



# GLM-16 & GLM-18

## Performance Assessment

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# Data Analysis Period

GLM-16 & 18 vs. Virtual Ground Network:

- Sep 2023
- $\pm 1$  s (flash to flash)
- $\pm 10$  min (flash to storm)
- Technique detailed in Bateman et al. (2020)

Plotted: 24h DE & FAR

# Virtual Network

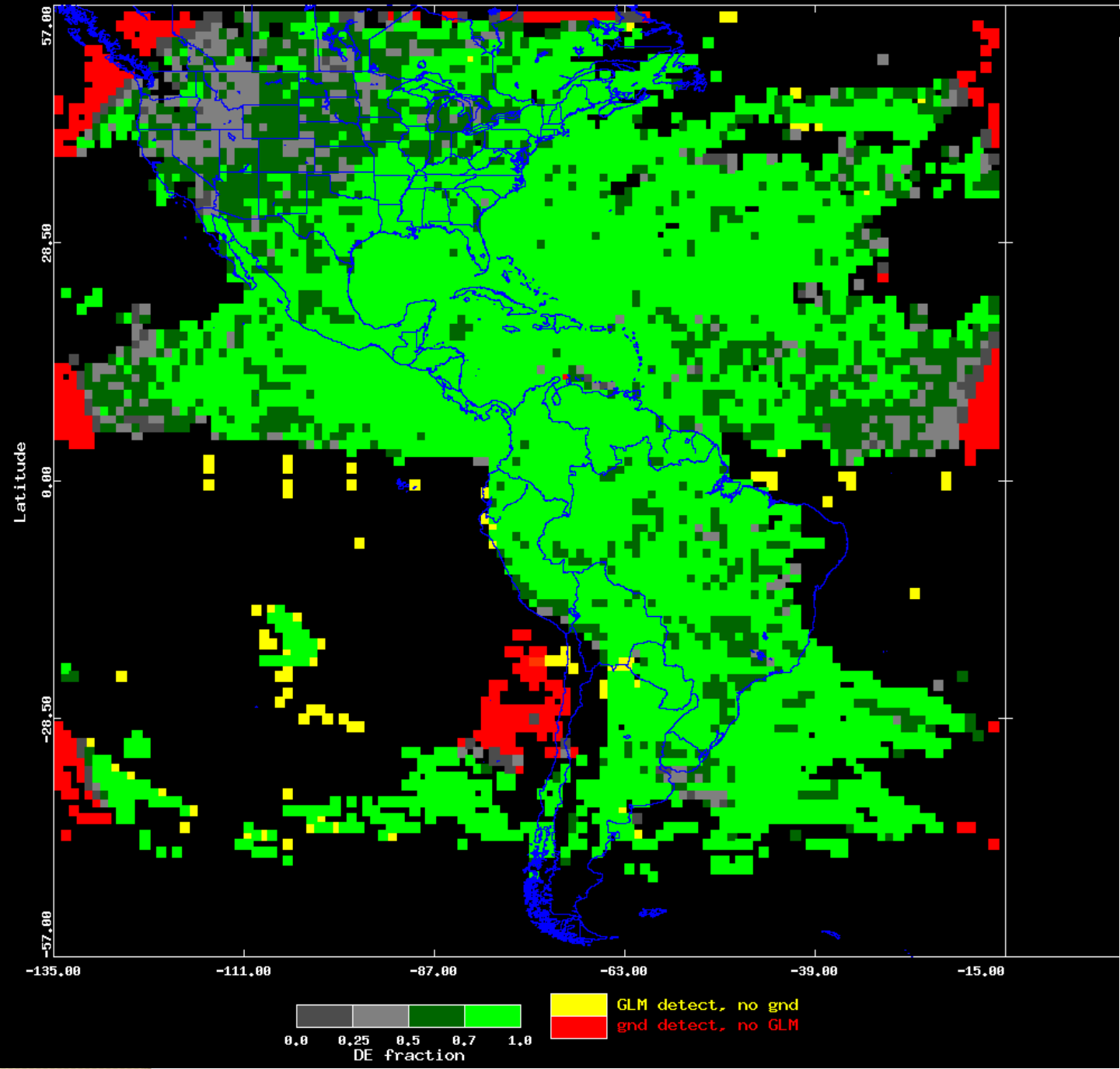
- Wanted the “best possible” source to compare GLM against
- Used several ground-based networks – GLD360, ENGLN, CLDN, NLDN (stroke & flash)
- Clustered similar to GLM clustering algorithm
- Within 330ms and 16.5km

# Coincidence Checking: GLM against Virtual

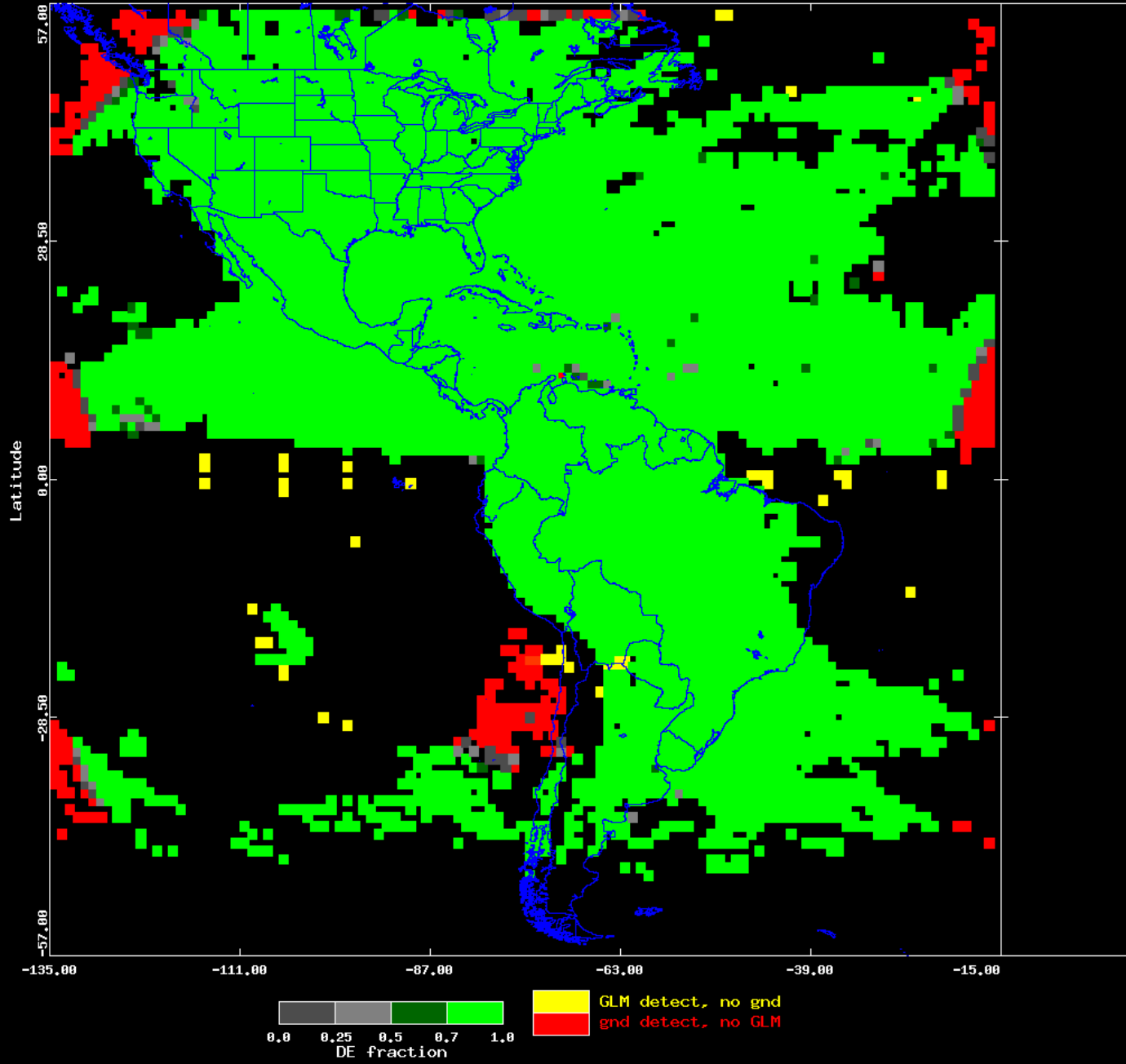
- Coincidence:  
within 50km and  $\pm 1s$  or  $\pm 10$  min
- Detection Efficiency  
DE =  
Coincident flashes / all virtual flashes
- False Alarms  
FAR =  
Non-coincident flashes / All GLM flashes
- These are relative to virtual network  
(the best comparison source we have)

# GLMI6 DE

$\pm 1s$   
Sep  
0.75



AvgDE 0.96 GLM Flashes (54.4 M) Combined GndNet flashes (65.5 M) Flash DE 09/2023 -- 1200s window



GLMI6 DE  
±10 min  
Sep  
0.96

AvgDE 0.76

GLM Flashes (15.4 M)

Combined GndNet flashes (65.5 M)

Flash DE 09/2023 -- 0002s window

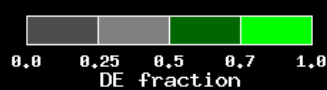
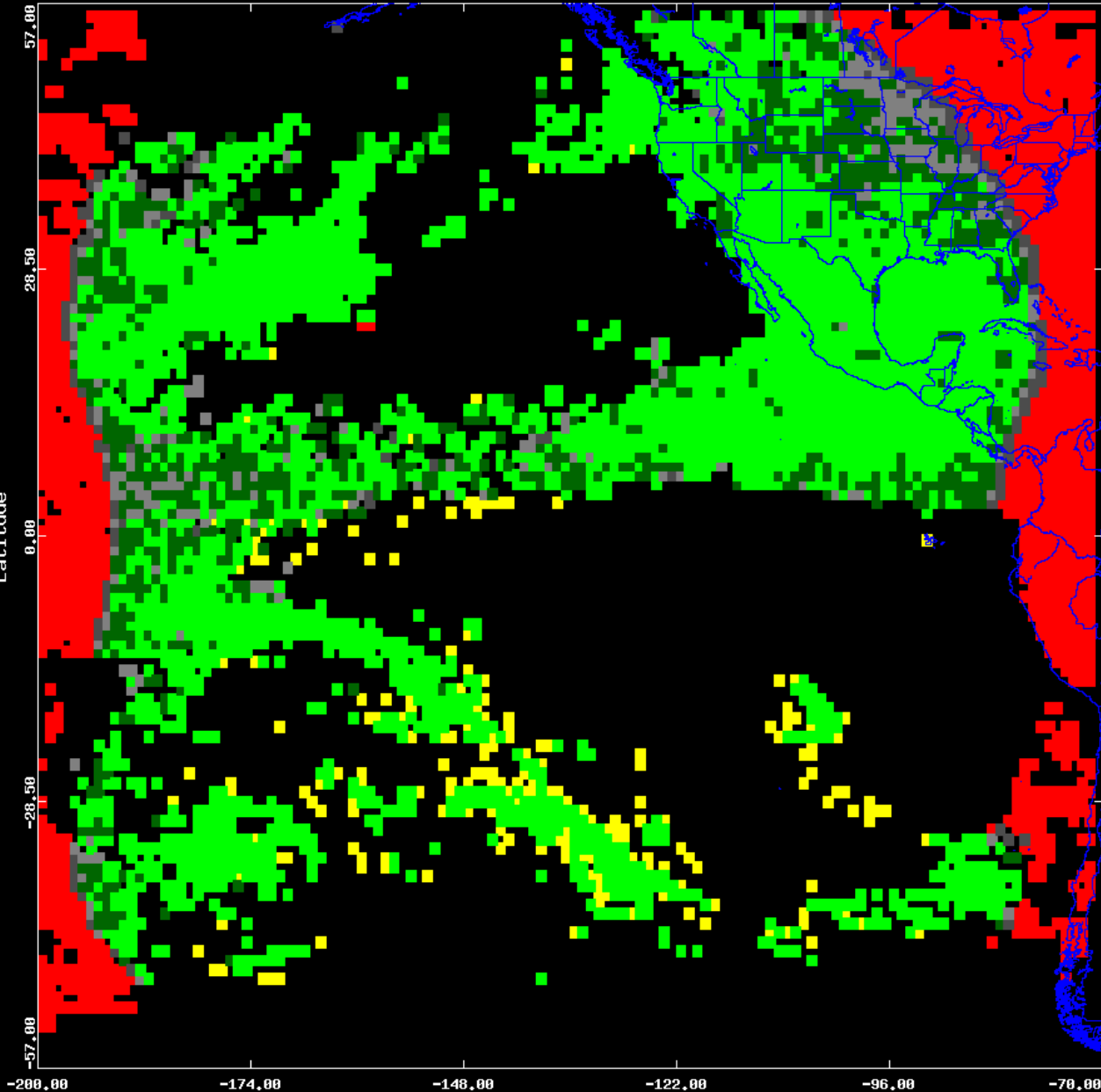
# GLMI8 DE

$\pm 1s$

Sep

0.76

Latitude



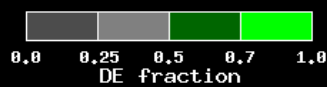
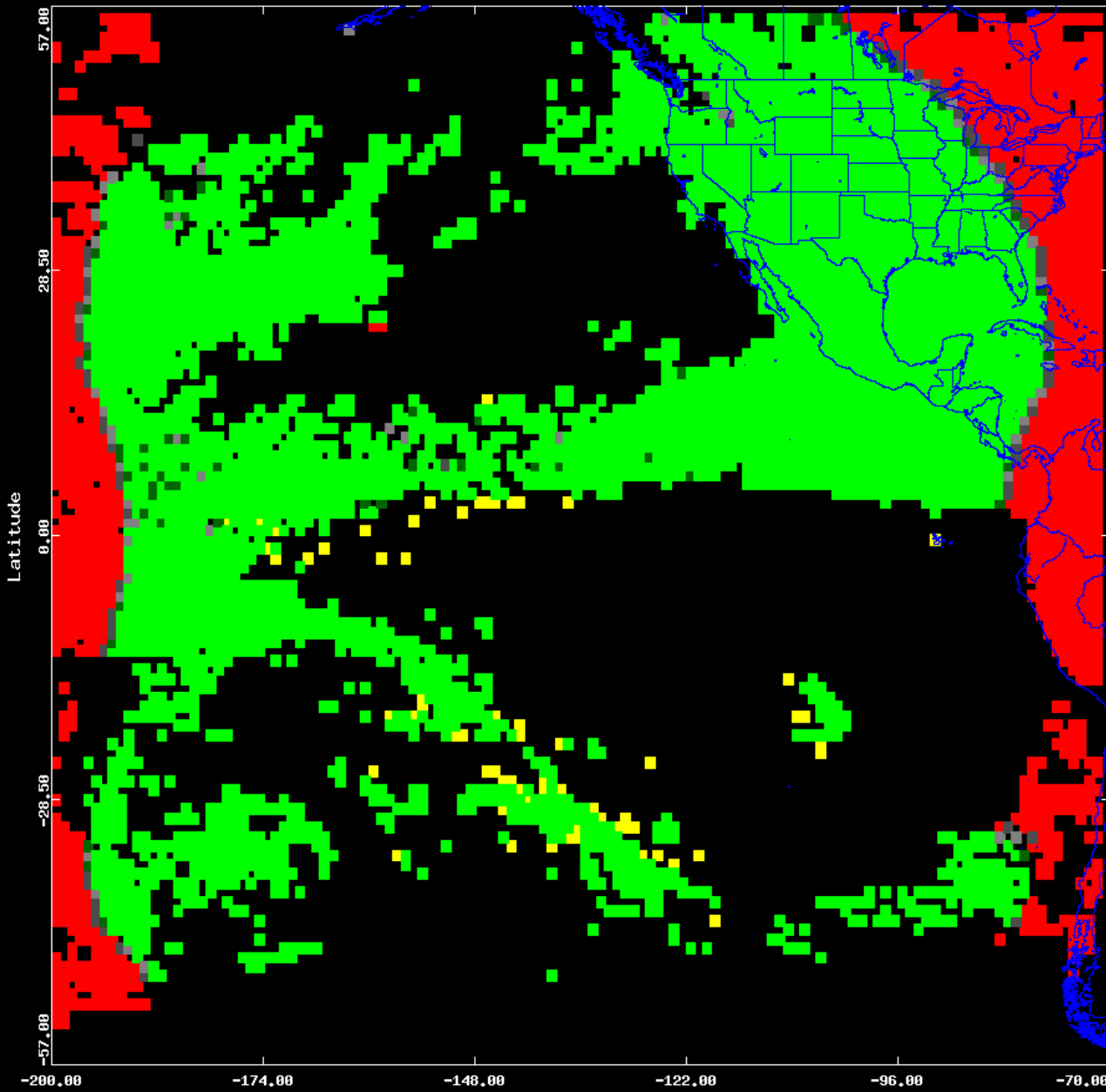
GLM detect, no gnd  
gnd detect, no GLM

AvgDE 0.95

GLM Flashes (15.4 M)

Combined GndNet flashes (65.5 M)

Flash DE  
09/2023 -- 1200s window



GLM detect, no gnd  
gnd detect, no GLM

GLM18 DE  
 $\pm 10$  min  
Sep  
0.95



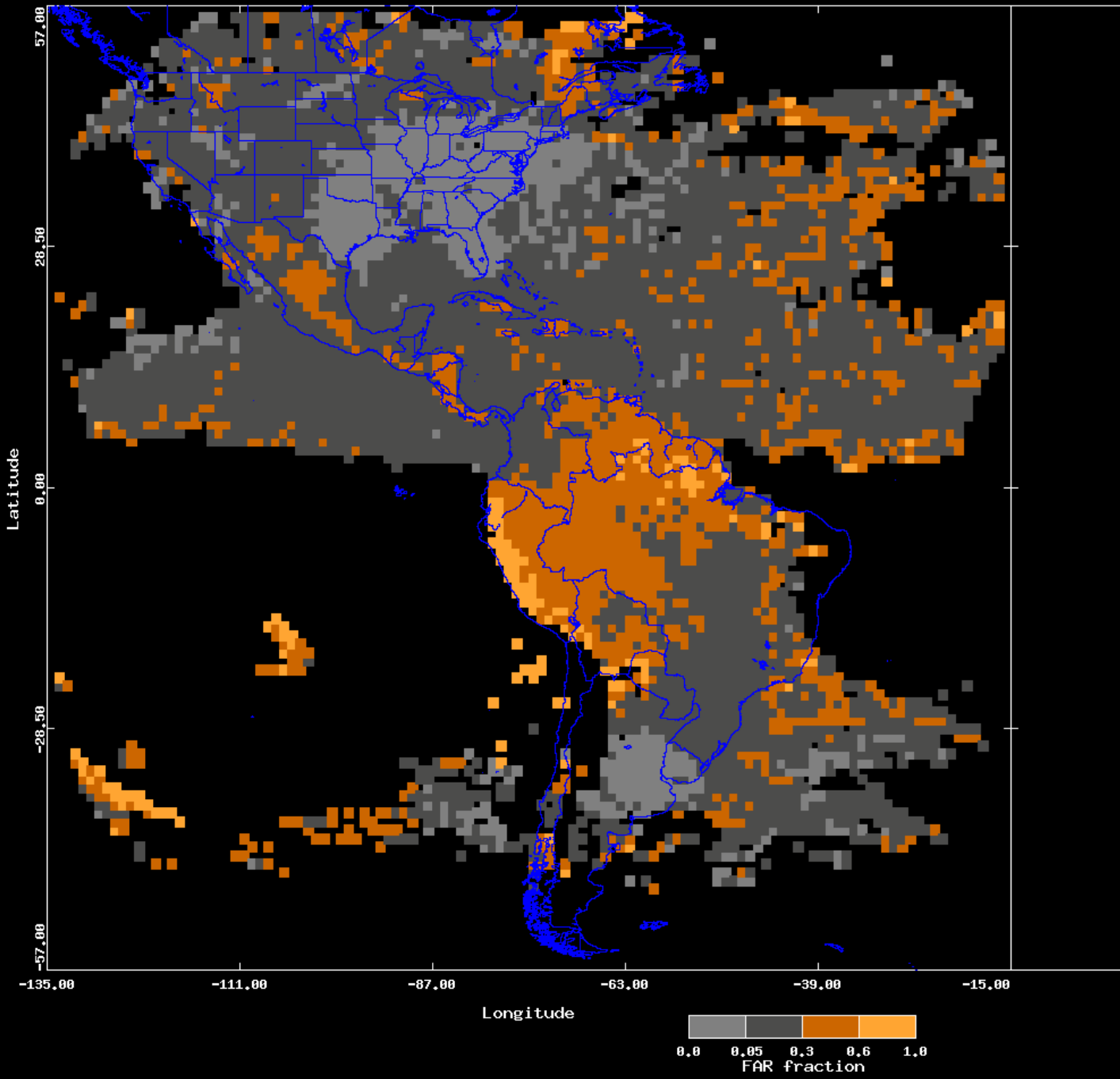
AvgFAR 0.21

GLM Flashes (54.4 M)

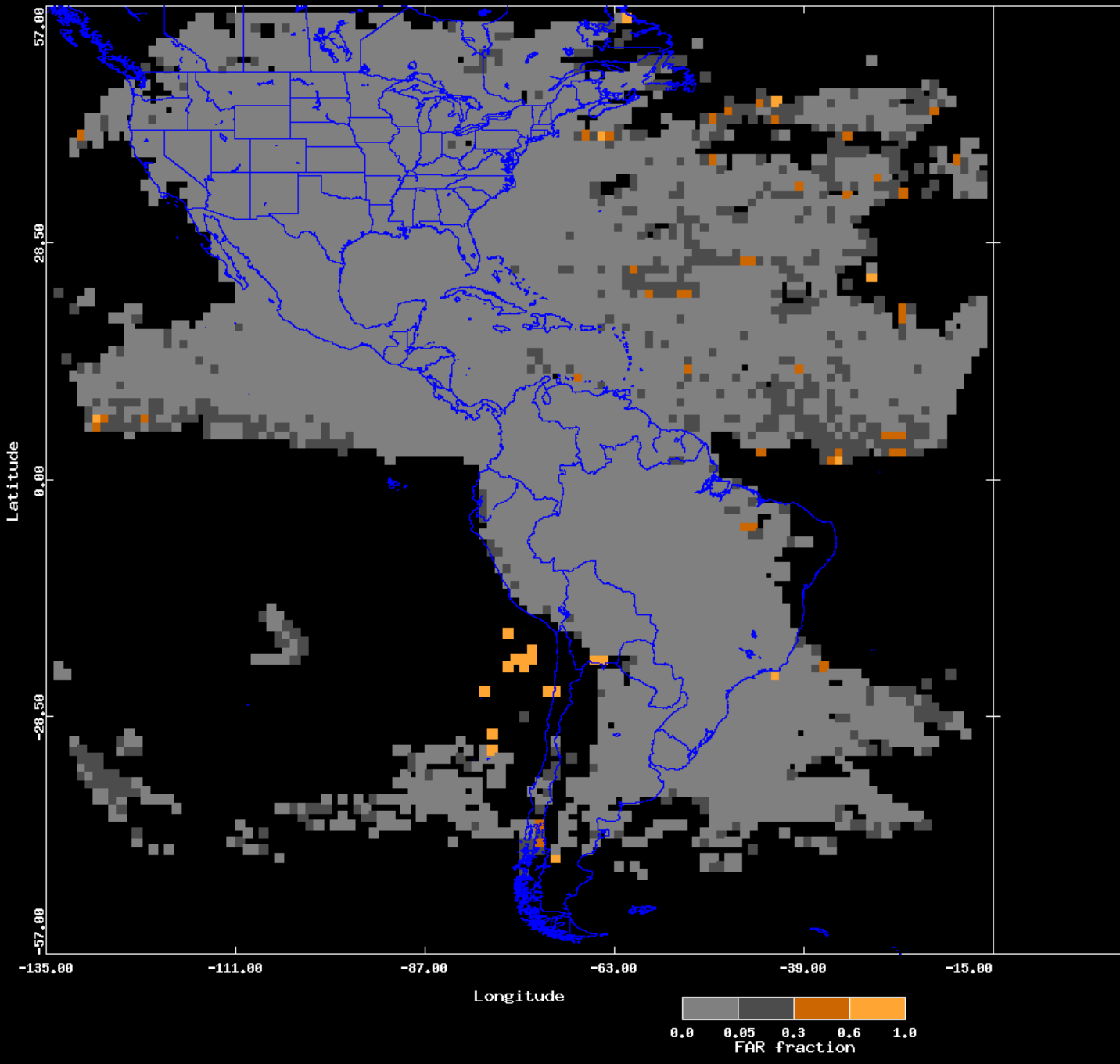
Combined GndNet flashes (65.5 M)

Flash FAR  
09/2023 -- 0002s window

GLMI6  
FAR  
 $\pm 1s$   
Sep  
0.21



AvgFAR 0.02 GLM Flashes (54.4 M) Combined GndNet flashes (65.5 M) Flash FAR 09/2023 -- 1200s window



# GLMI6 FAR

$\pm 10$  min

Sep

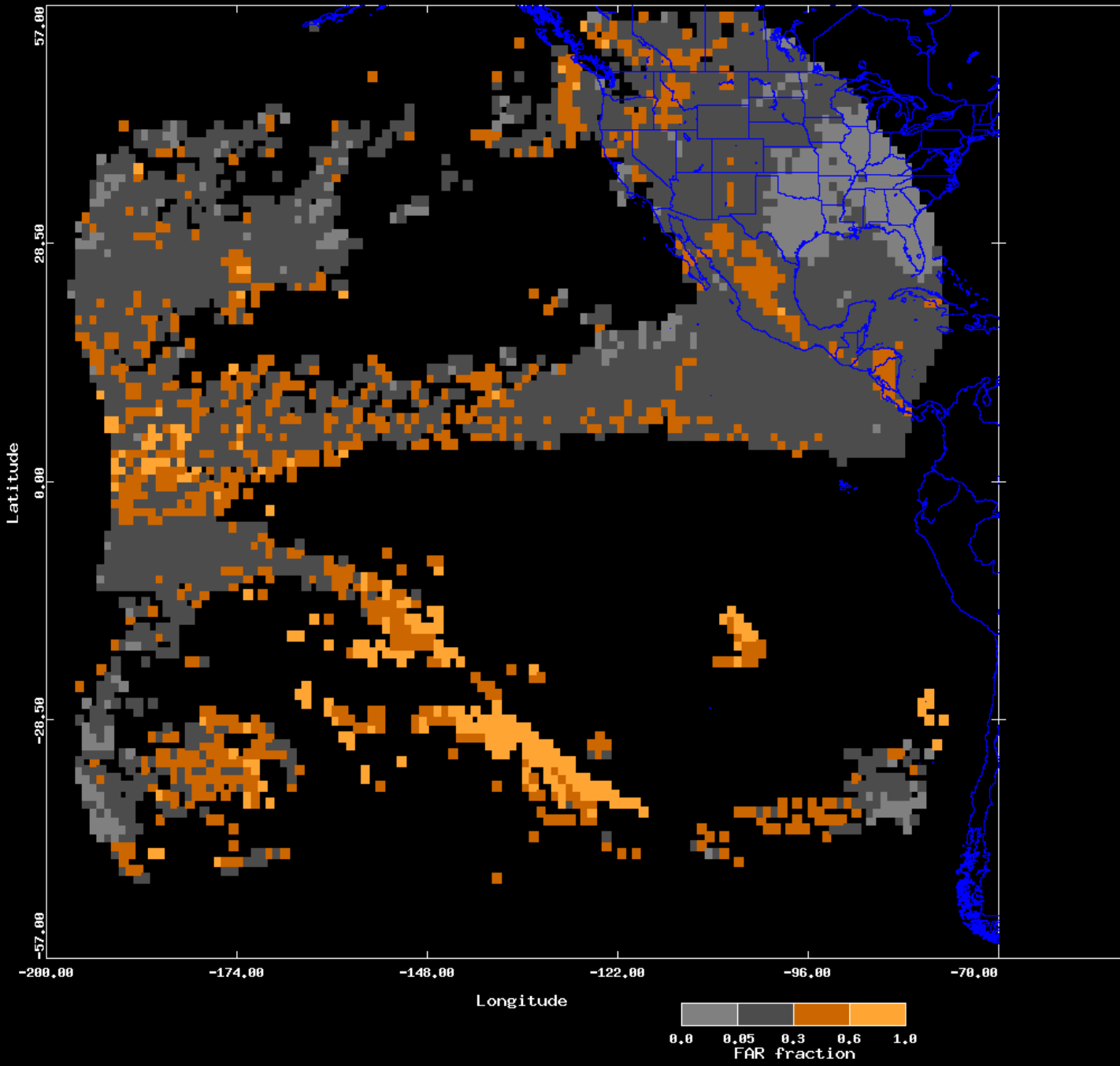
0.02

AvgFAR 0.23

GLM Flashes (15.4 M)

Combined GndNet flashes (65.5 M)

Flash FAR  
09/2023 -- 0002s window



# GLM18 FAR

$\pm 1s$   
Sep  
0.23

AvgFAR 0.05

GLM Flashes (15.4 M)

Combined GndNet flashes (65.5 M)

Flash FAR  
09/2023 -- 1200s window

# GLM18 FAR

## ±10 min

## Sep

## 0.05

Latitude

57.00

28.50

0.00

-28.50

-57.00

-200.00

-174.00

-148.00

-122.00

-96.00

-70.00

Longitude

0.0

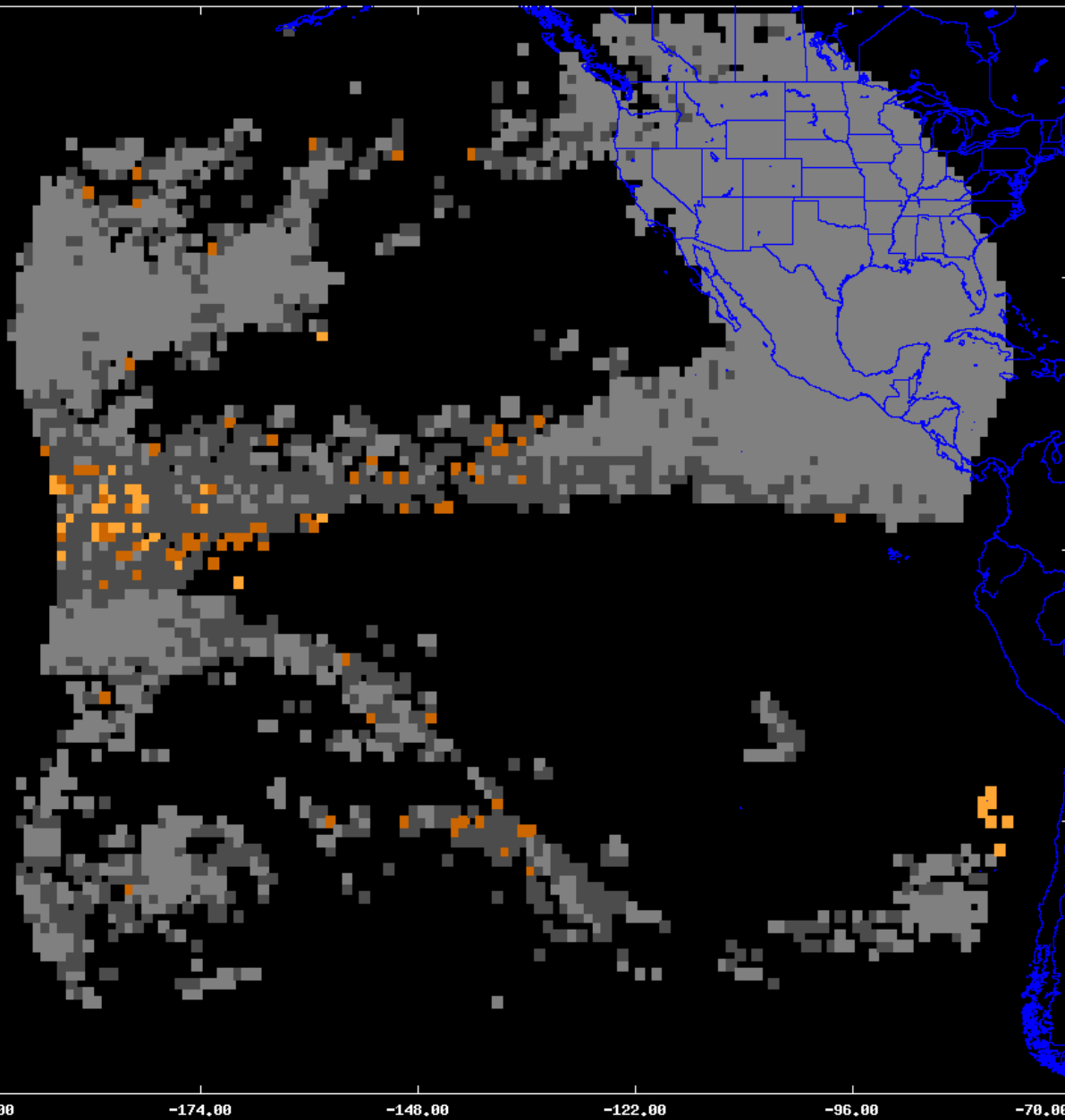
0.05

0.3

0.6

1.0

FAR fraction



# Concluding Remarks

- DE & FAR for GLM-16 & GLM-18 are performing well
- Sep GLM-16: DE 0.75, FAR 0.02
- Sep GLM-18: DE 0.76, FAR: 0.05