

GNSS Observations from Venetie, Alaska during the ISINGLASS sound rocket mission

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In Situ and Groundbased Low Altitude Studies or ISINGLASS mission





Dartmouth College

Cornell University

UNH

UAF/GI

ERAU

NASA GSFC/UMd

SRI/PFISR

PFRR

NASA/WFF

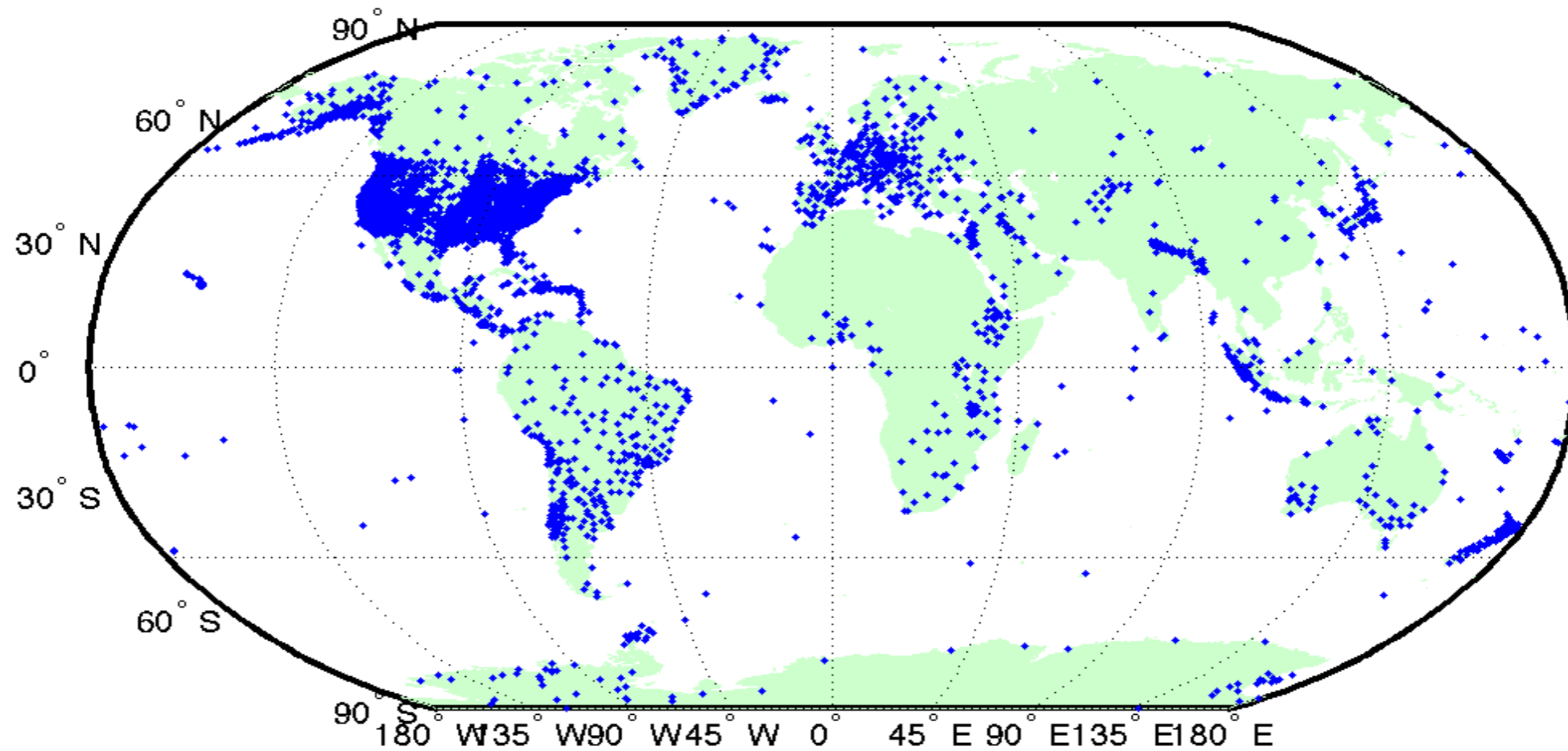
NSROC

ISINGLASS 2017

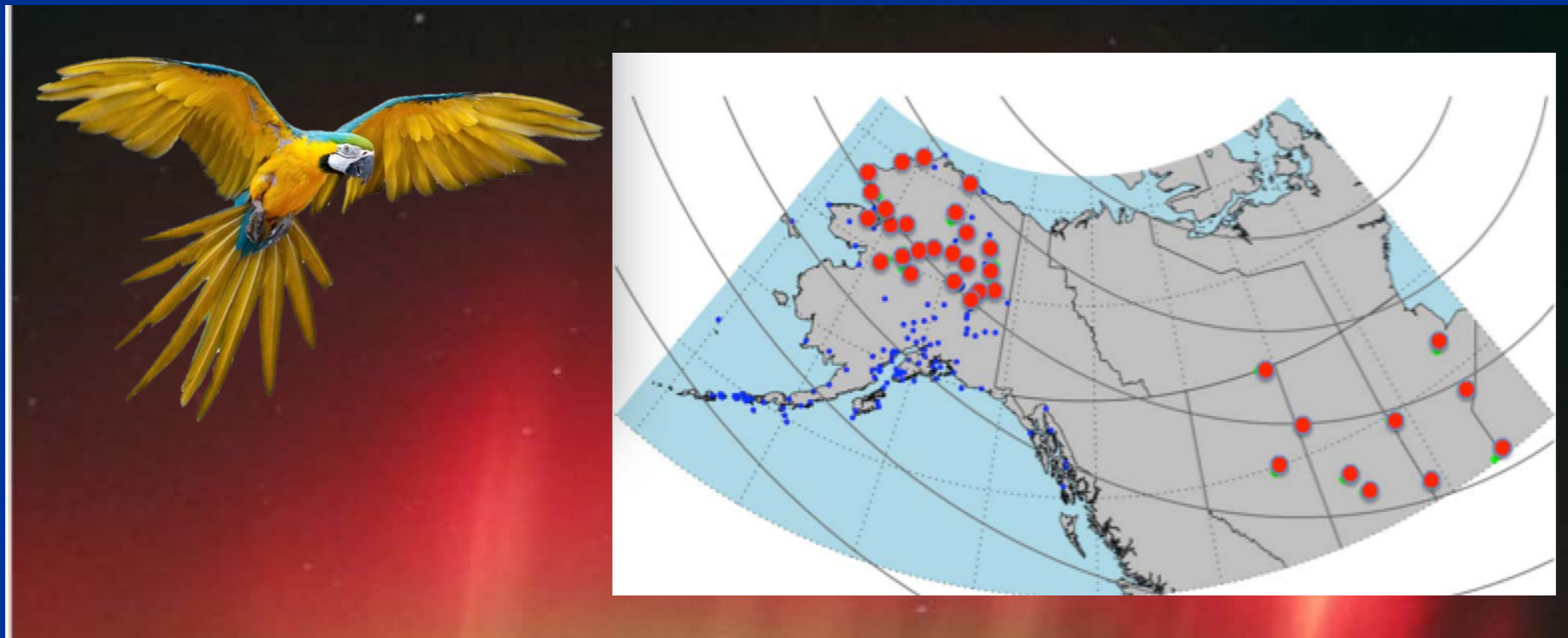


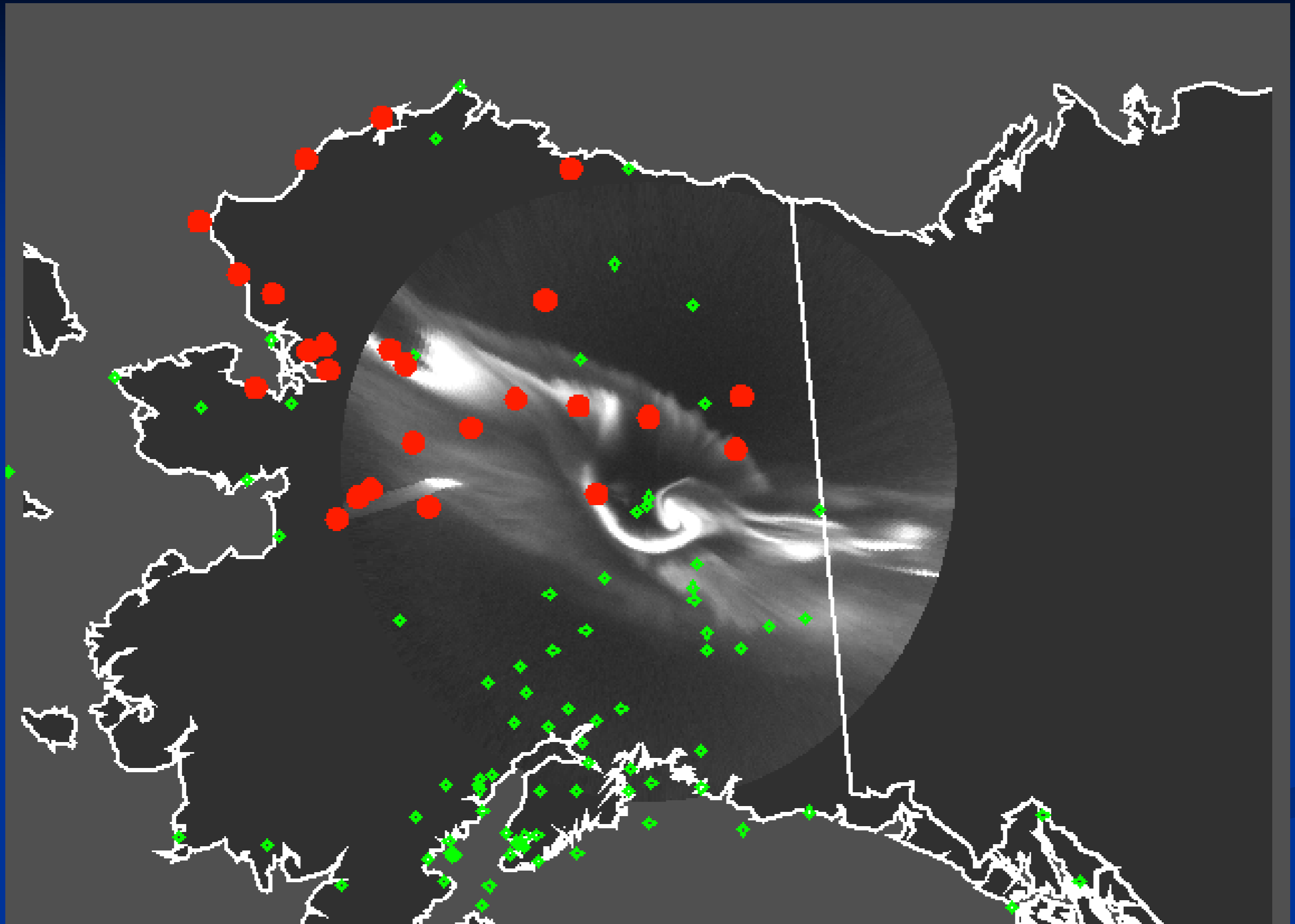


Map of GPS receivers

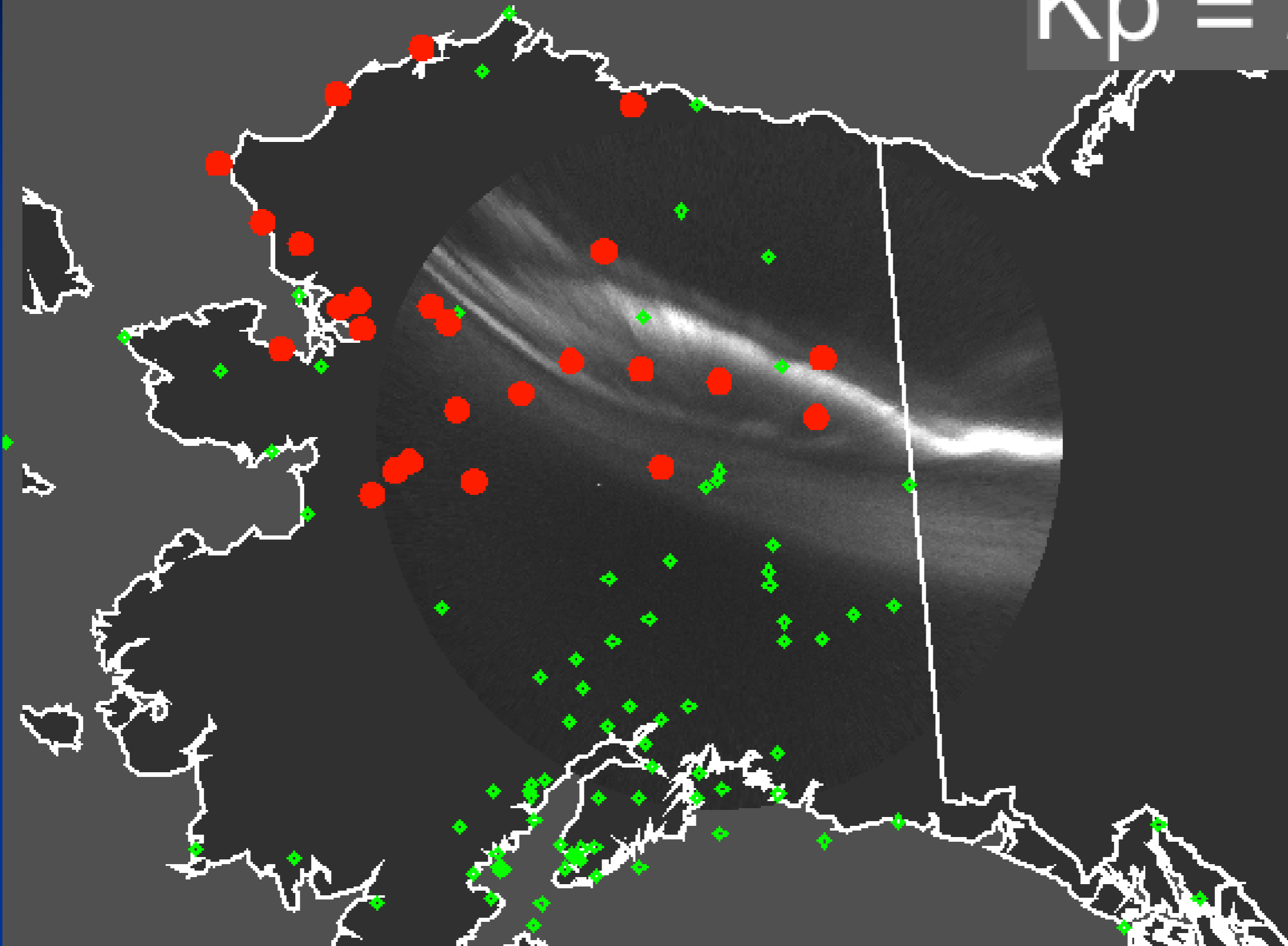


MRI Collaborative: Development of Monitors for Alaskan and Canadian Auroral Weather in Space (MACAWS)

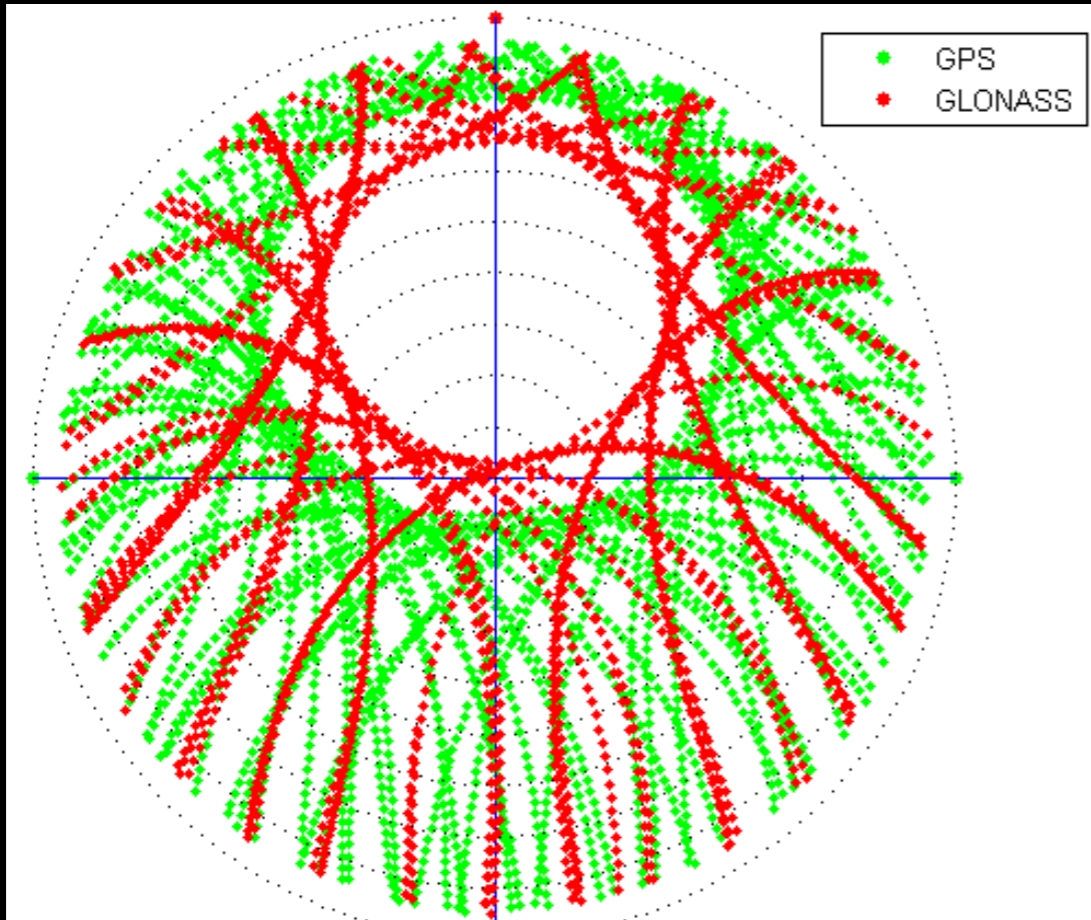




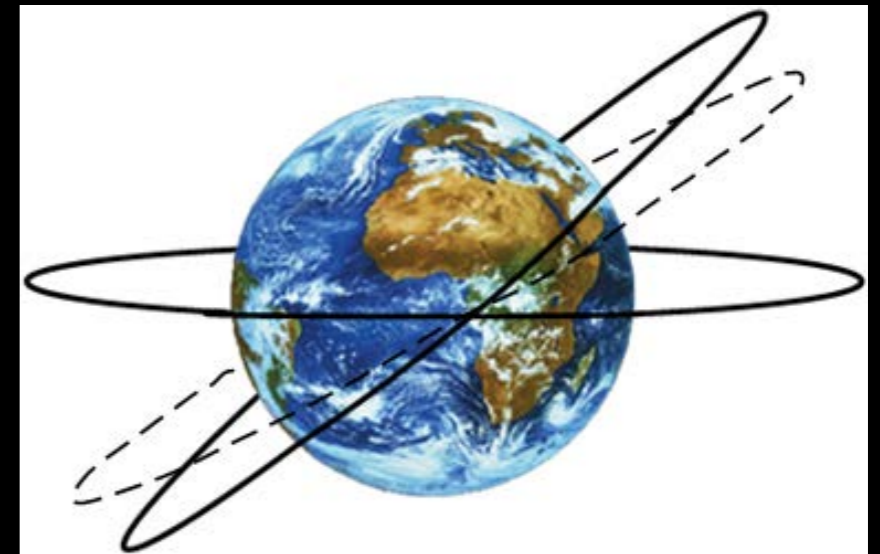
Kp = 2+



24-hour satellite path for GPS (Green) and GLONASS (Red)



GLONASS orbit plane inclination: 65°



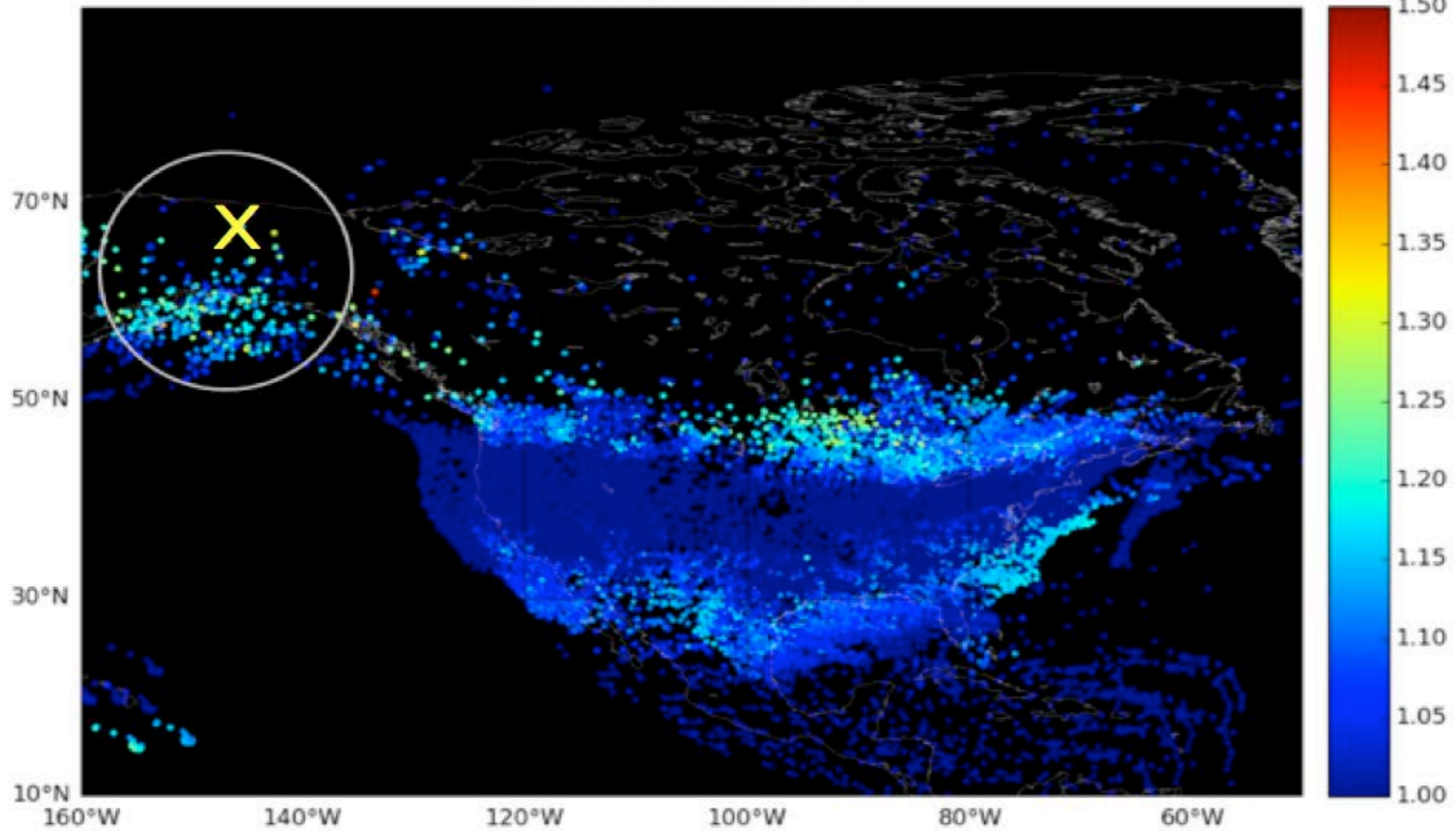
COMPASS

GALILEO





2015-03-17 09:39:00 UTC





N463711

WRIGHT AIR SERVICE







Venetie
GPS PC



to GPS
Com3-4/
USB Host



to PC USB

Power Port



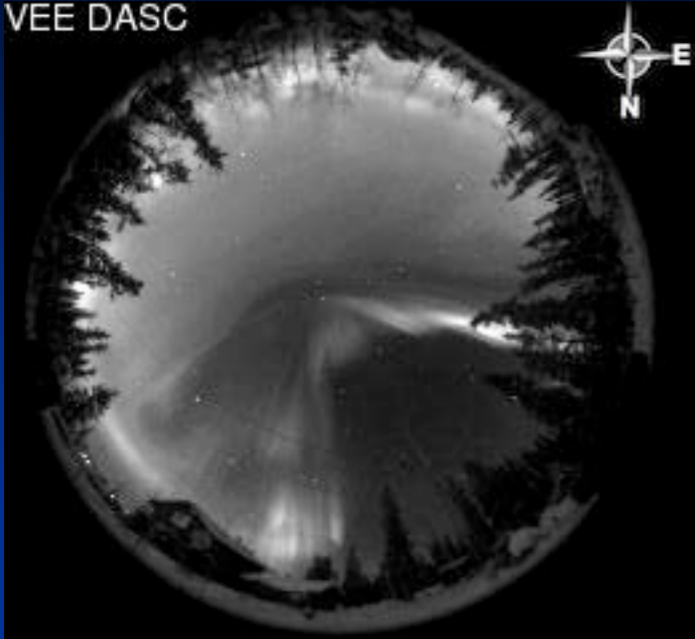
The third rocket
launched at 2:50 a.m. EST
was part of the
Ionospheric Structuring: In
Situ and Groundbased
Low Altitude Studies or
ISINGLASS mission







VEE DASC



2017/03/01

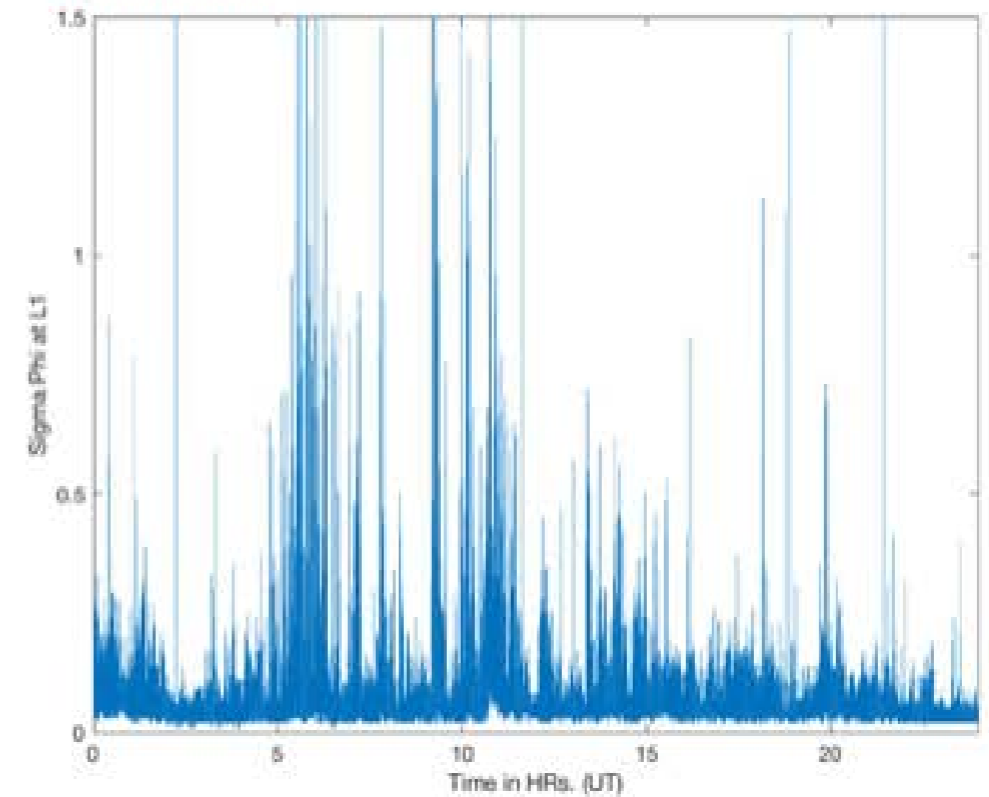
10:41:30



Aurora observed at Venetie, Alaska 2 March 2017

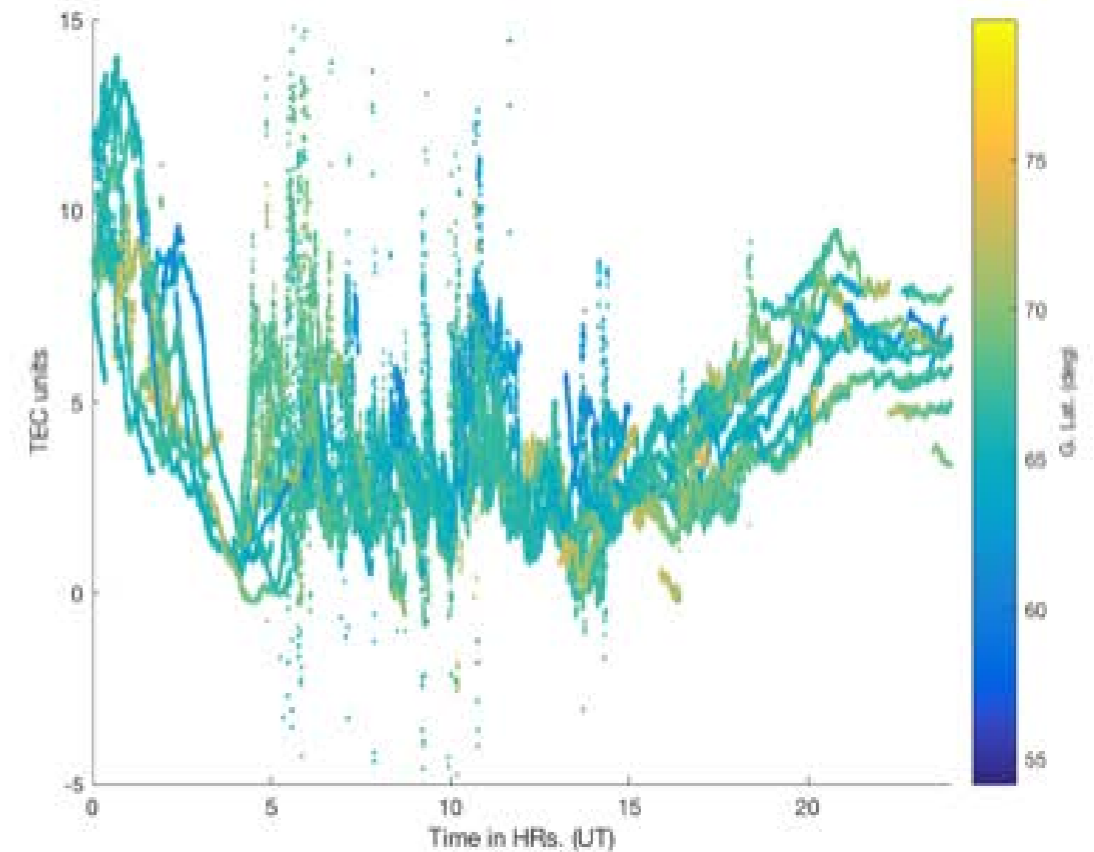


Venetie Sigma-Phi 2 March 2017

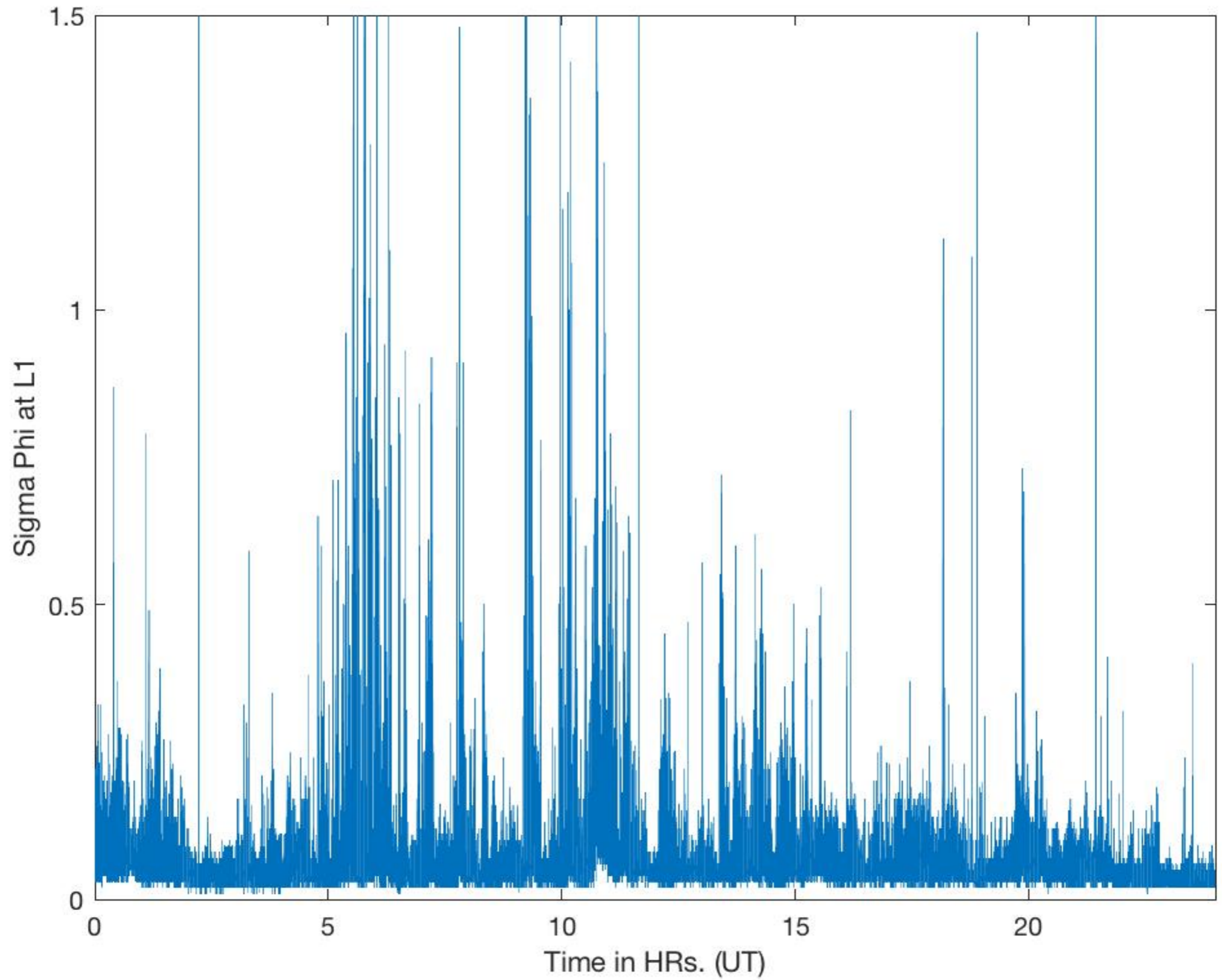


Venetie TEC 2 March 2017

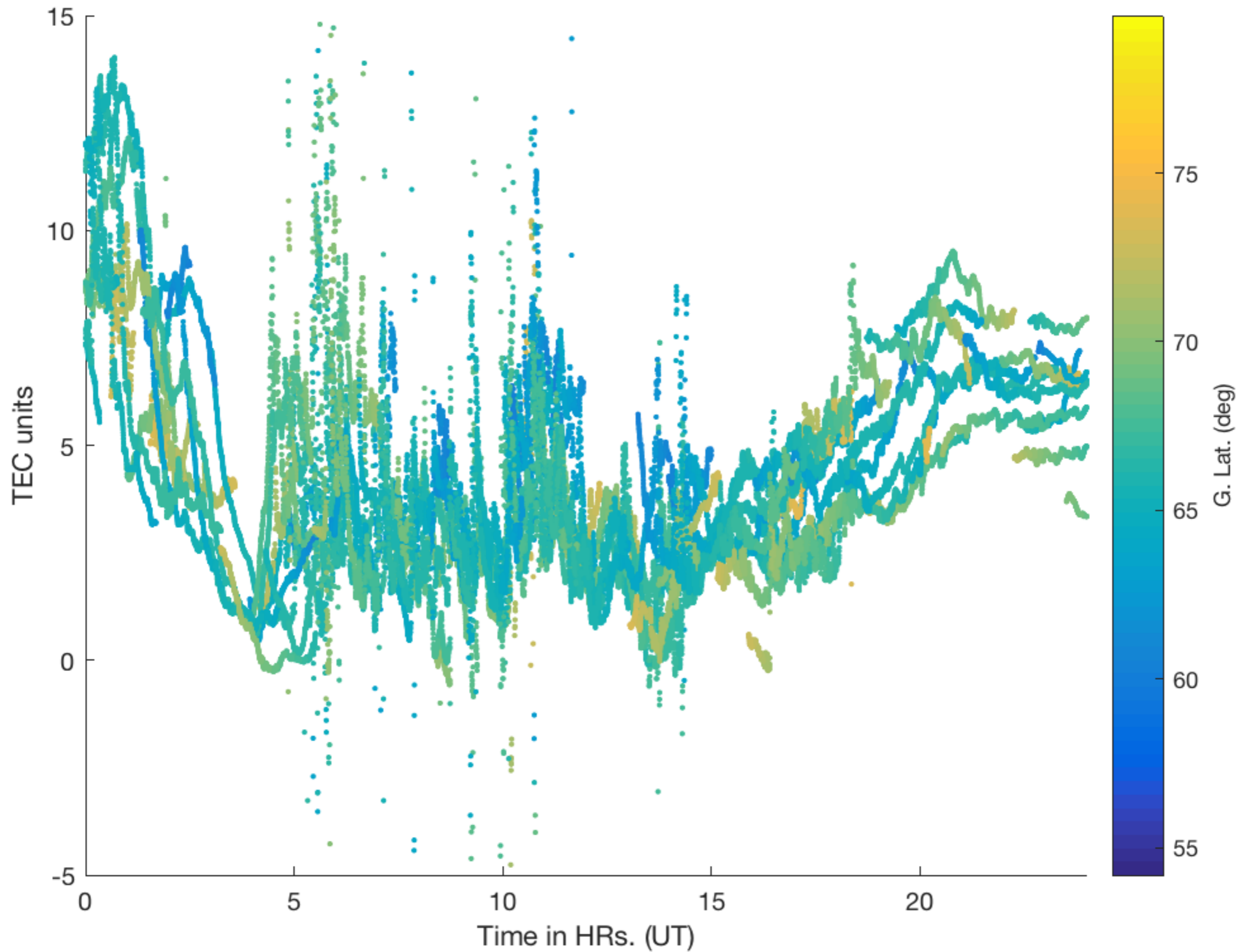
2017-Mar-2 GPS TEC from vene Long. > -163.944054 & < -128.435680 deg.



2017- 3- 2 Venetie Sigma Phi

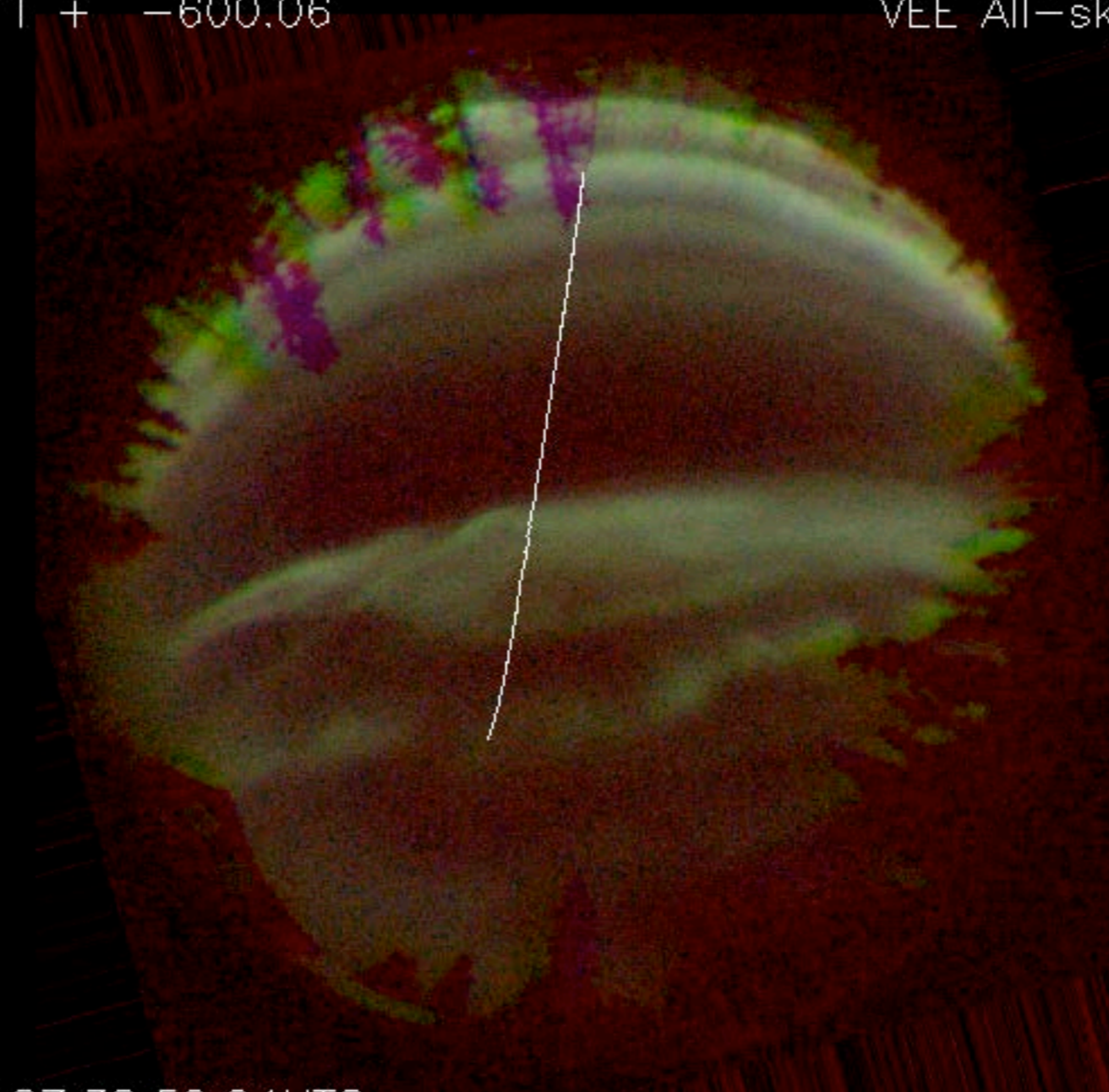


2017-Mar-2 GPS TEC from vene Long. > -163.944054 & < -128.435680 deg.



T + -600.06

VEE All-sky



07:39:59.94UTC

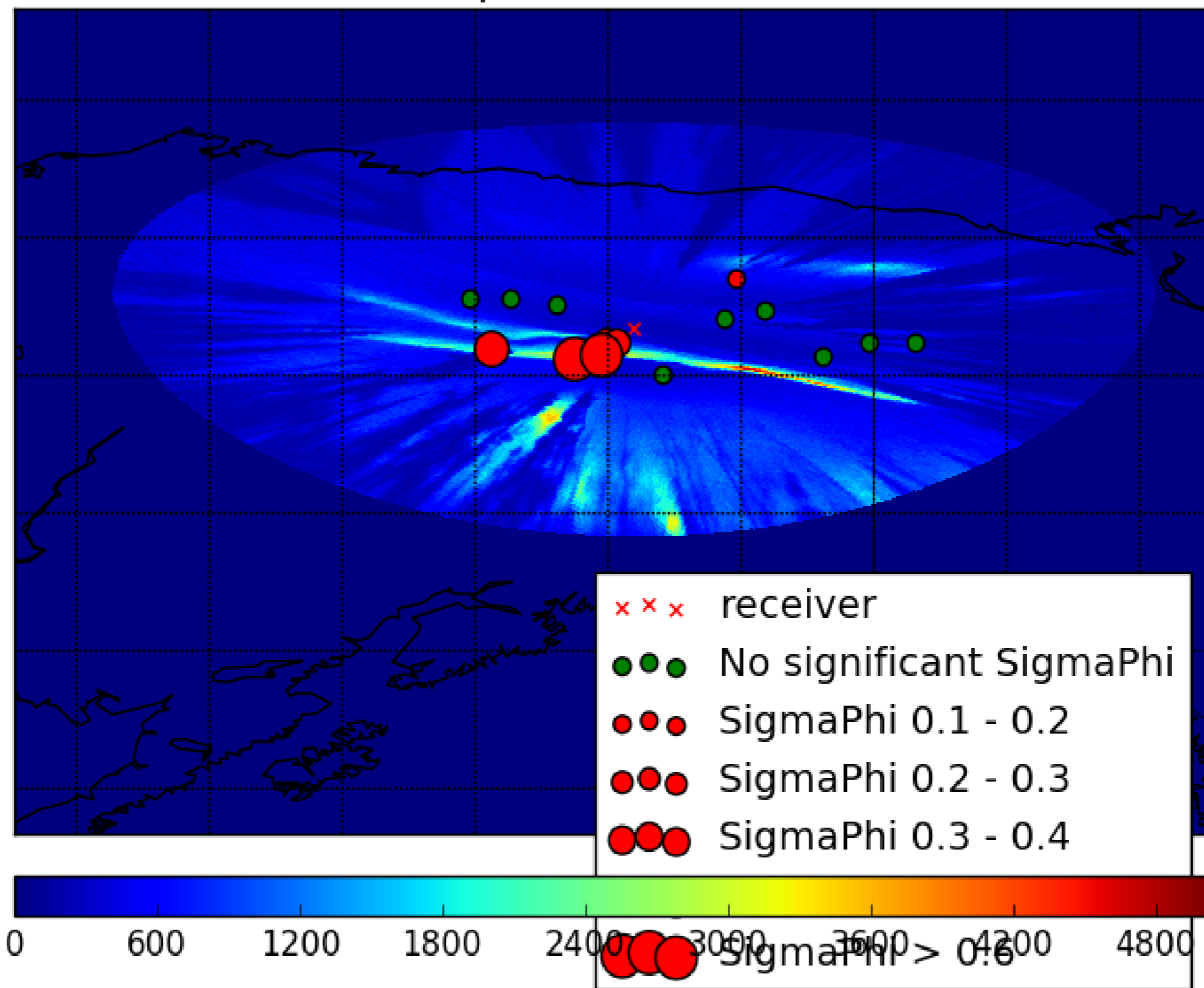
427.8, 557.7, 844.6 nm, LOG₁₀

Movie of Sigma - Phi

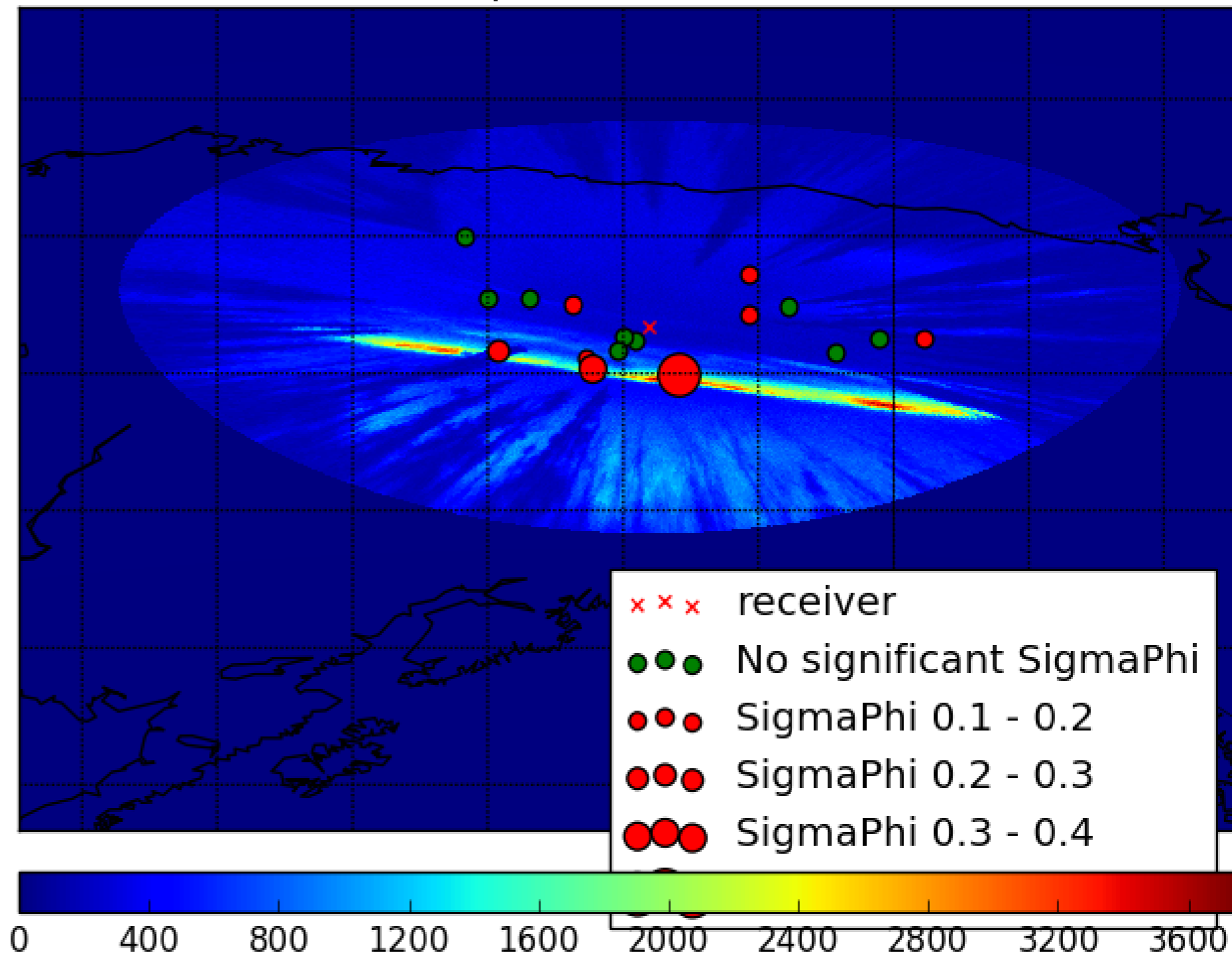


Sigma Phi observations mapped to 110 km

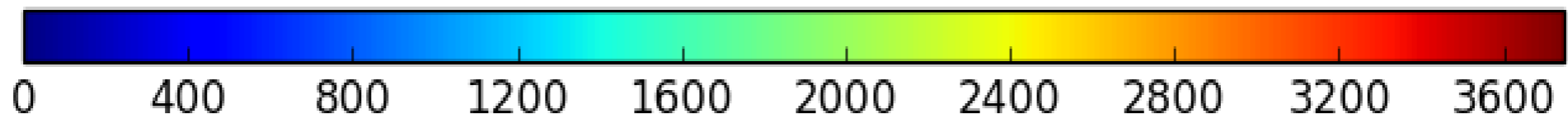
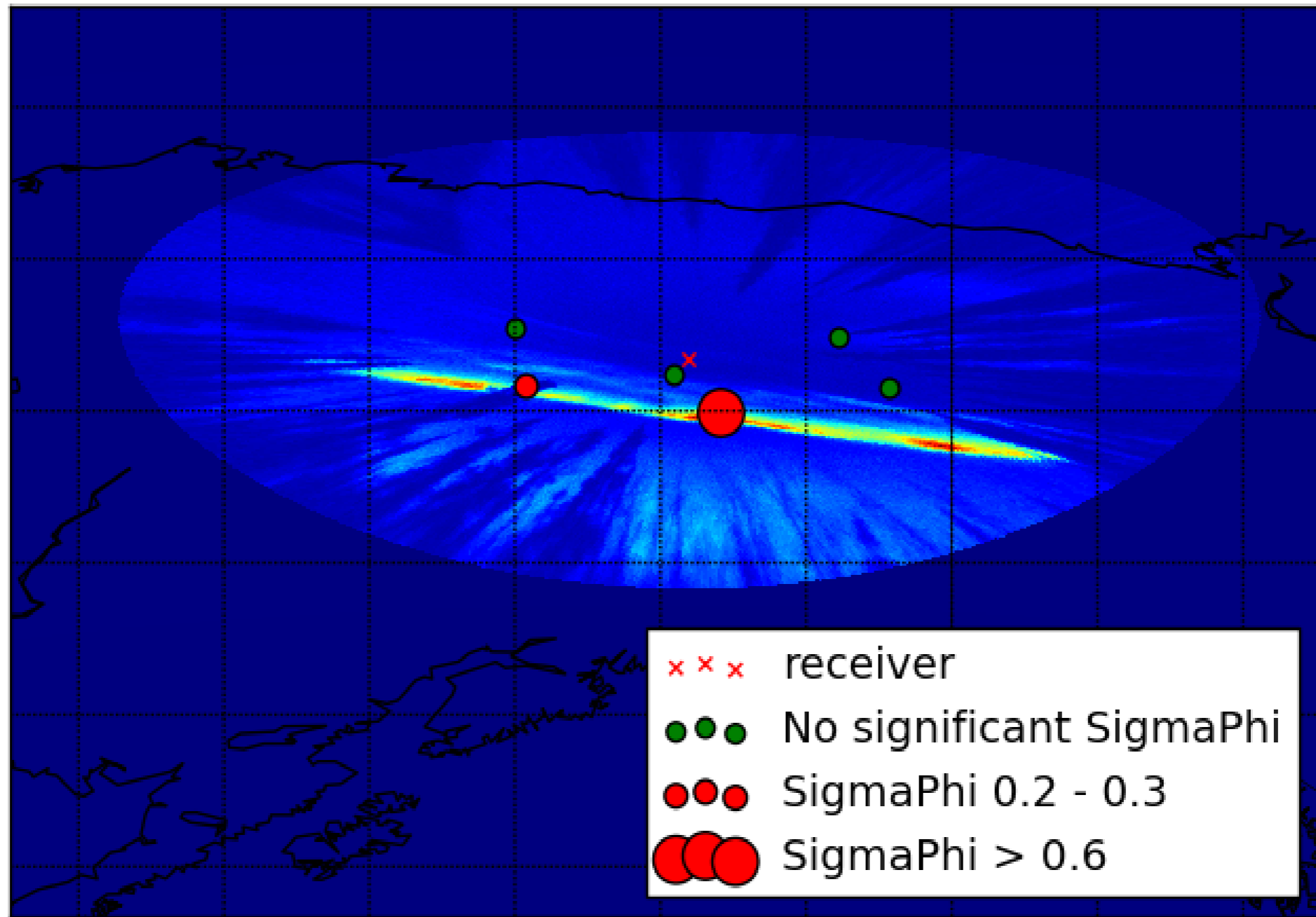
Scintillation/TEC map 2017-03-02 07:50:55.000789



Scintillation/TEC map 2017-03-02 07:53:33.000319

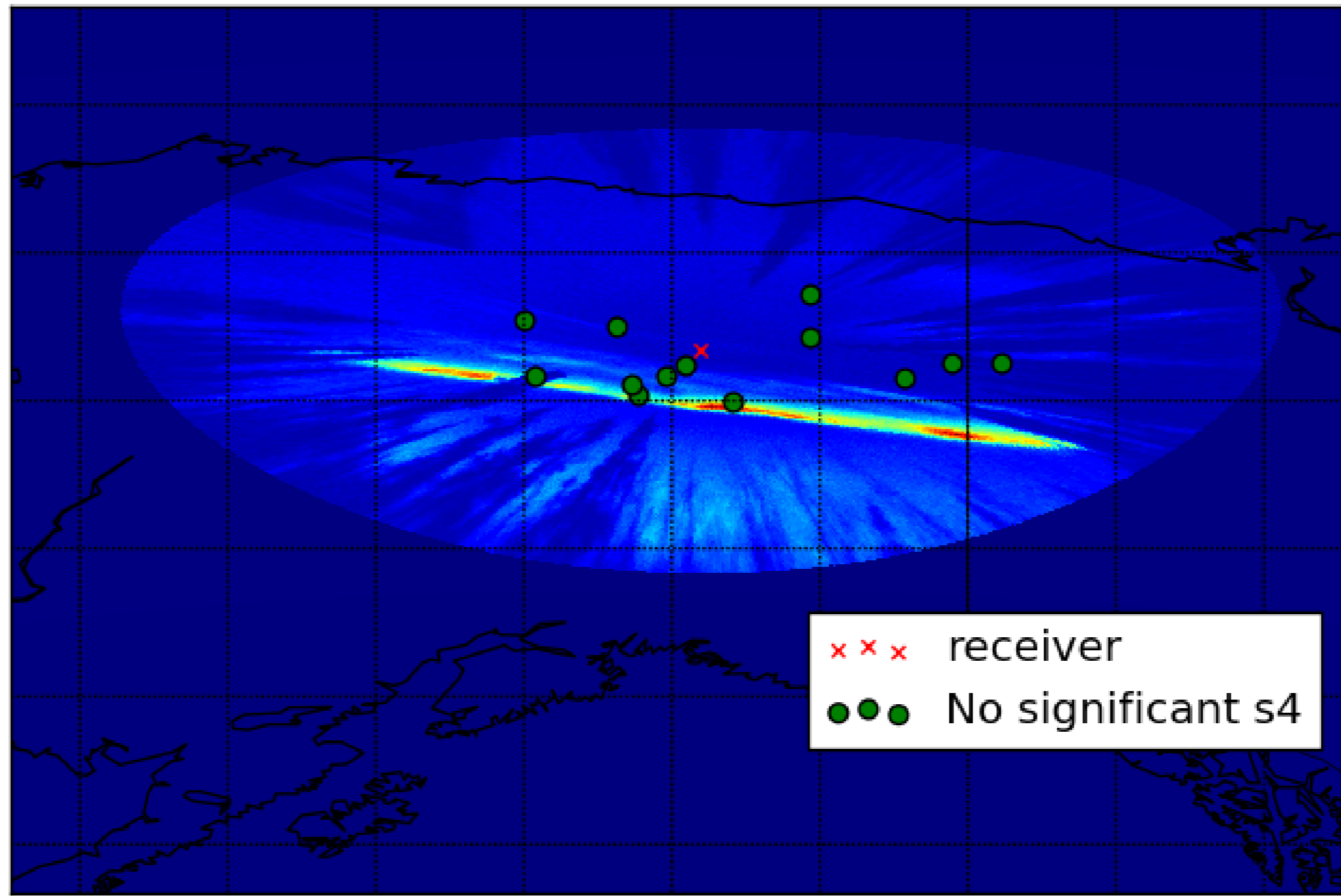


Scintillation/TEC map 2017-03-02 07:53:33.000319

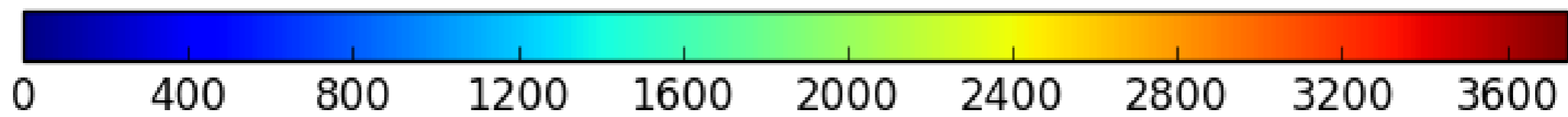


S4 – no significant S4 throughout time period

Scintillation/TEC map 2017-03-02 07:53:33.000319



x x x receiver
● ● ● No significant s4



Summary

- 1) Northern Alaska lacks GNSS observations
- 2) Multi-constellation GNSS receivers are especially beneficial at high latitudes
- 3) Sigma phi observations track auroral arcs using 110 km pierce point altitude
- 4) S4 observations are minimal, perhaps due to low TEC