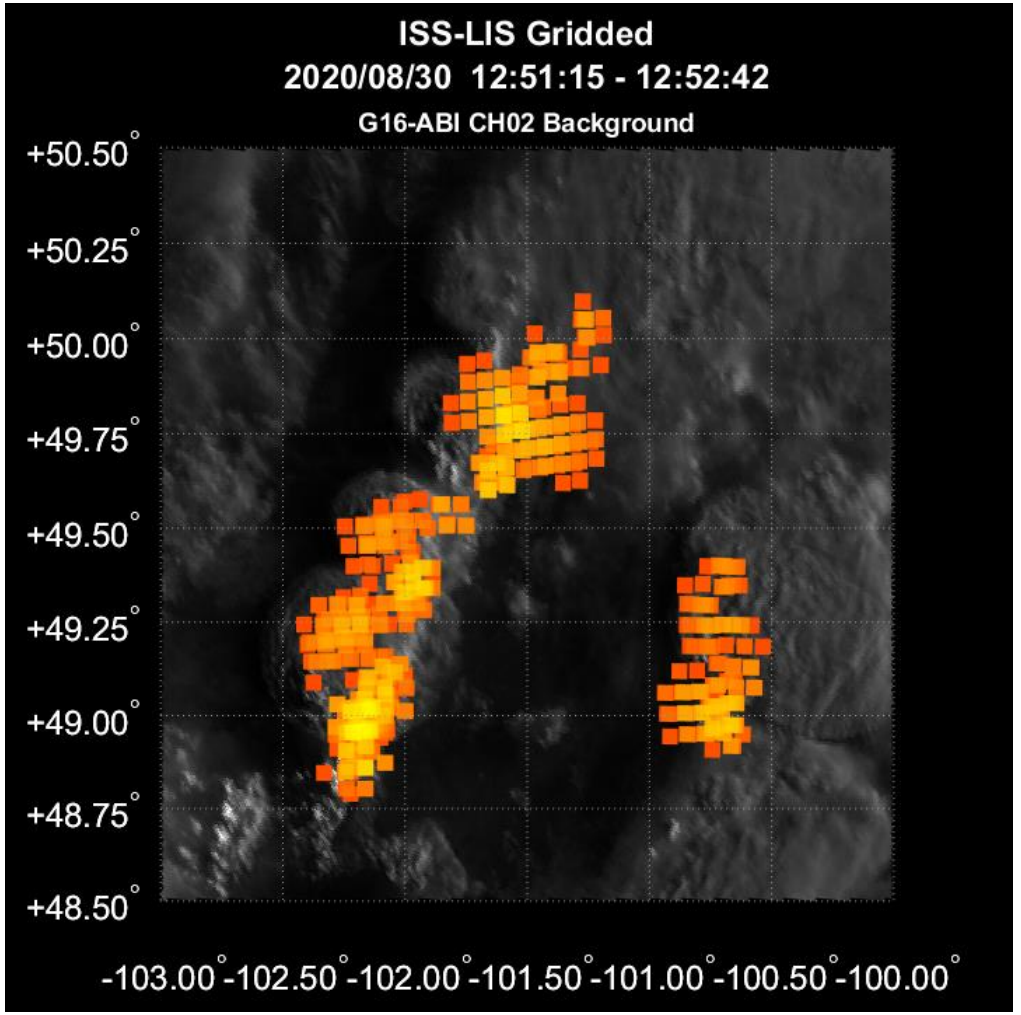
GLM vs. ISS-LIS Ex 2 (CH2): High Lat (high parallax)





- GLM has offset in the higher latitudes
- Boresight-dependent parallax correction

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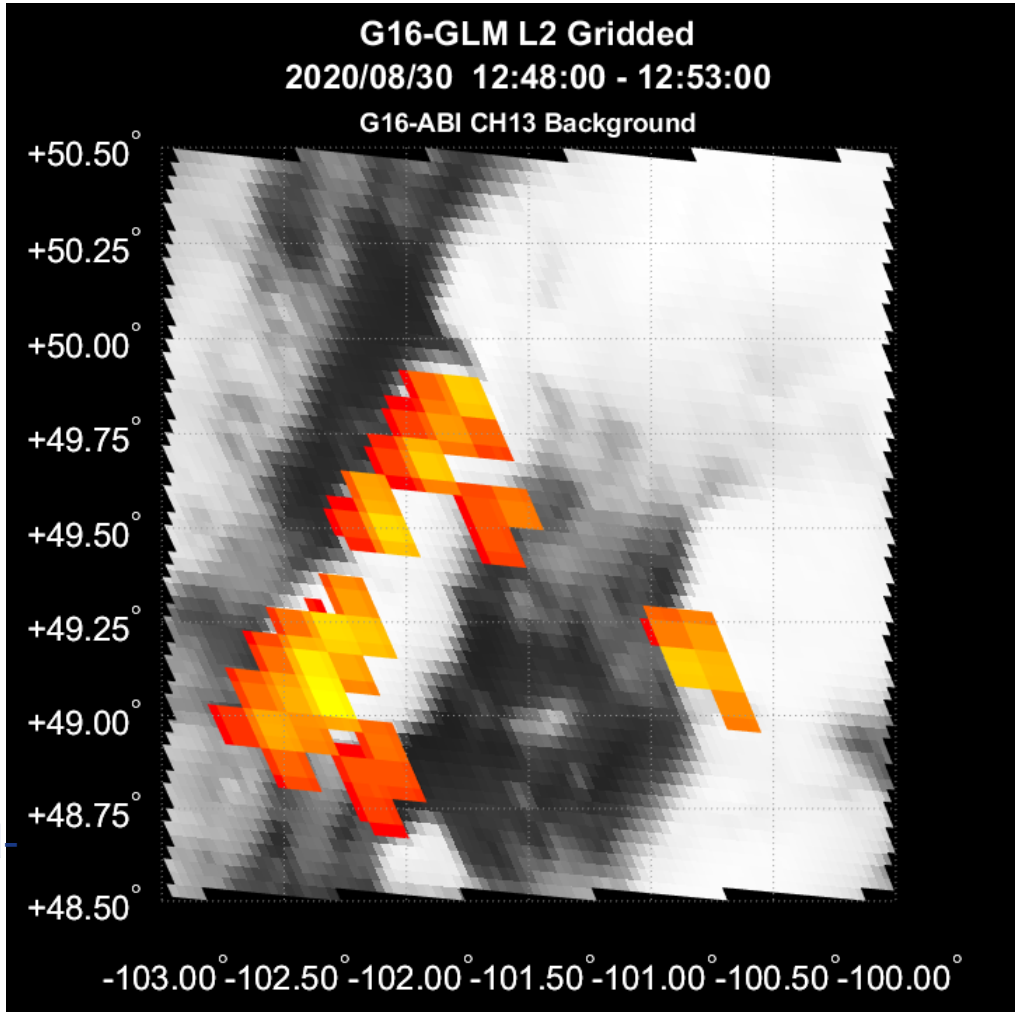
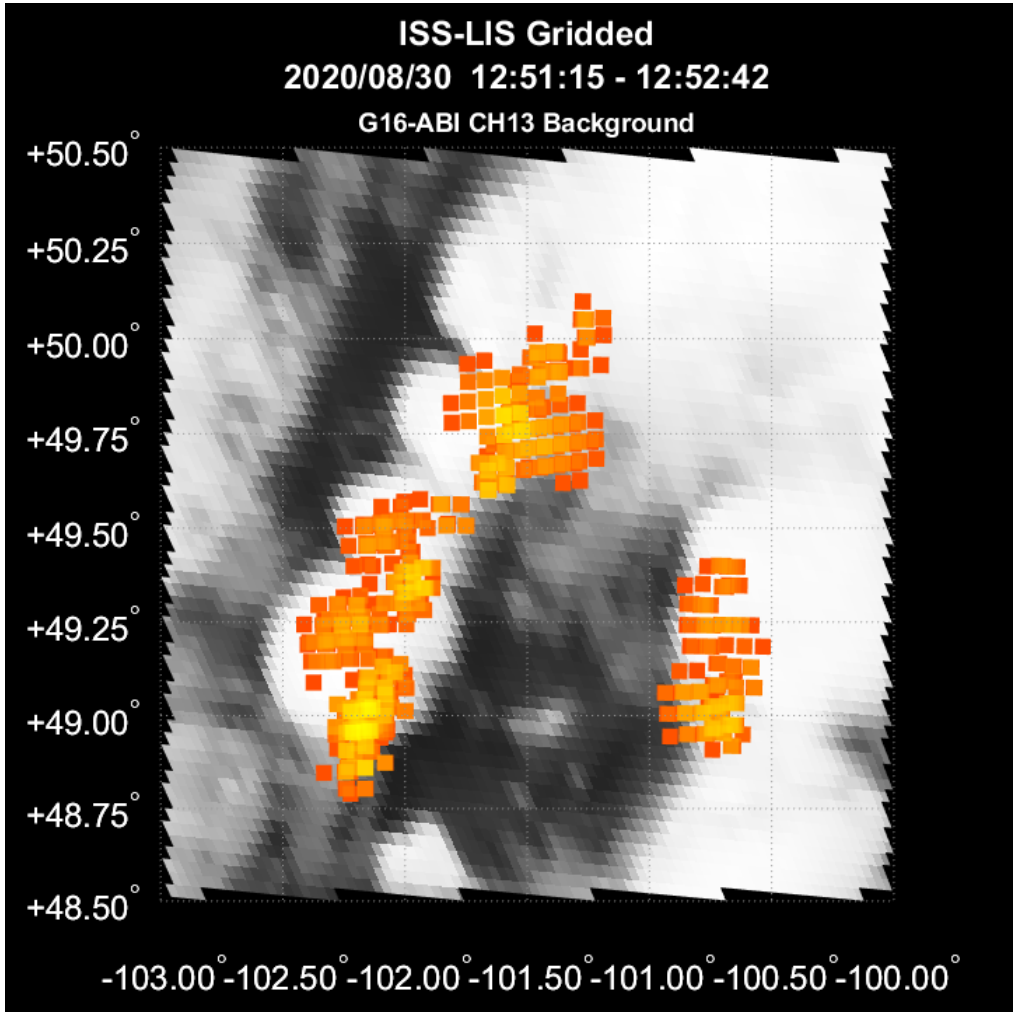
GLM vs. ISS-LIS Ex 2 (CH13)





- IR image provides additional information of cloud-body scattering

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Plan

- Conduct the ISS-LIS full **evaluation**
- Build an ISS-LIS and GLM coincidence **collection**
- Analyze the GLM-LIS cloud-top optical products **empirical relationships**
- Construct the GLM **downscaled dataset**
- Establish a machine learning model for cloud-top optical products pattern recognition and predicting LIS radiance pattern given GLM

➢ We hope that the study will provide benefit for severe storm nowcasting, lightning-caused fire monitoring, and public safety and decision making.

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Thank you!