

オメガバンドオーロラ発生時の SuperDARN観測

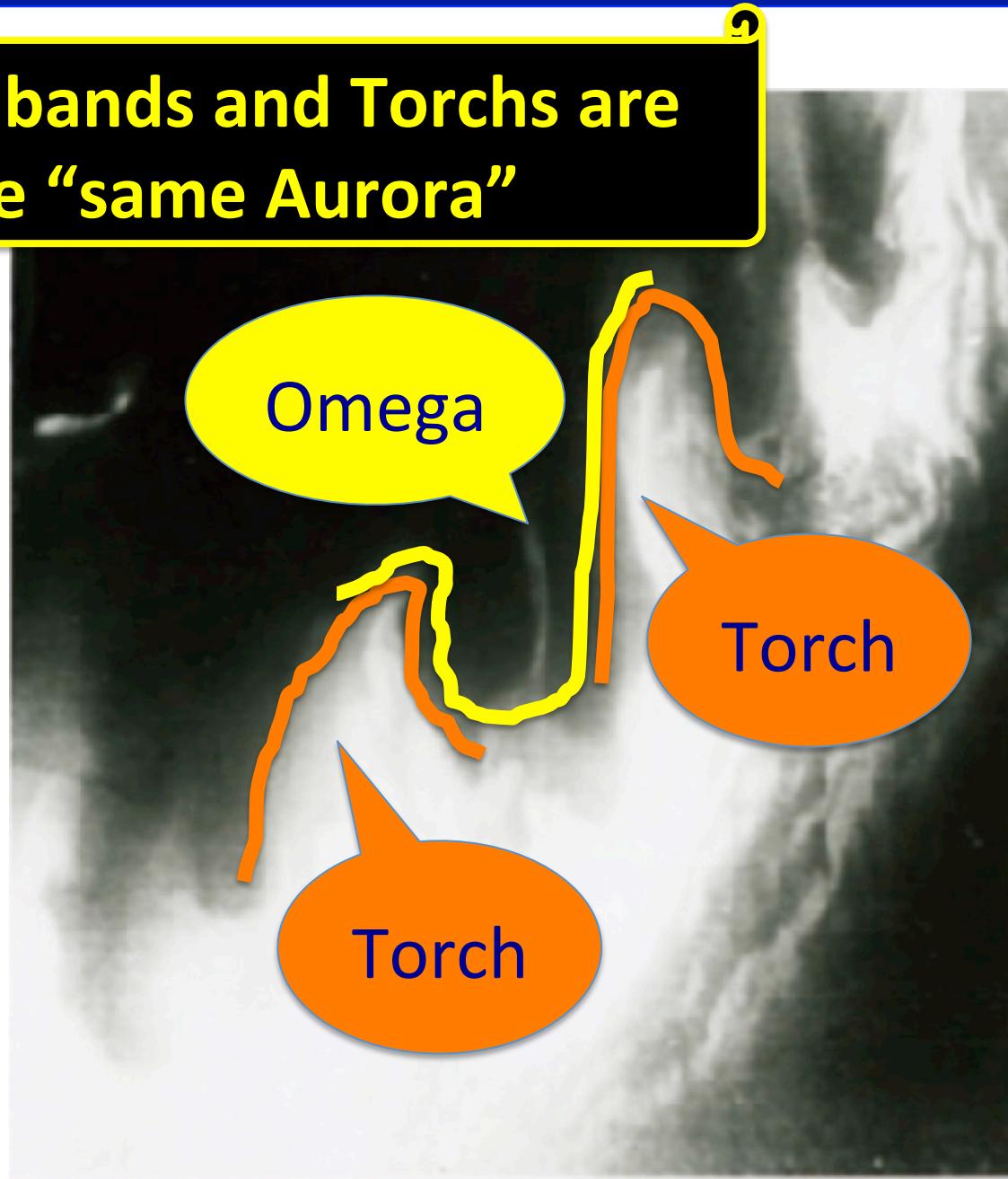
佐藤夏雄(極地研)、行松彰(極地研)、田中良昌
(極地研)、堀智昭(名大)、長妻努(NICT)、W.
Bristow (アラスカ大)



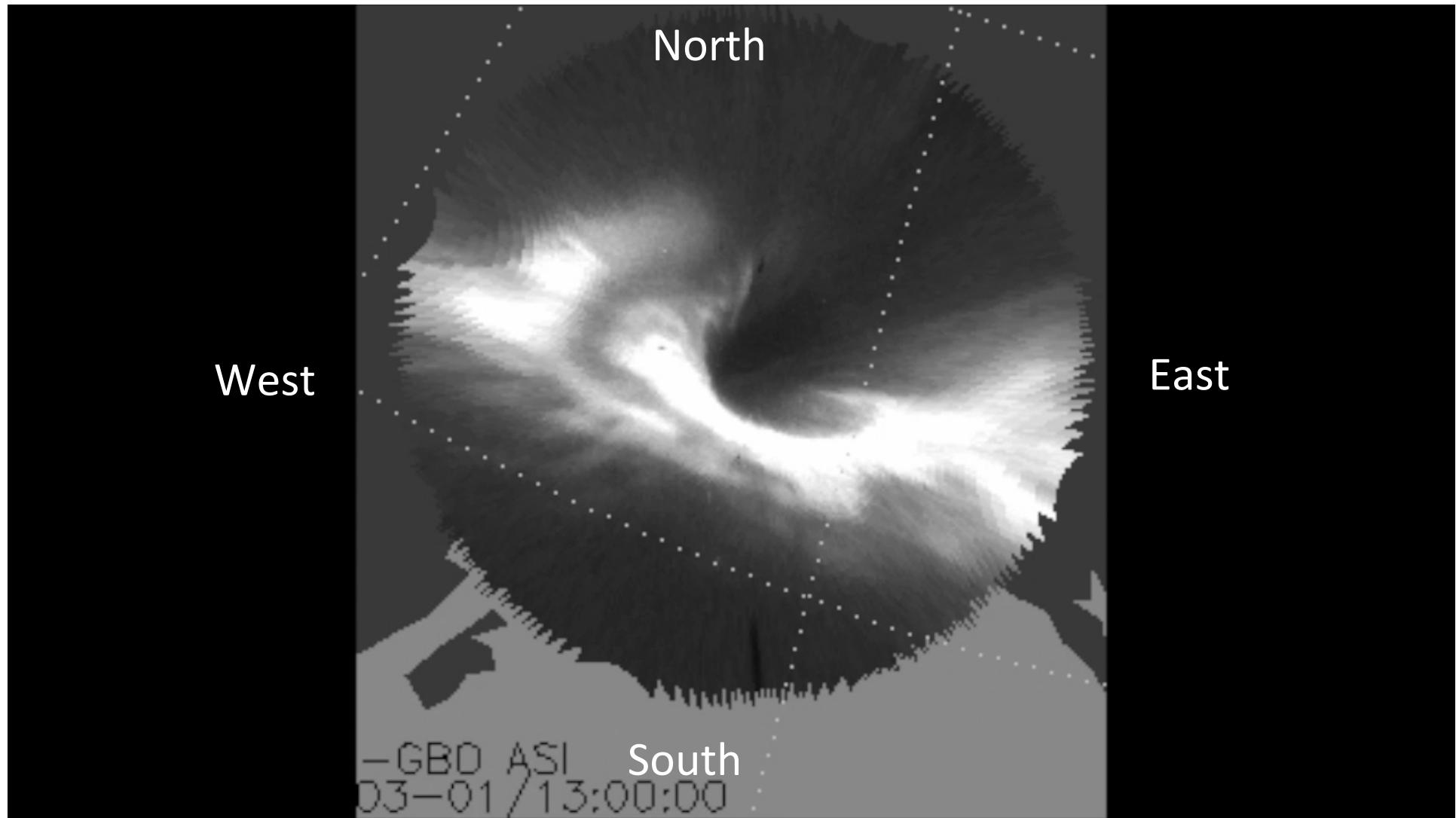
Omega Bands and Torches

I Omega bands and Torches are
the “same Aurora”

by DMSP
spacecraft

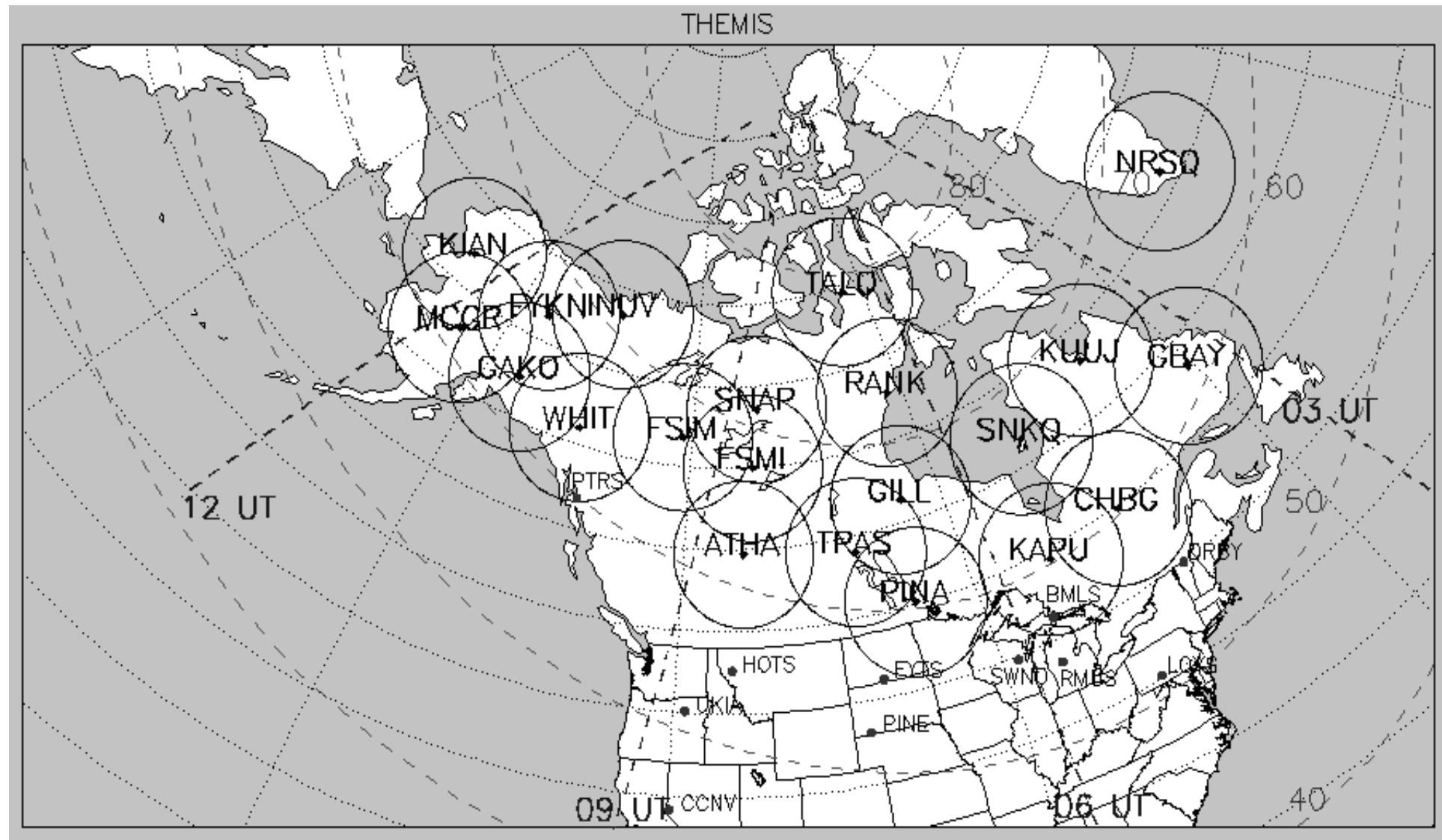


Example Movie of Omega Bands/Torches



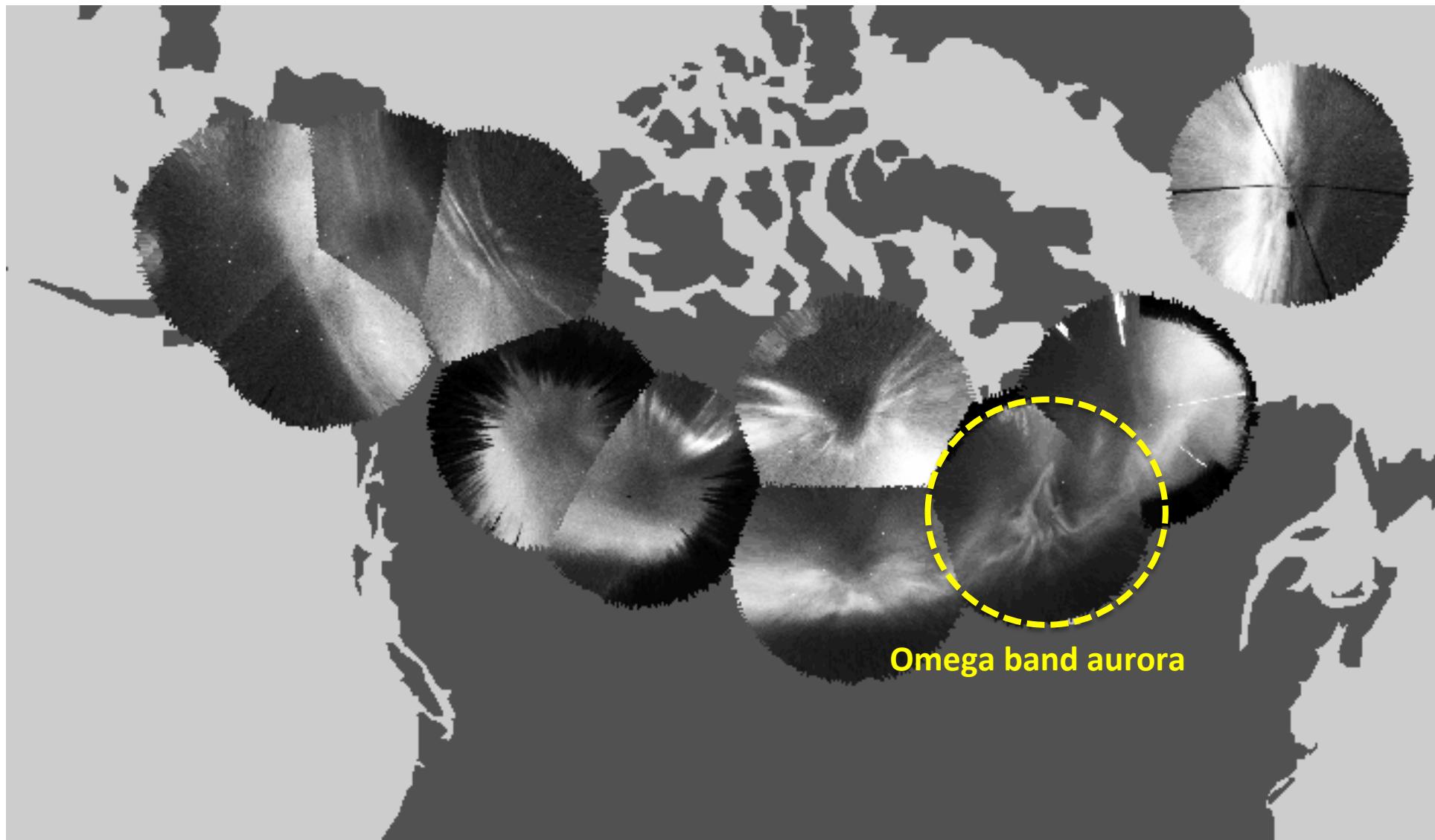
THEMIS: Coordinated space and ground observation

THEMIS All-sky Imager network

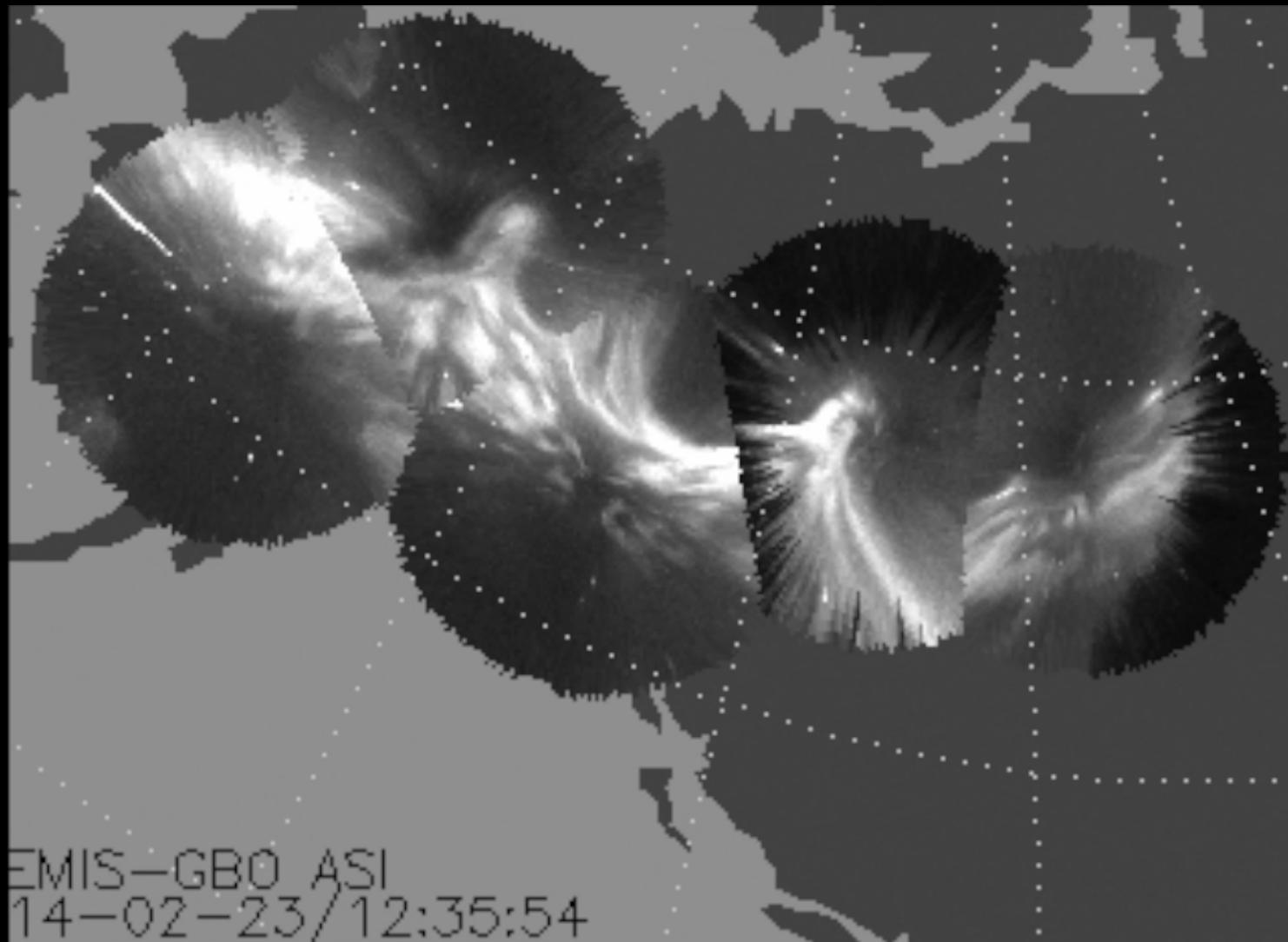


THEMIS: Coordinated All-sky imager network

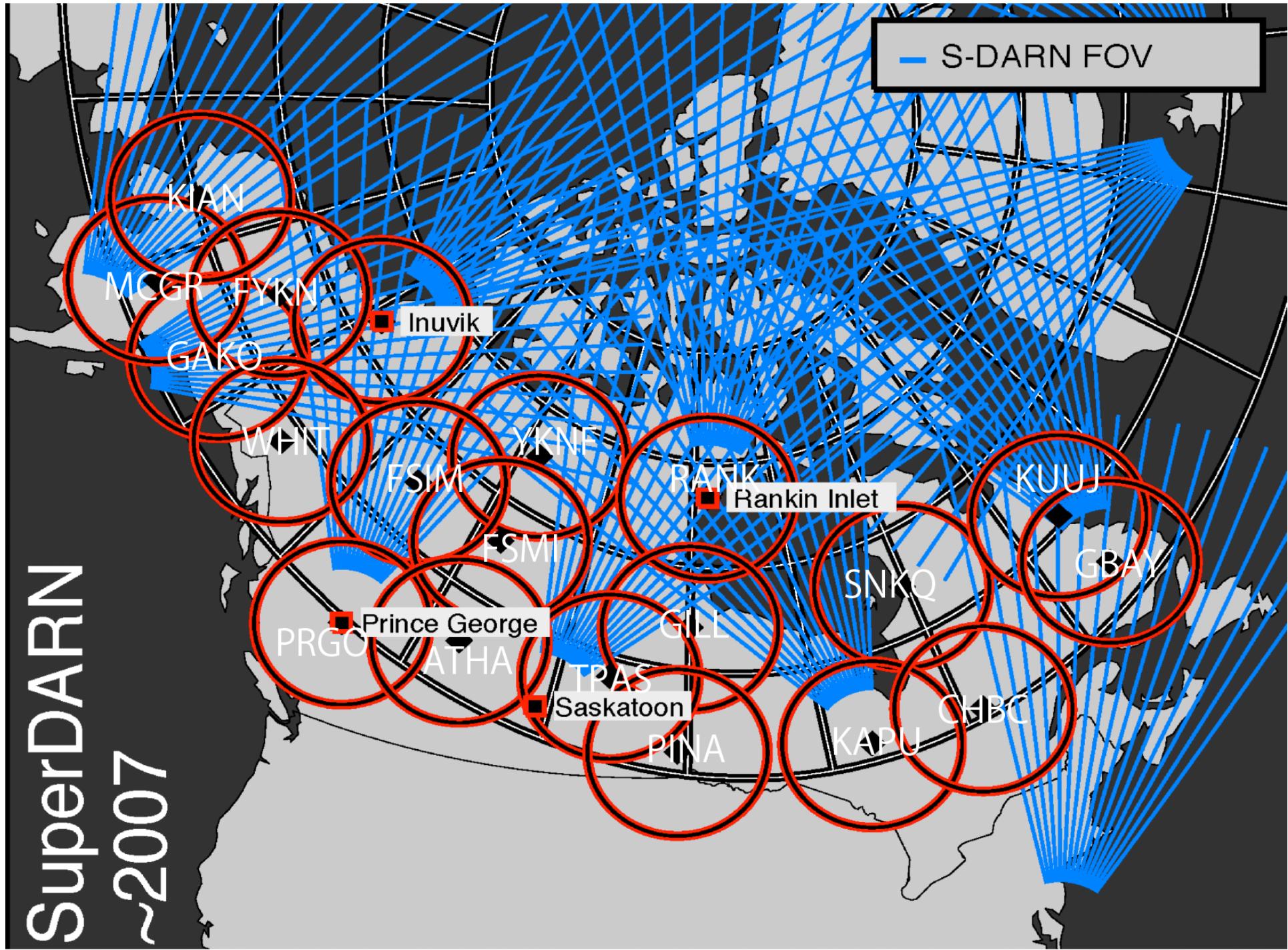
2011.03.01.0736:06UT



THEMIS: Coordinated All-sky imager network

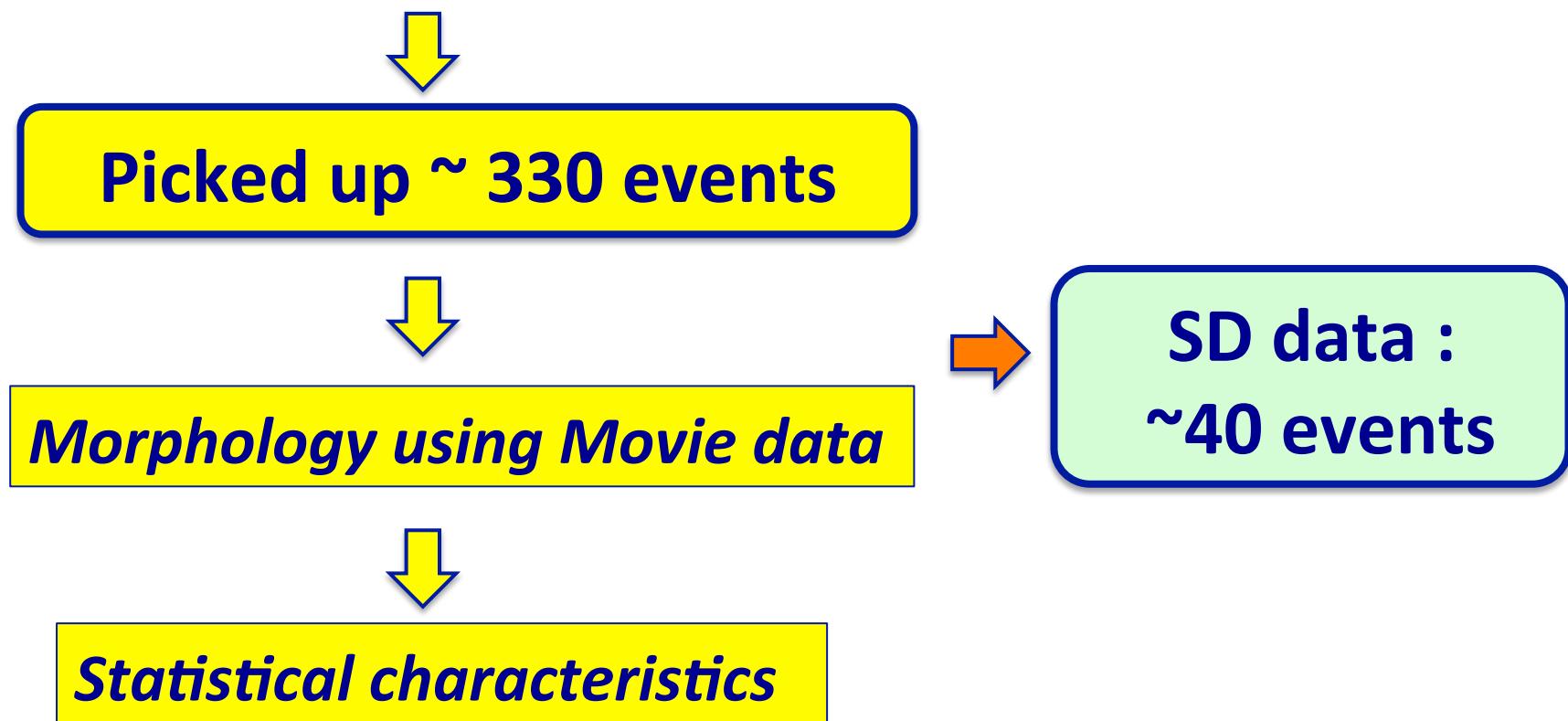


SuperDARN
~2007



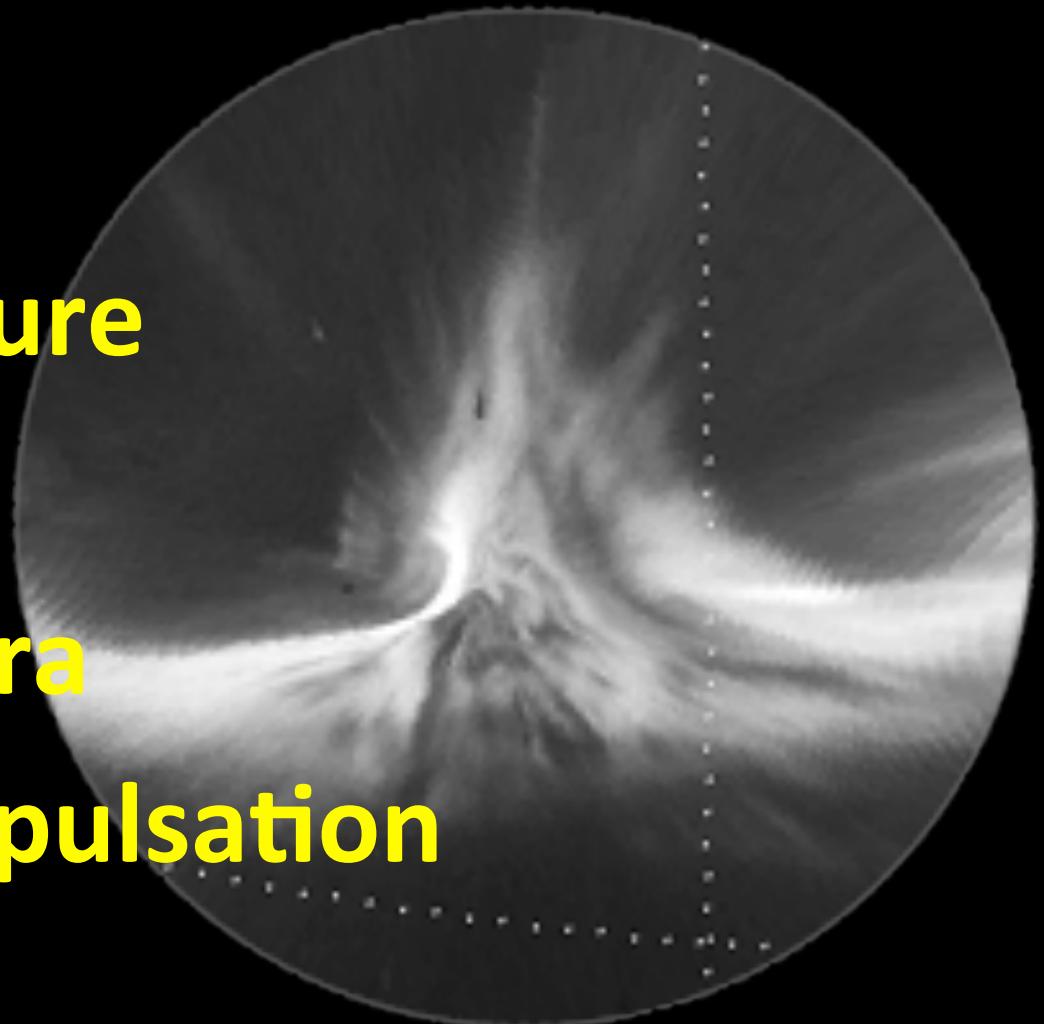
Event survey using THEMIS ground-base All-sky Imager network

*Selection of Omega event using THEMIS GBO summary
plots for 8 years data from Jan. 2007*



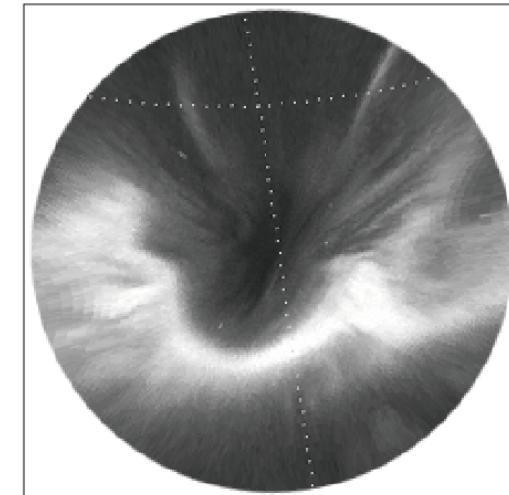
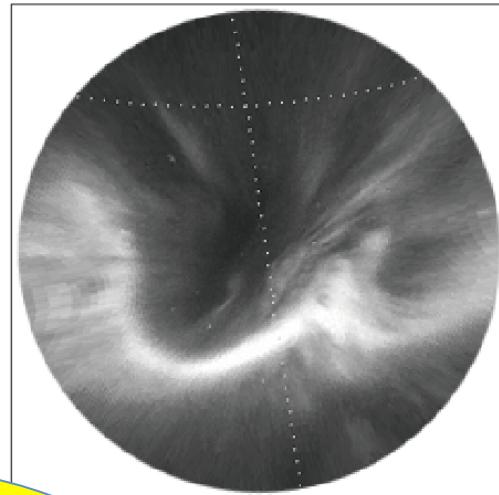
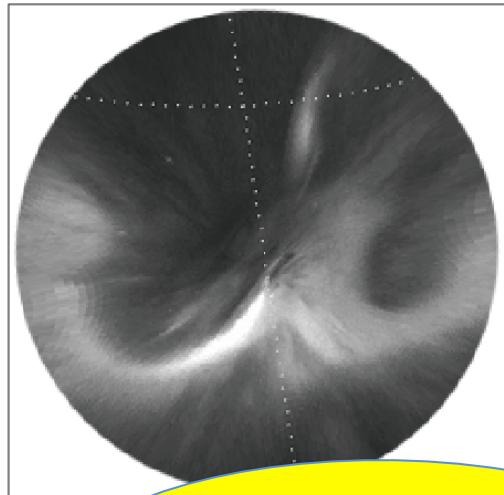
Omega band aurora: Morphological Signature on Optical

- Black aurora
- Growth signature
- Change Types
- Pulsating aurora
- Ps 6 magnetic pulsation



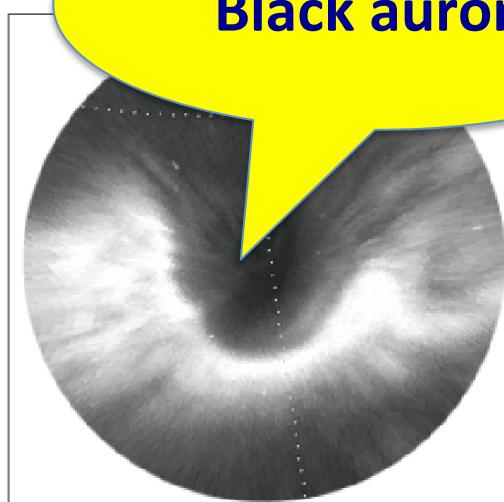
Growth signature of Omegas

2009.02.27_GILL

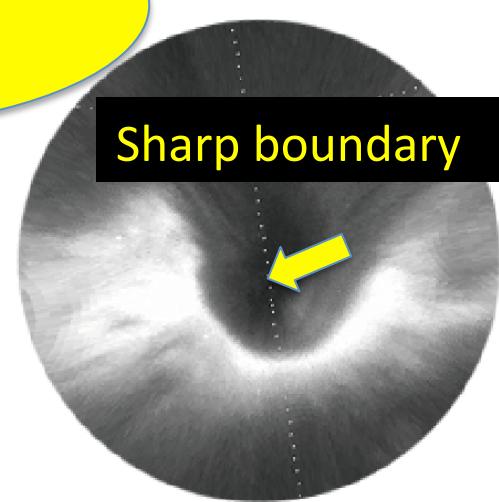


1008:00 UT

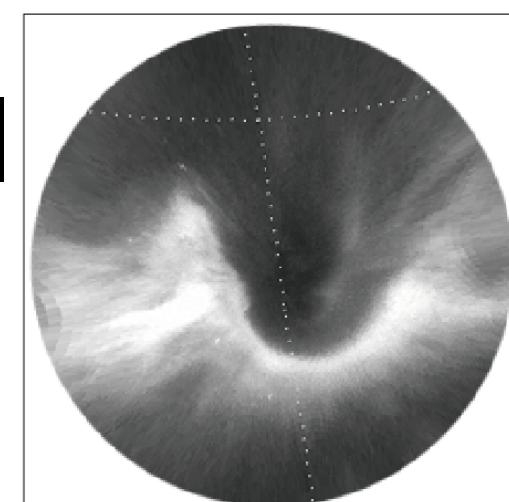
1010:00 UT



1012:00 UT



1014:00 UT

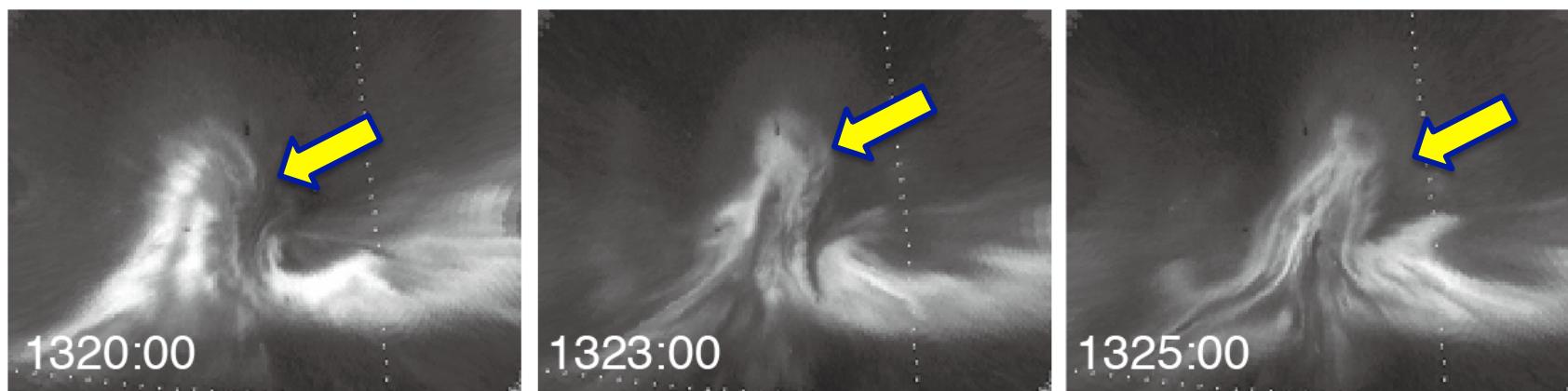
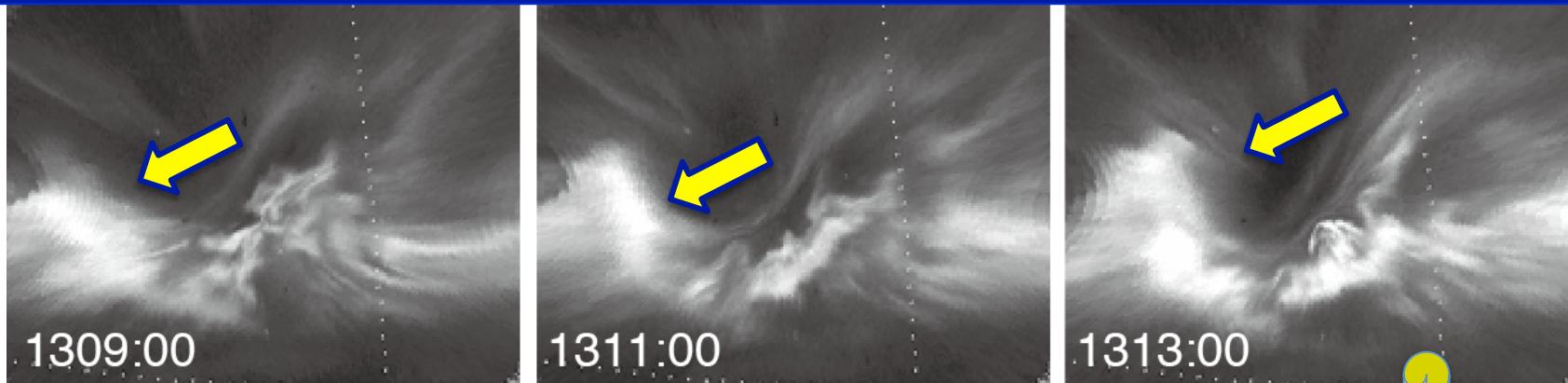


1016:00 UT

Black aurora

Sharp boundary

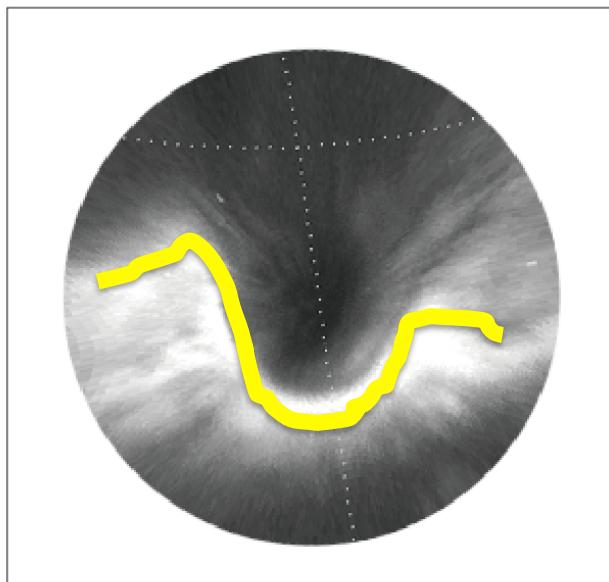
Growth signature of Omegas



Classification of Omega band aurora

Classical Omega band

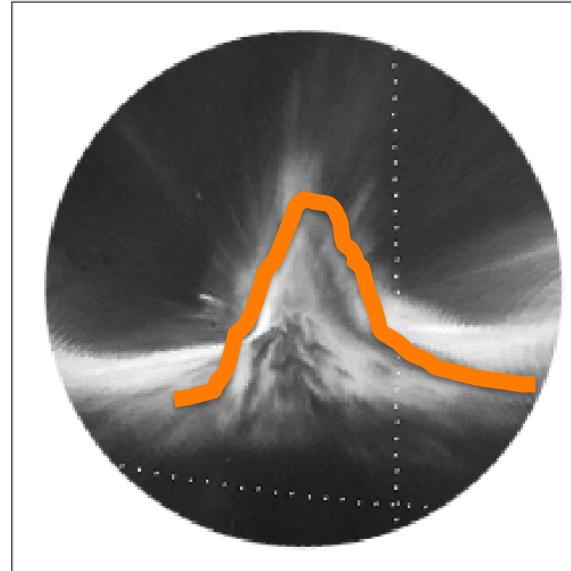
O-type
(Classical Omega band)



2009.02.27_GILL 1012:30 UT

Tongue (Torch)

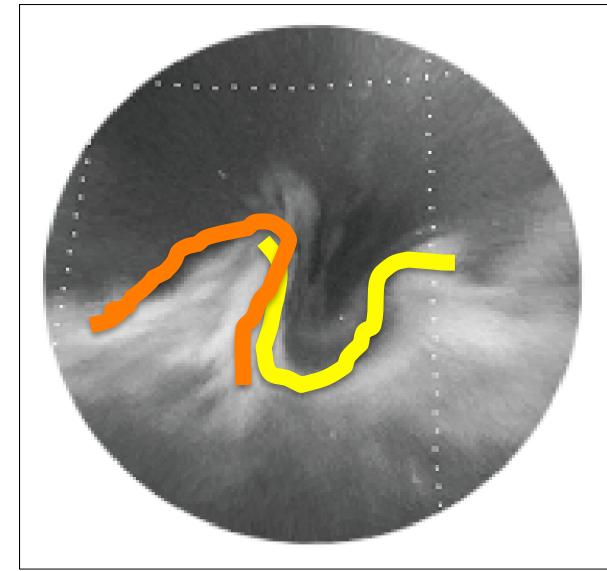
T-type
(Torch)



2011.03.01_GAKO
1427:00 UT

Omega and Tongue

O/T-type
(Omega and Tongue)

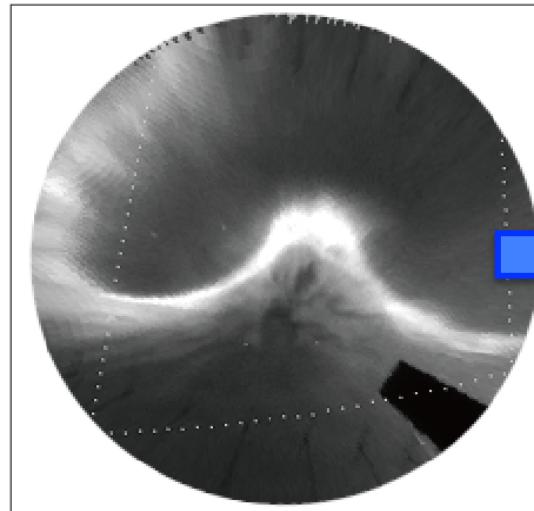


13.02.07_SNKQ 0847:00 UT

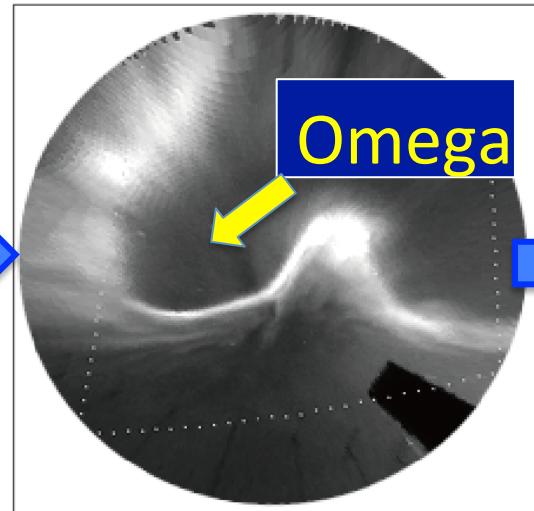
Example of O/T-type (*Omega* and *Torch*)

Growth signature of Omega and Torch

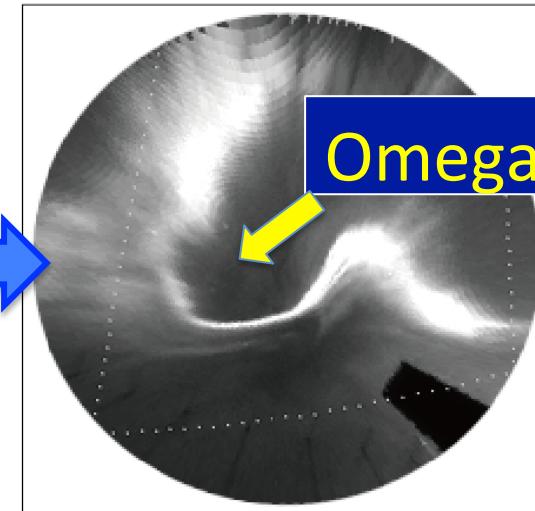
2008.03.09_GBAY



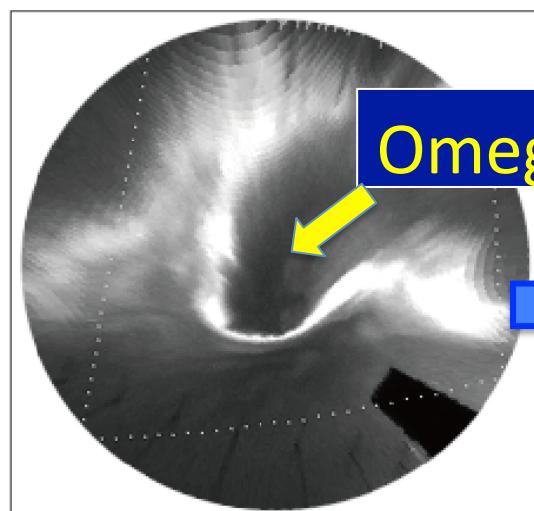
0504:00 UT



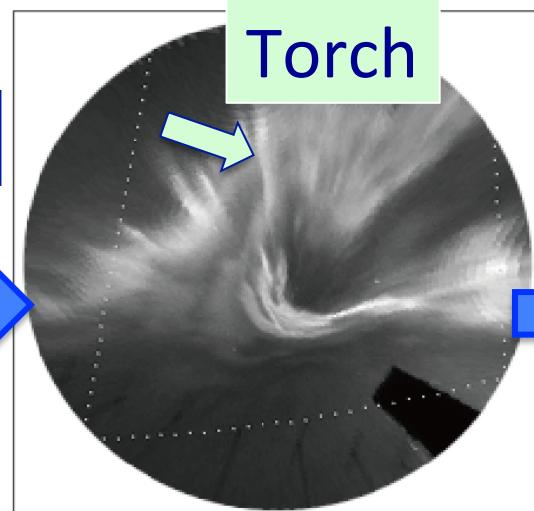
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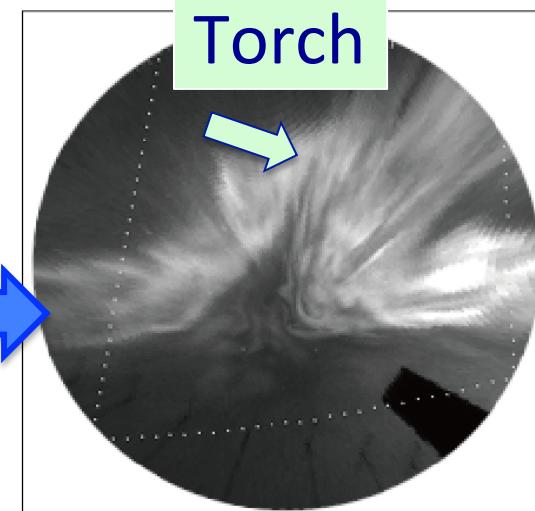
0508:00 UT



0510:00 UT

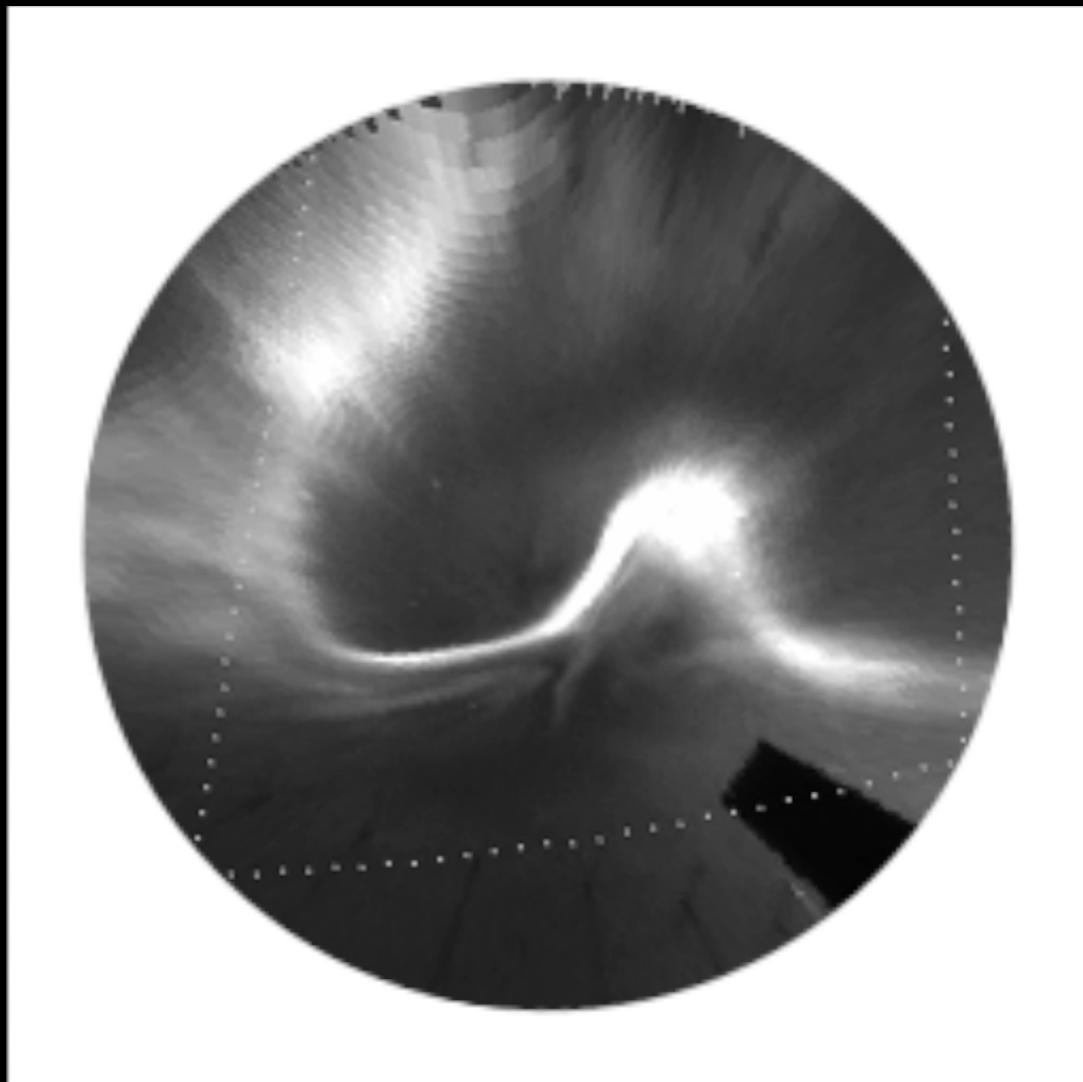


0512:00 UT



0514:00 UT

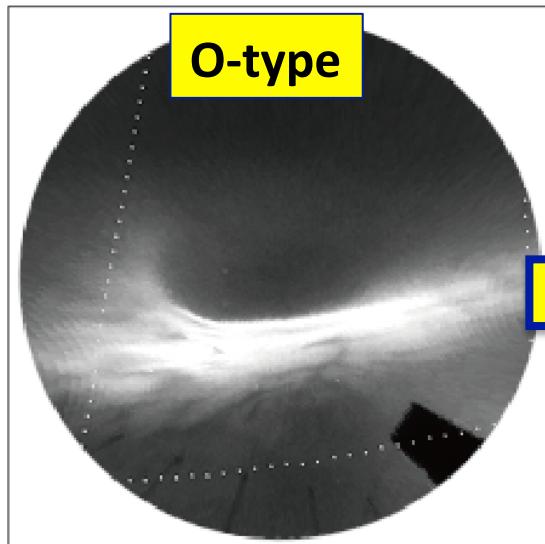
Example of O/T-type (*Omega and Torch*)



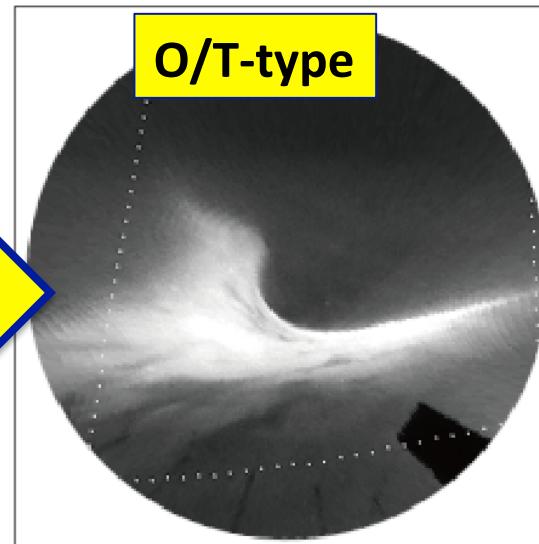
3 different types appeared within one event

O, O/T, then T-type

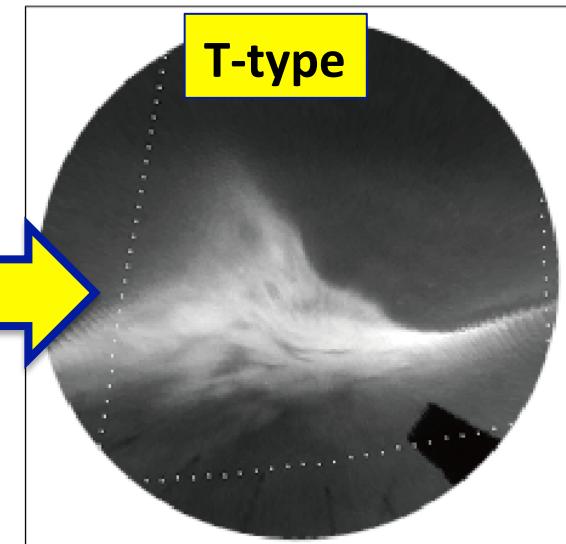
2008.03.09_GILL



0428:00 UT

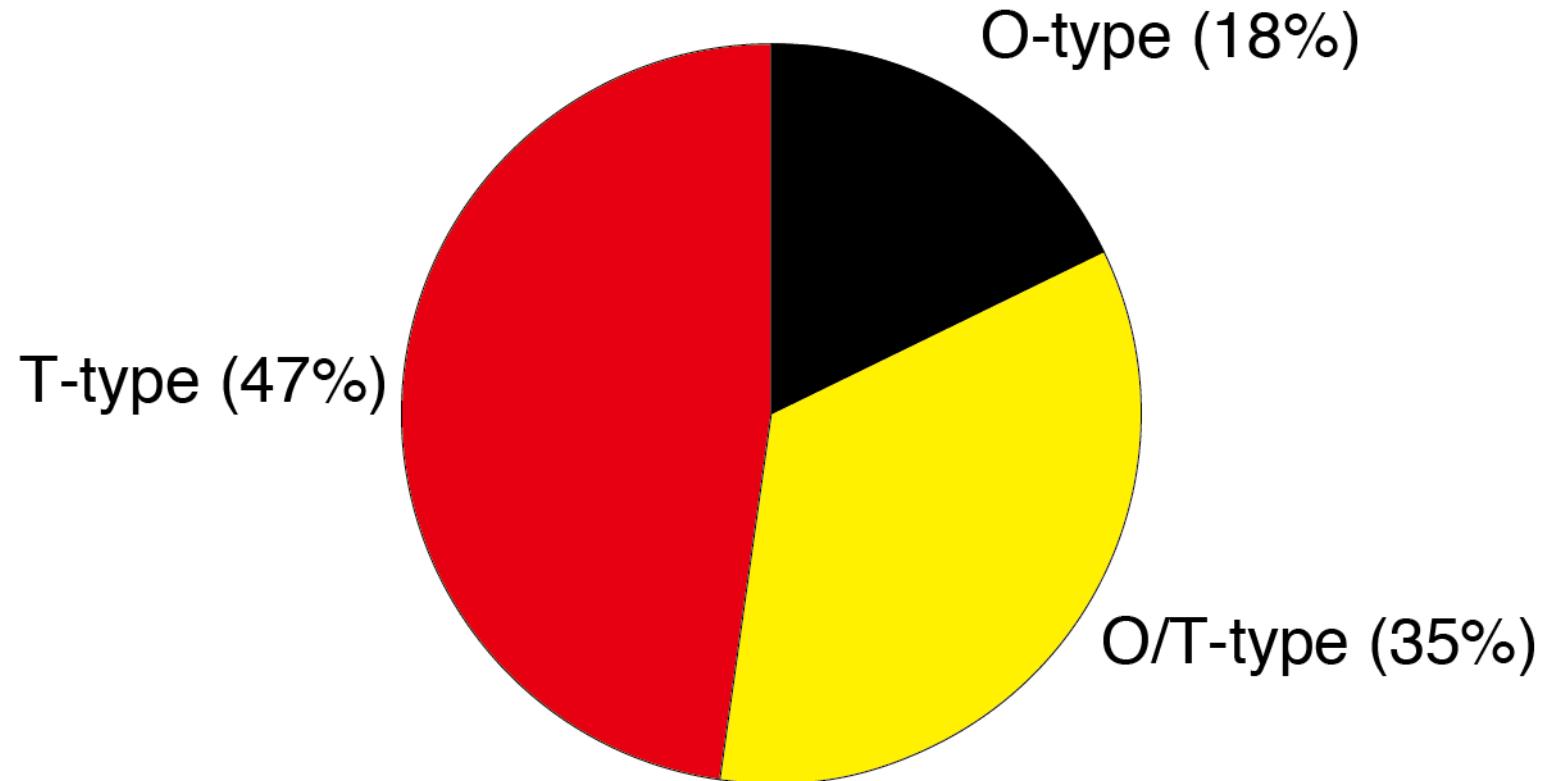


0431:00 UT



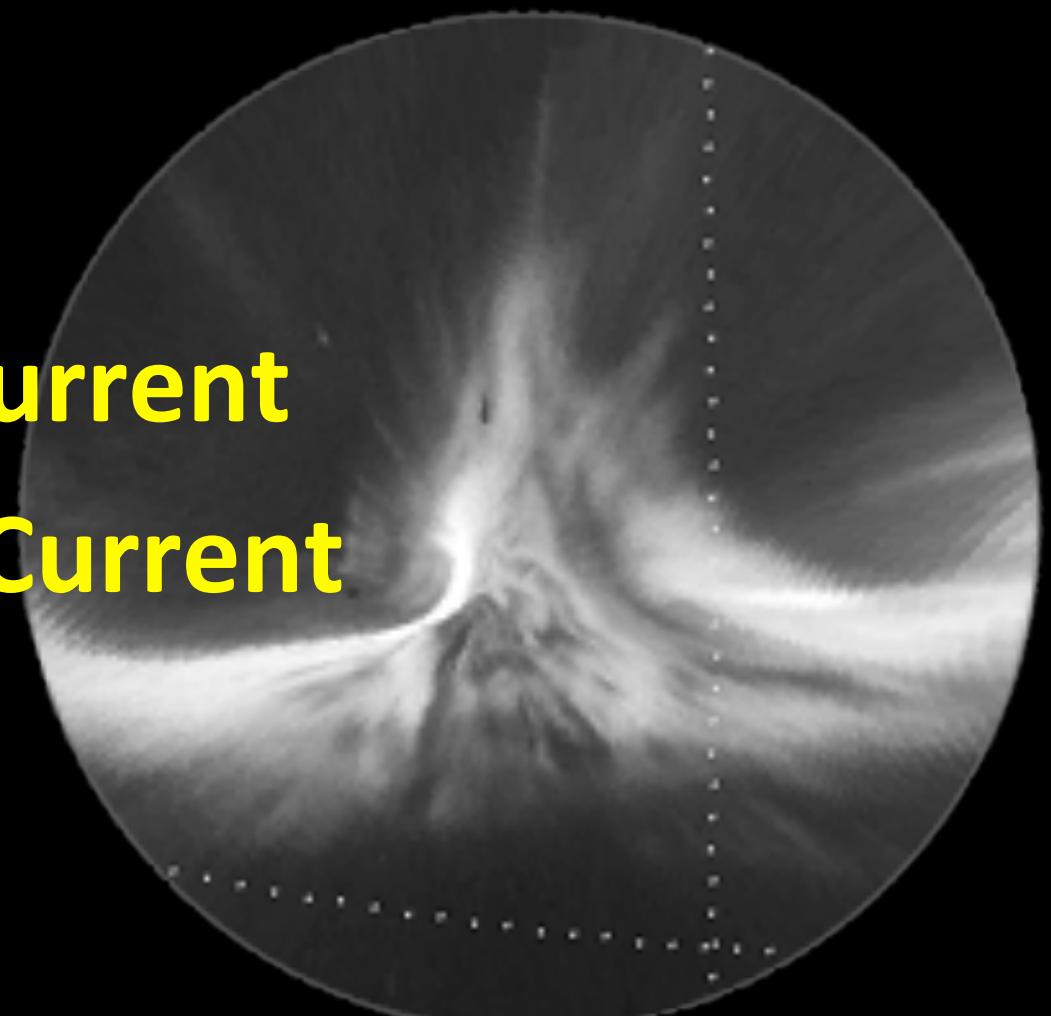
0433:00 UT

Statistical results of occurrences on 3-types: Fundamental type



Relation: SuperDARN and Omega Optical

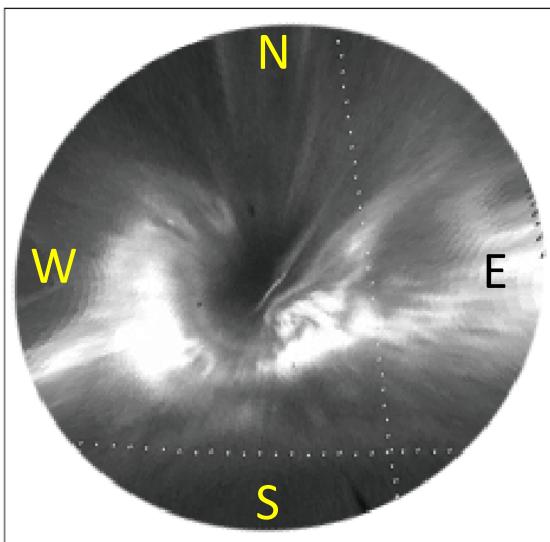
- Drift Speed
- Electric field
- Ionospheric Current
- Field-aligned Current



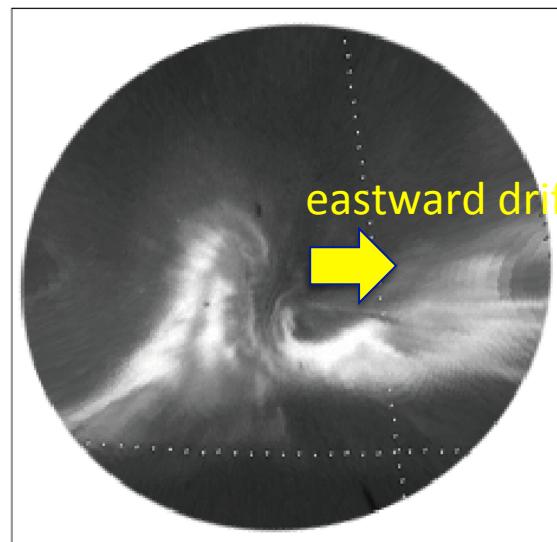
Eastward Drift speed

Eastward Drift speed determined from optical image
=> ~ 400 m/sec

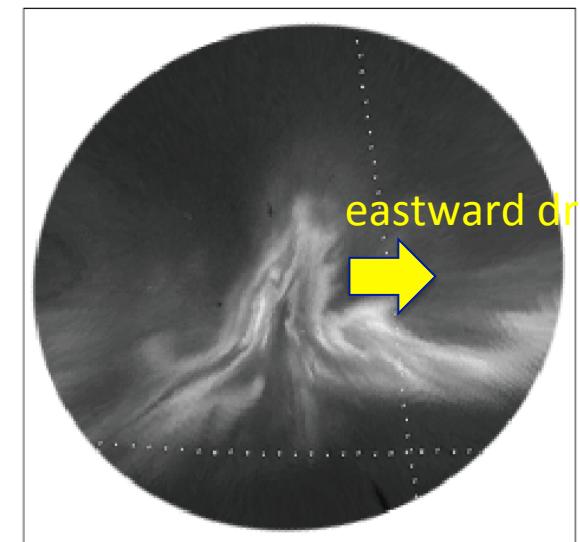
2011.03.01_GAKO



1315

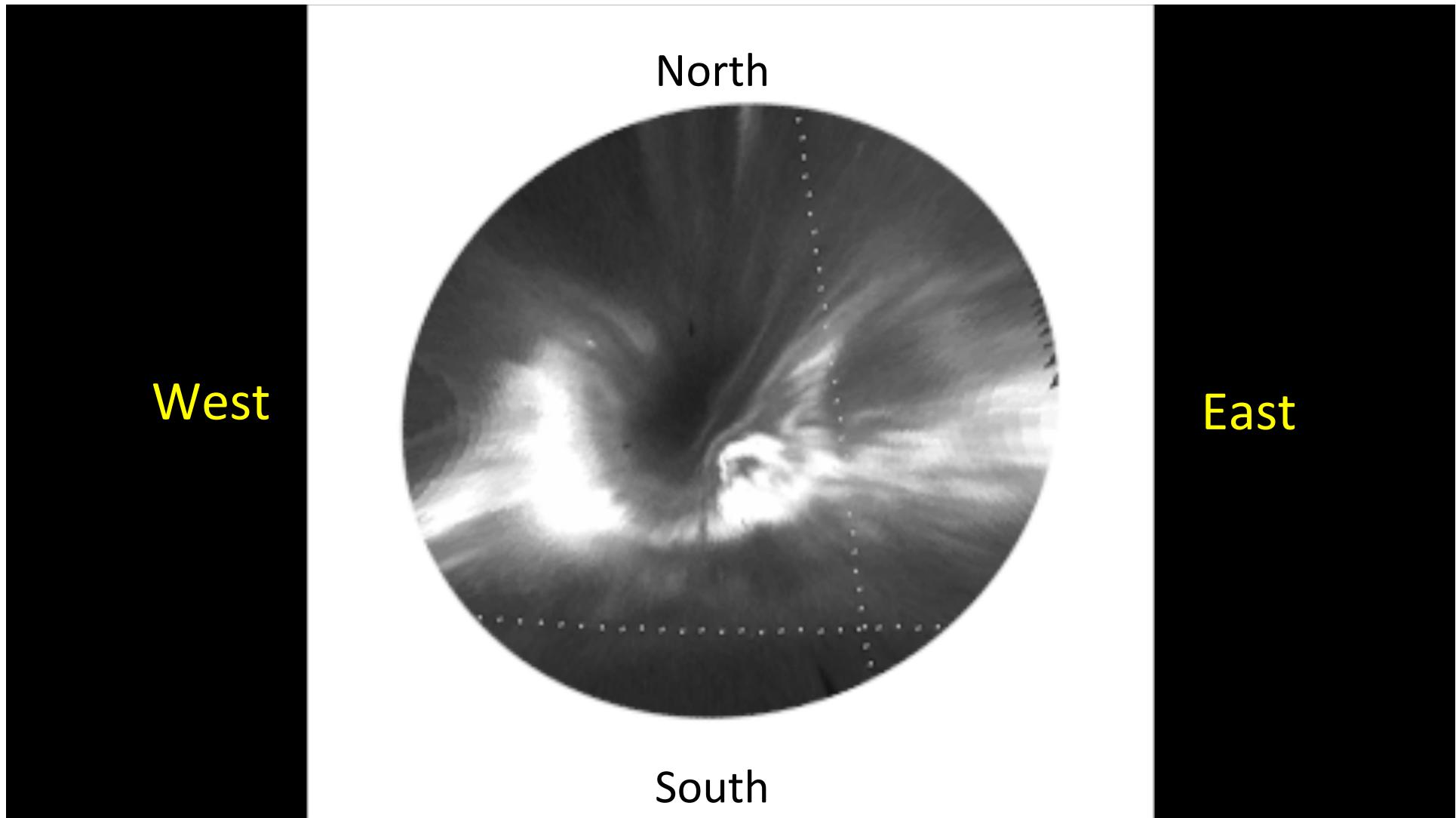


1320

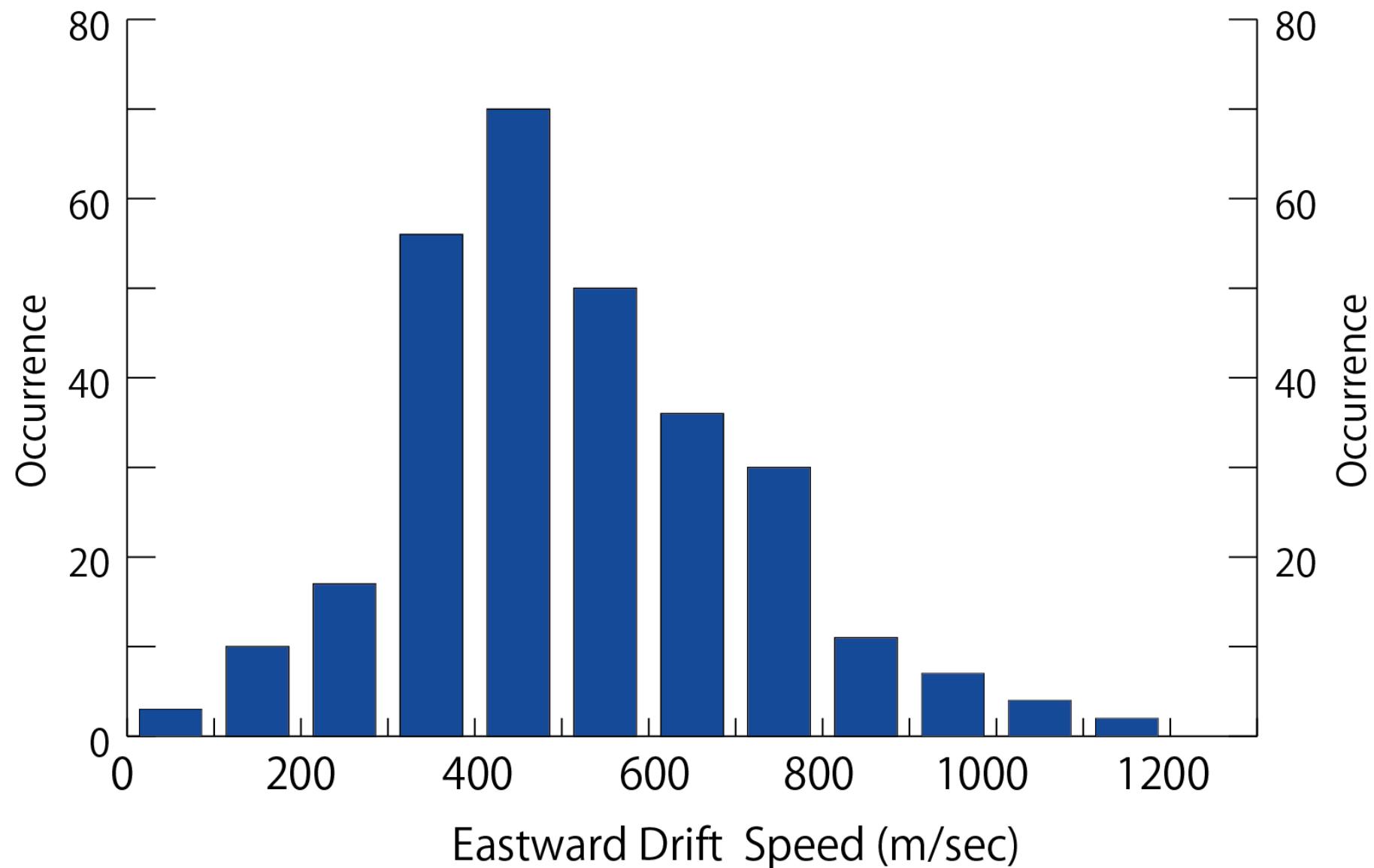


1325

Eastward drift



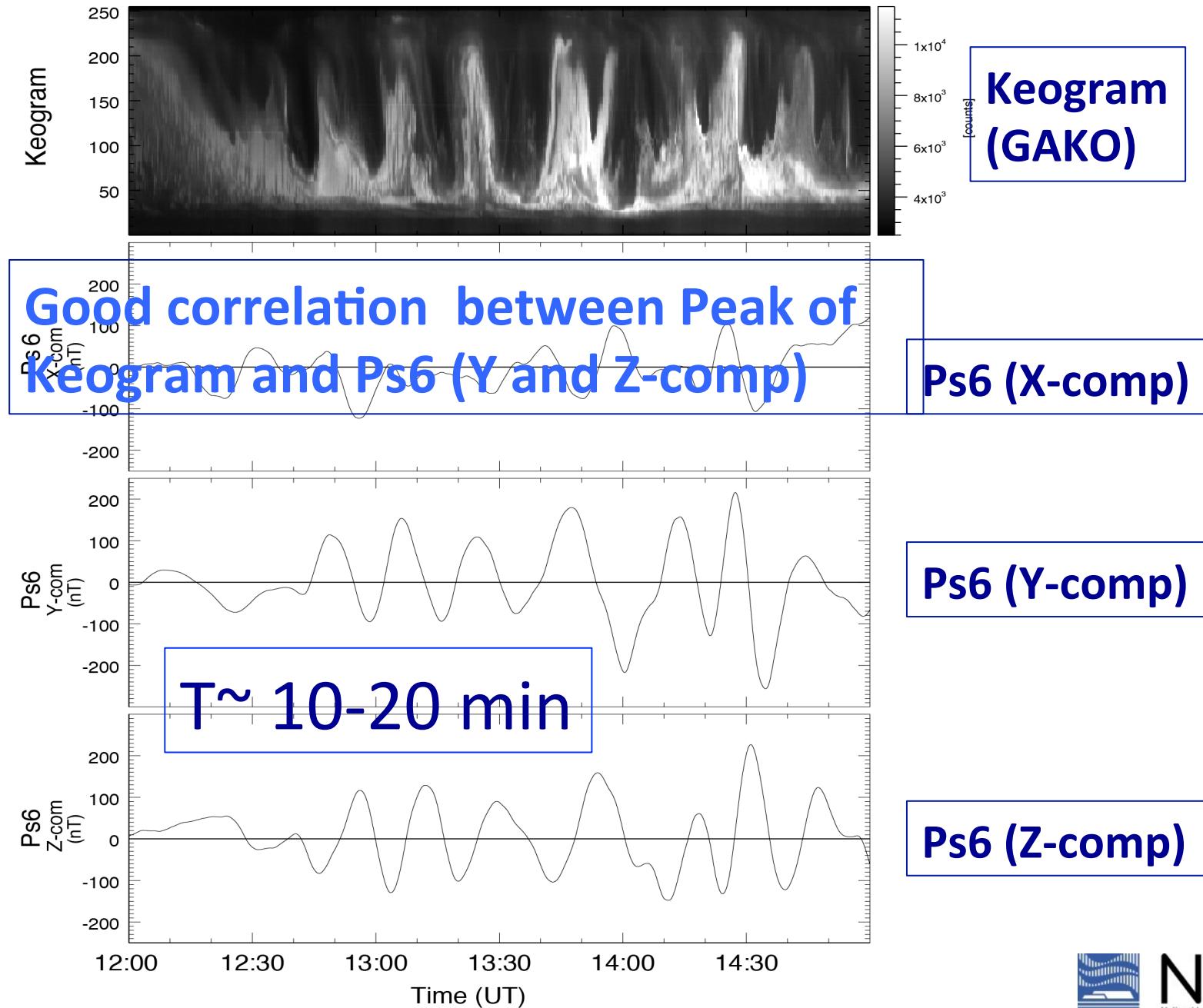
Statistical characteristics: Drift speed (eastward)



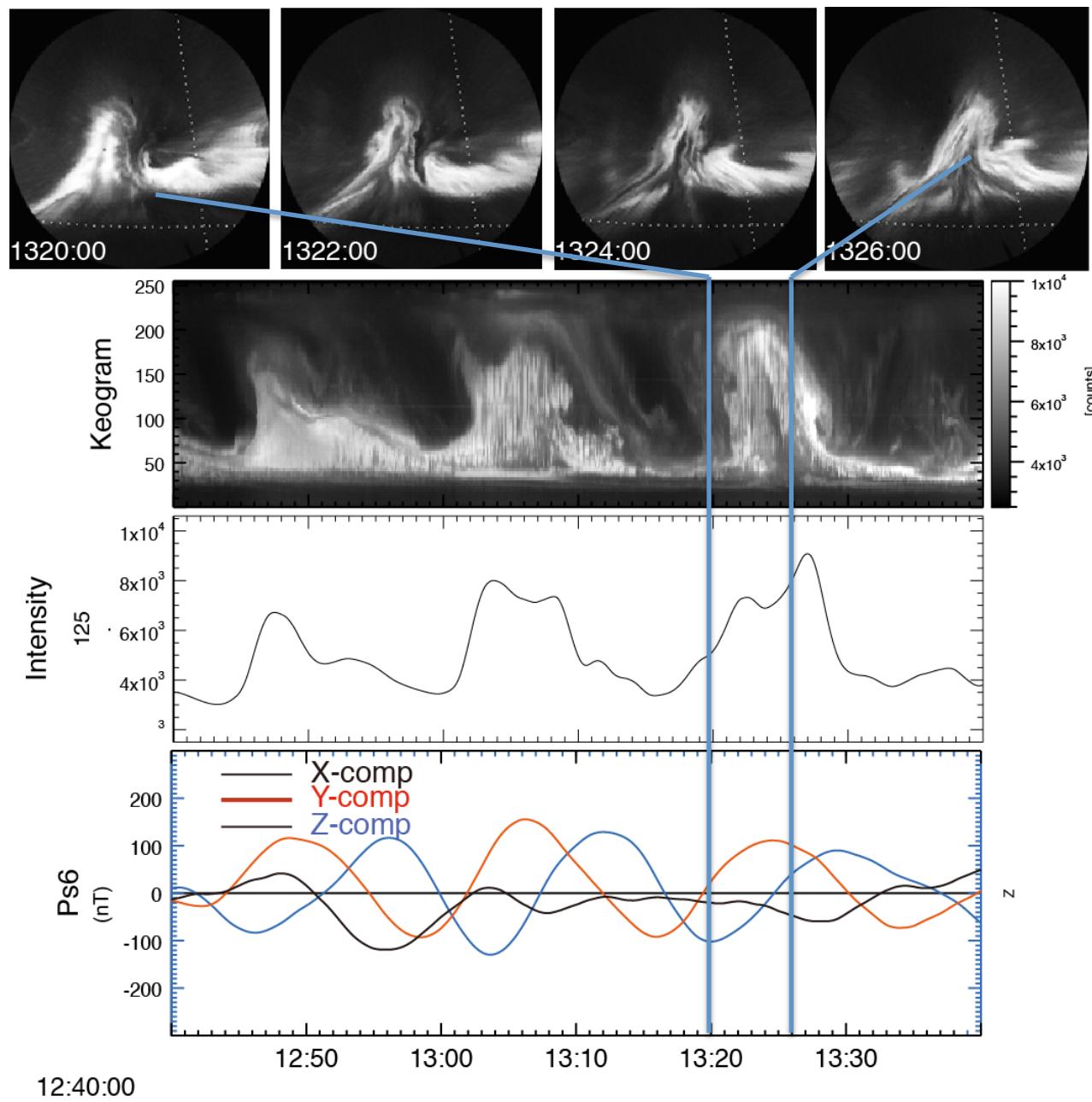
Growth of Omega band and Ps6 magnetic pulsation

Relation between Omega band auroras and Ps6 Magnetic pulsations

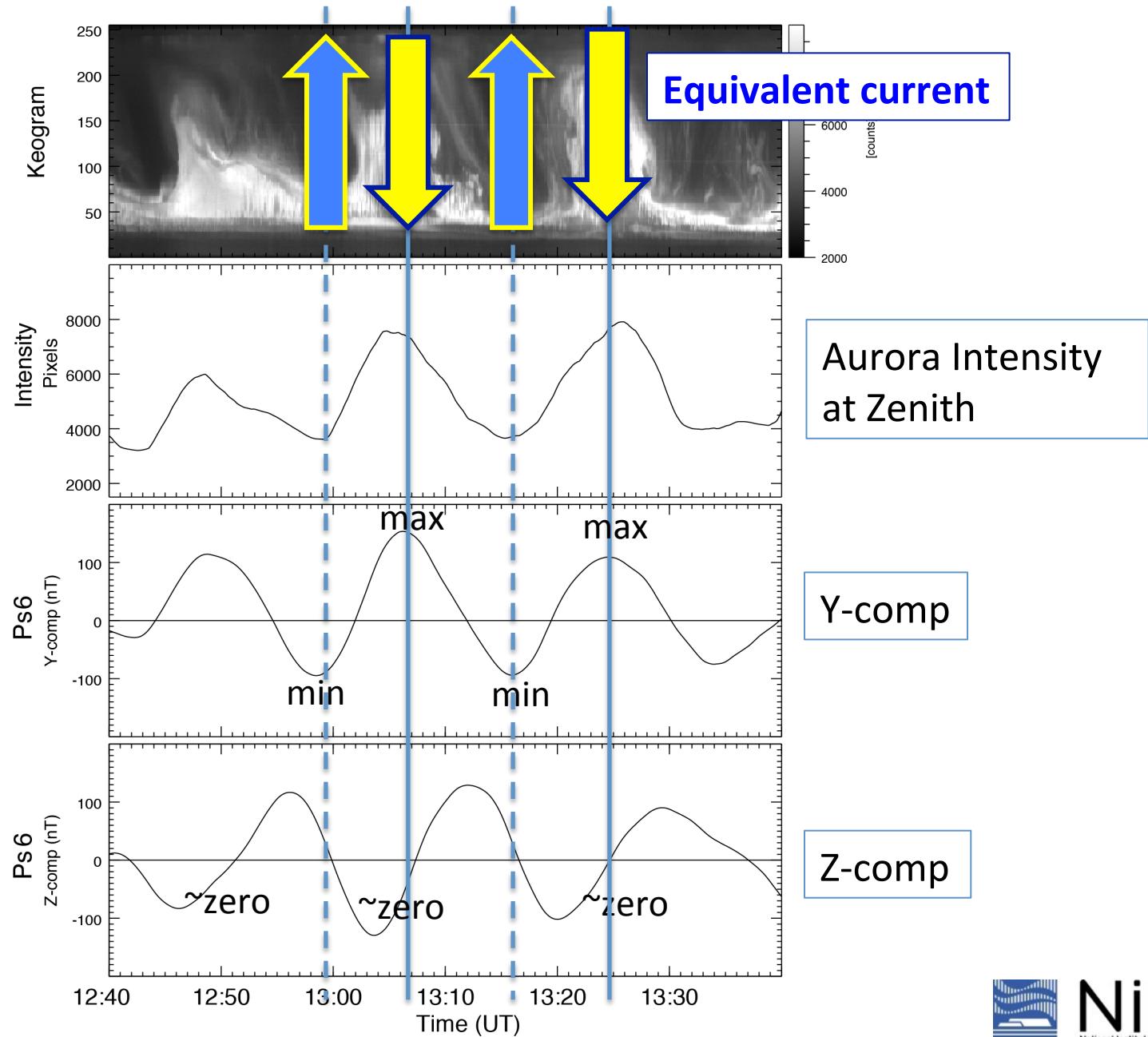
Omega band aurora and Ps6 magnetic pulsation



NiPR
National Institute of Polar Research



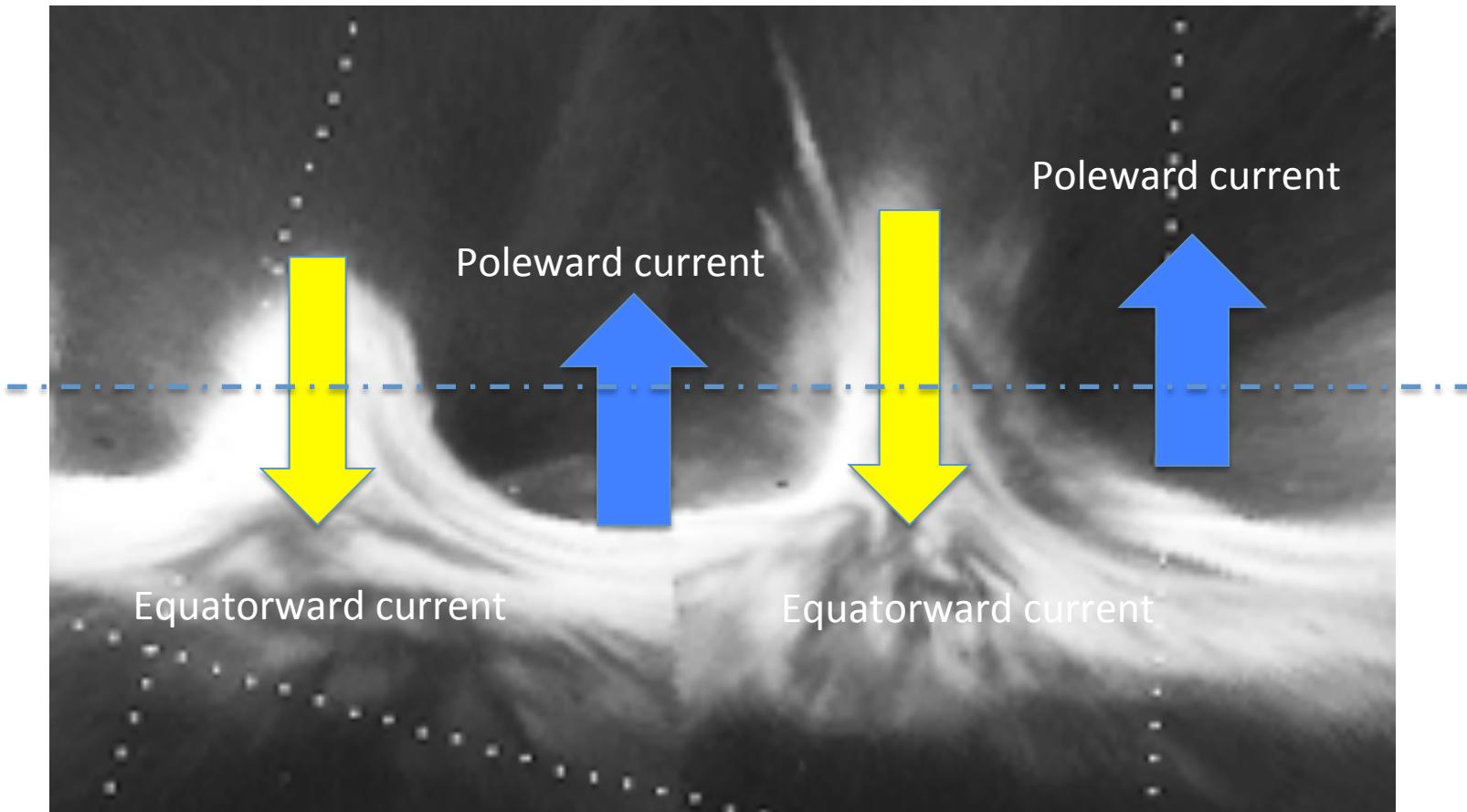
Omega band aurora and Ps6 magnetic pulsation



NiPR
National Institute of Polar Research

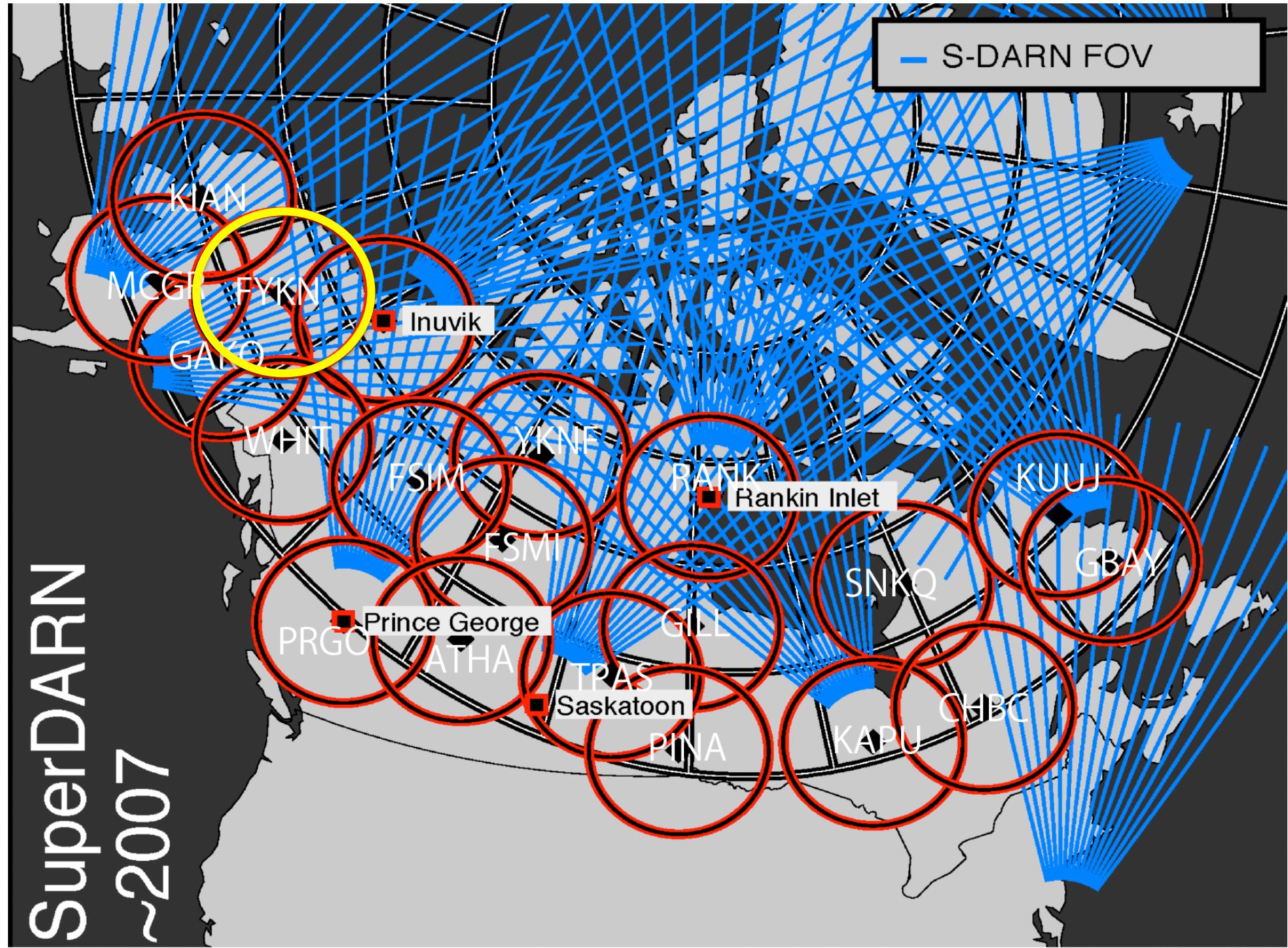
Omega band aurora and Ps6 magnetic pulsation

Equivalent current

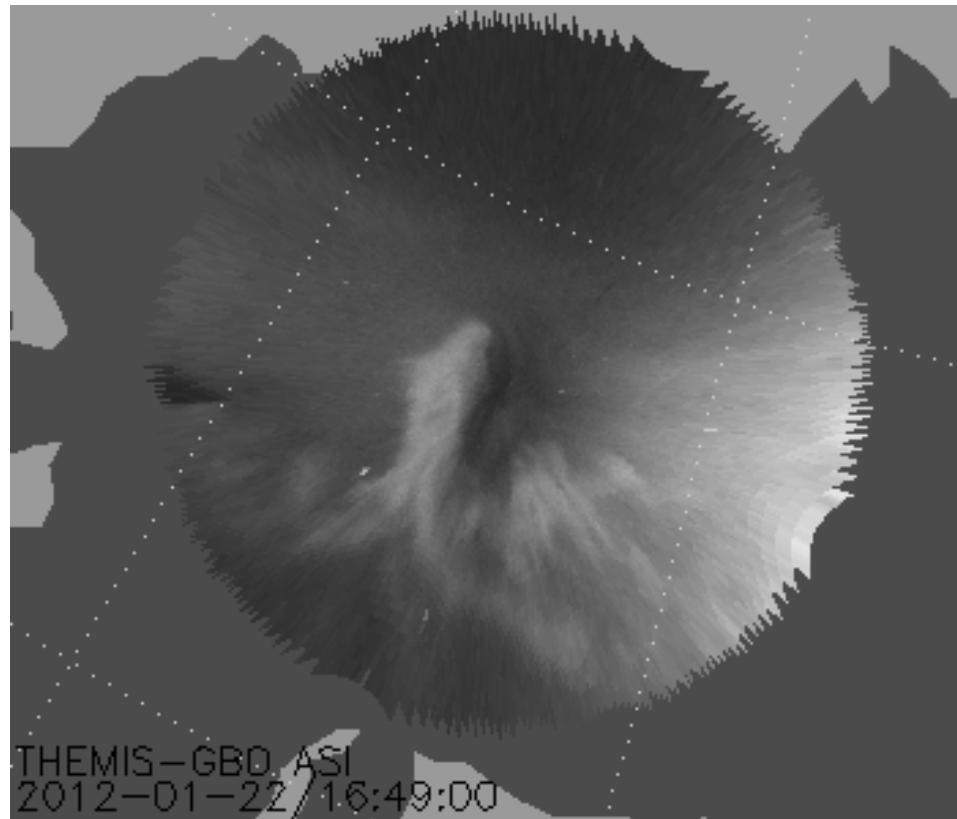


2012.01.22 event
Omega band
observed at Fort Yukon (FYKN) in
Alaska
compared with
SuperDARN radars at
Kodiak

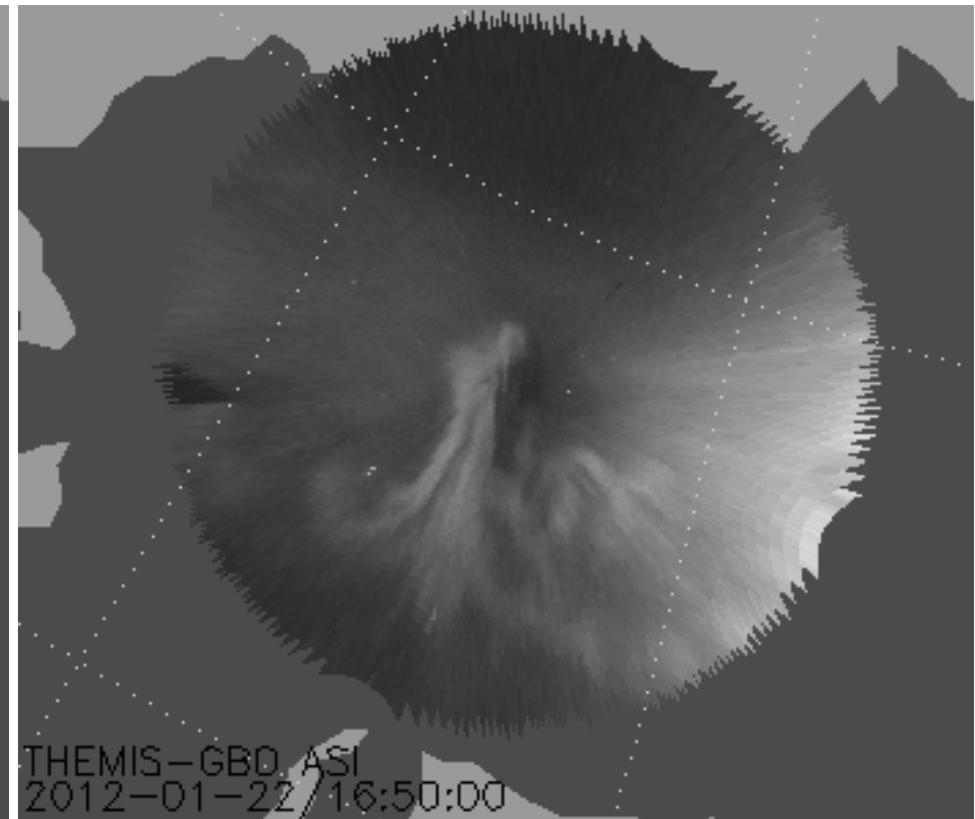
SuperDARN
~2007



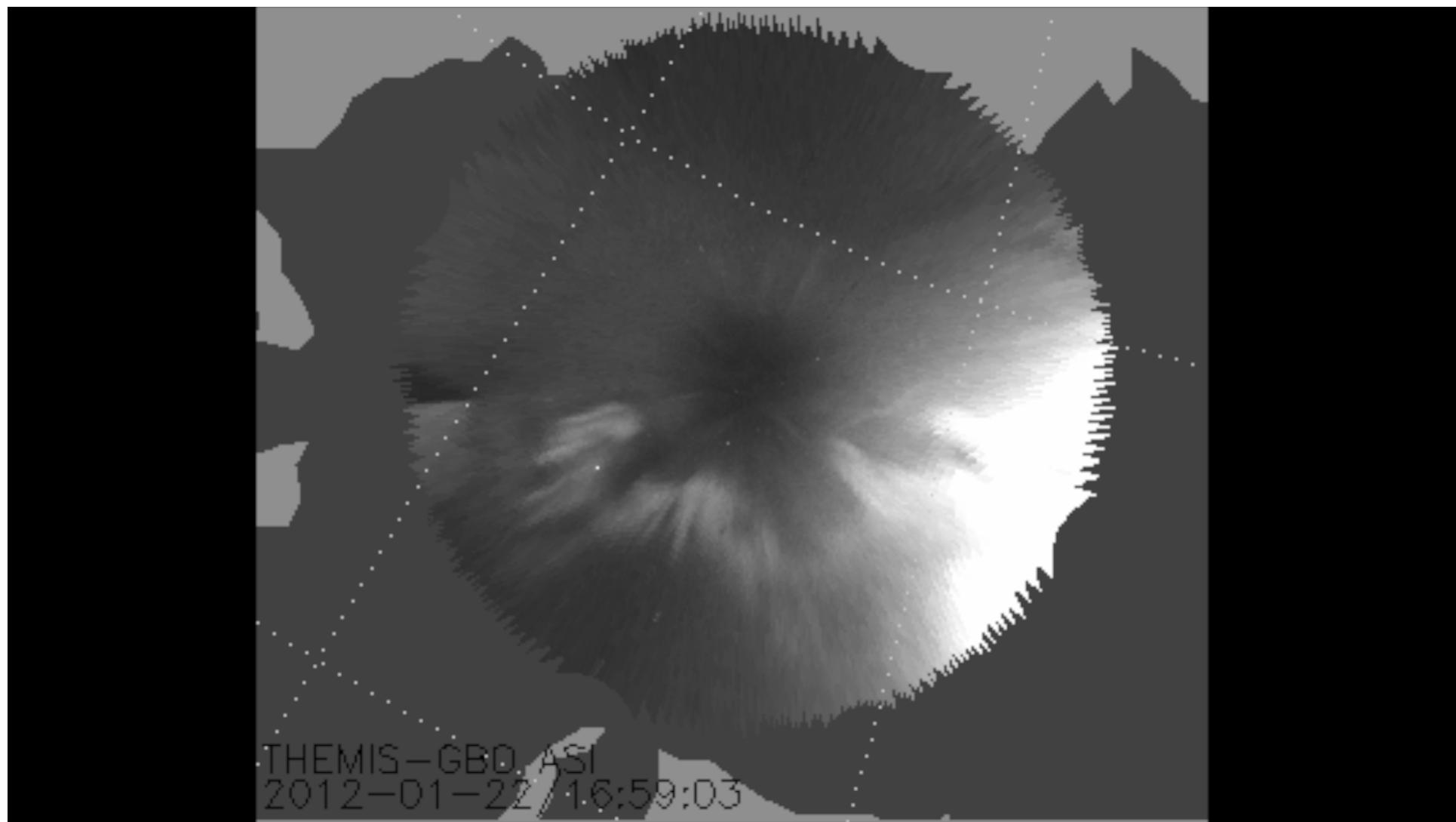
2012.01.22_FYKN



1649 UT

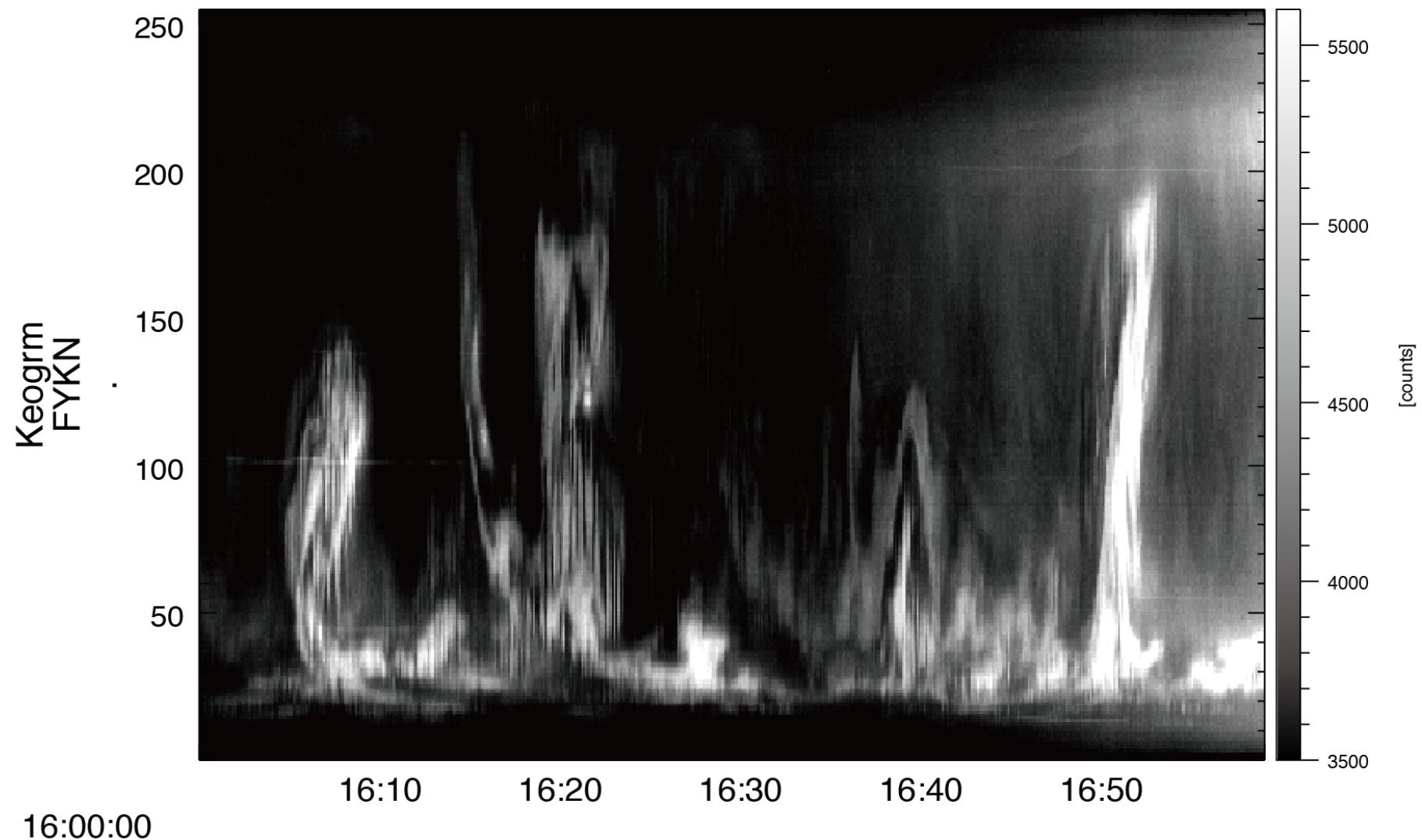


1650 UT

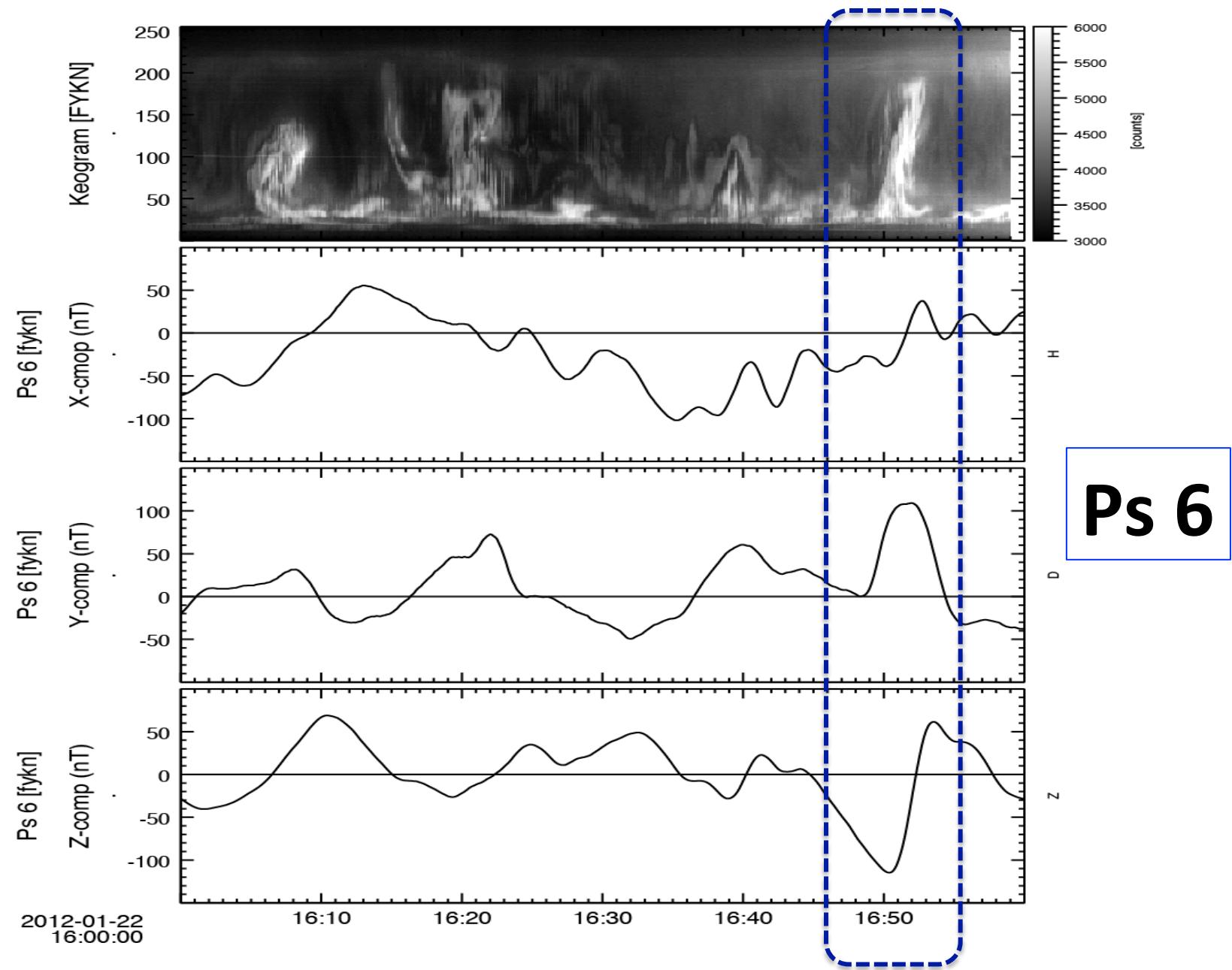


THEMIS-GBO ASI
2012-01-22/16:59:03

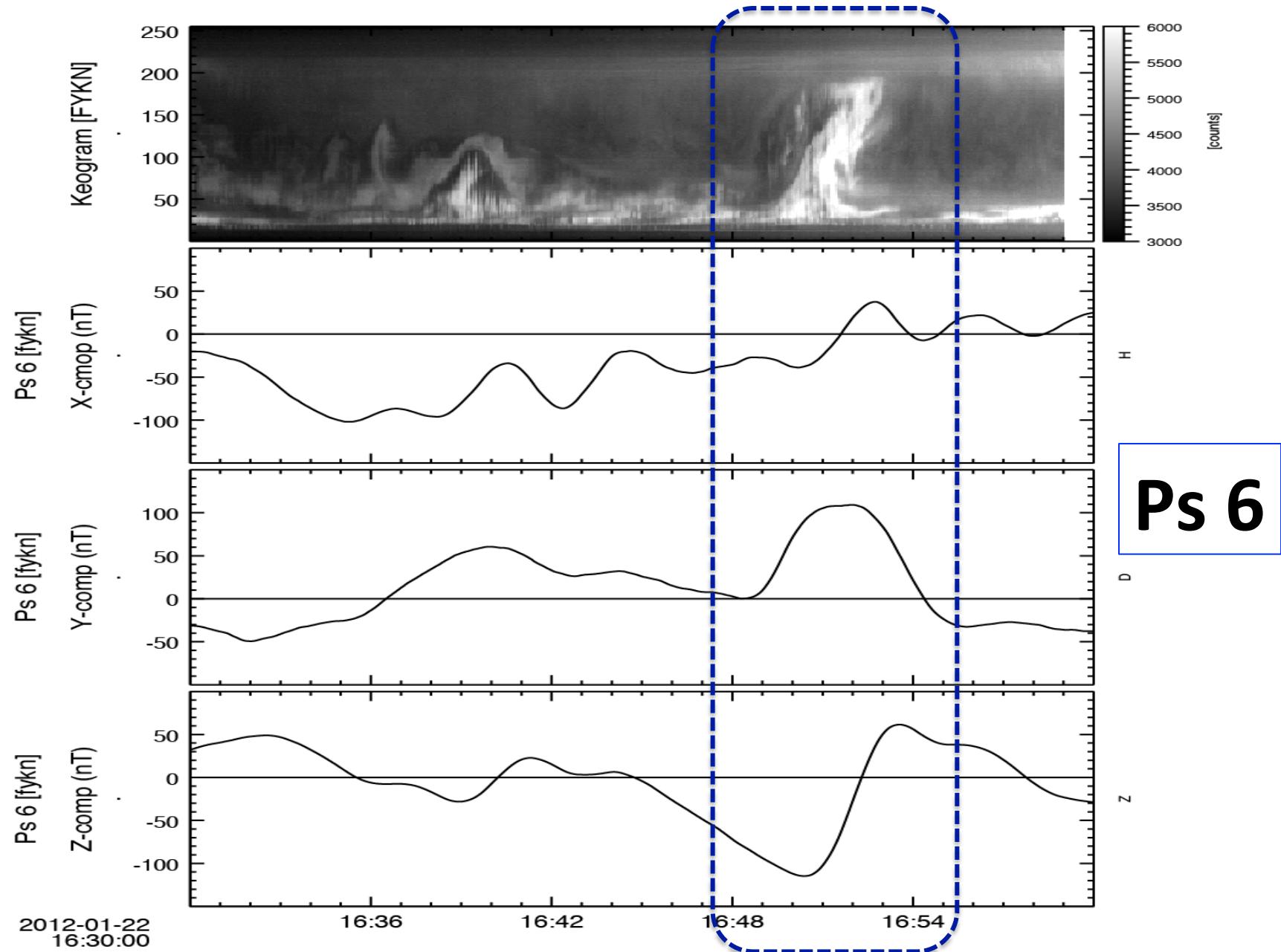
Keogram of Omega band aurora

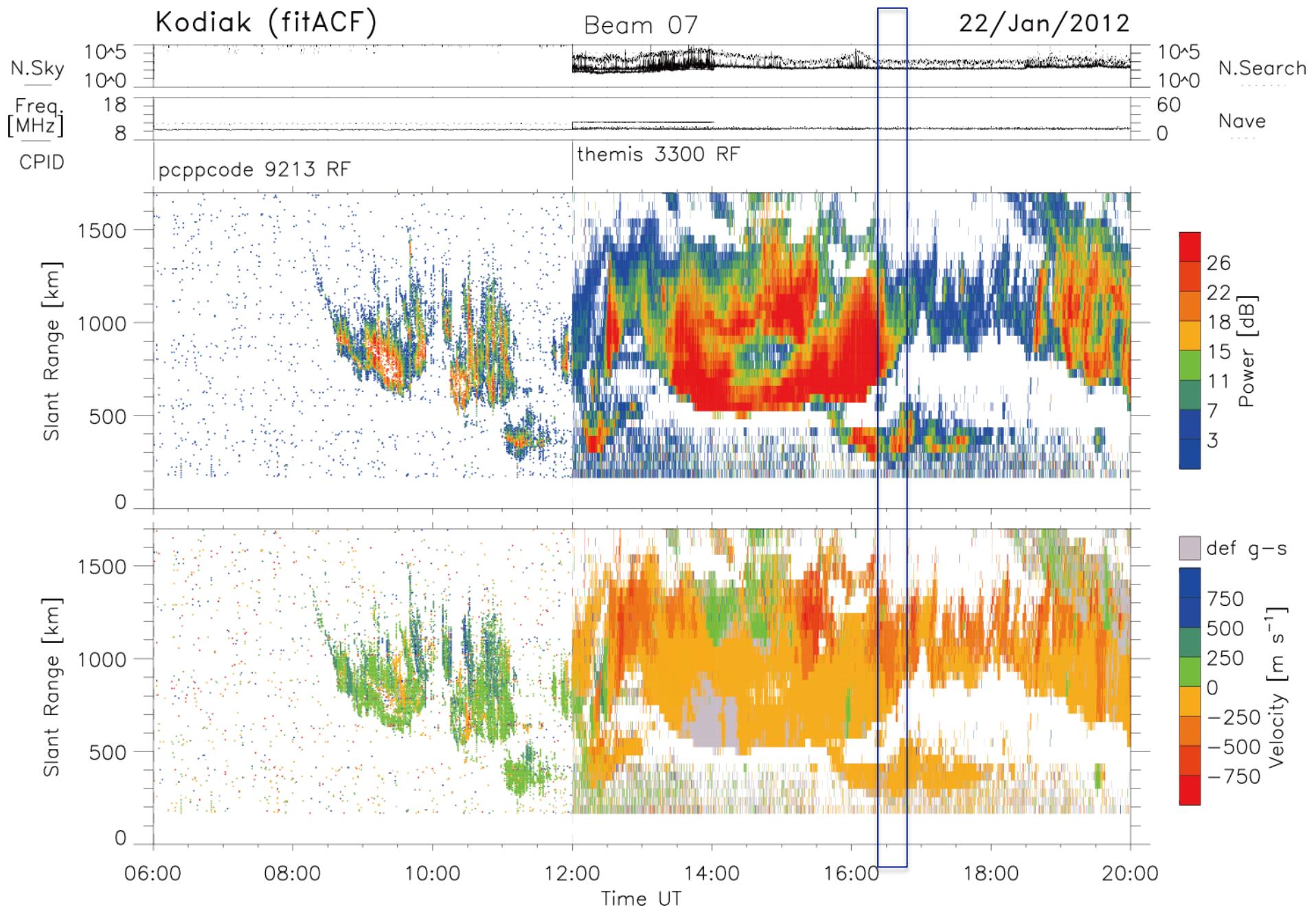


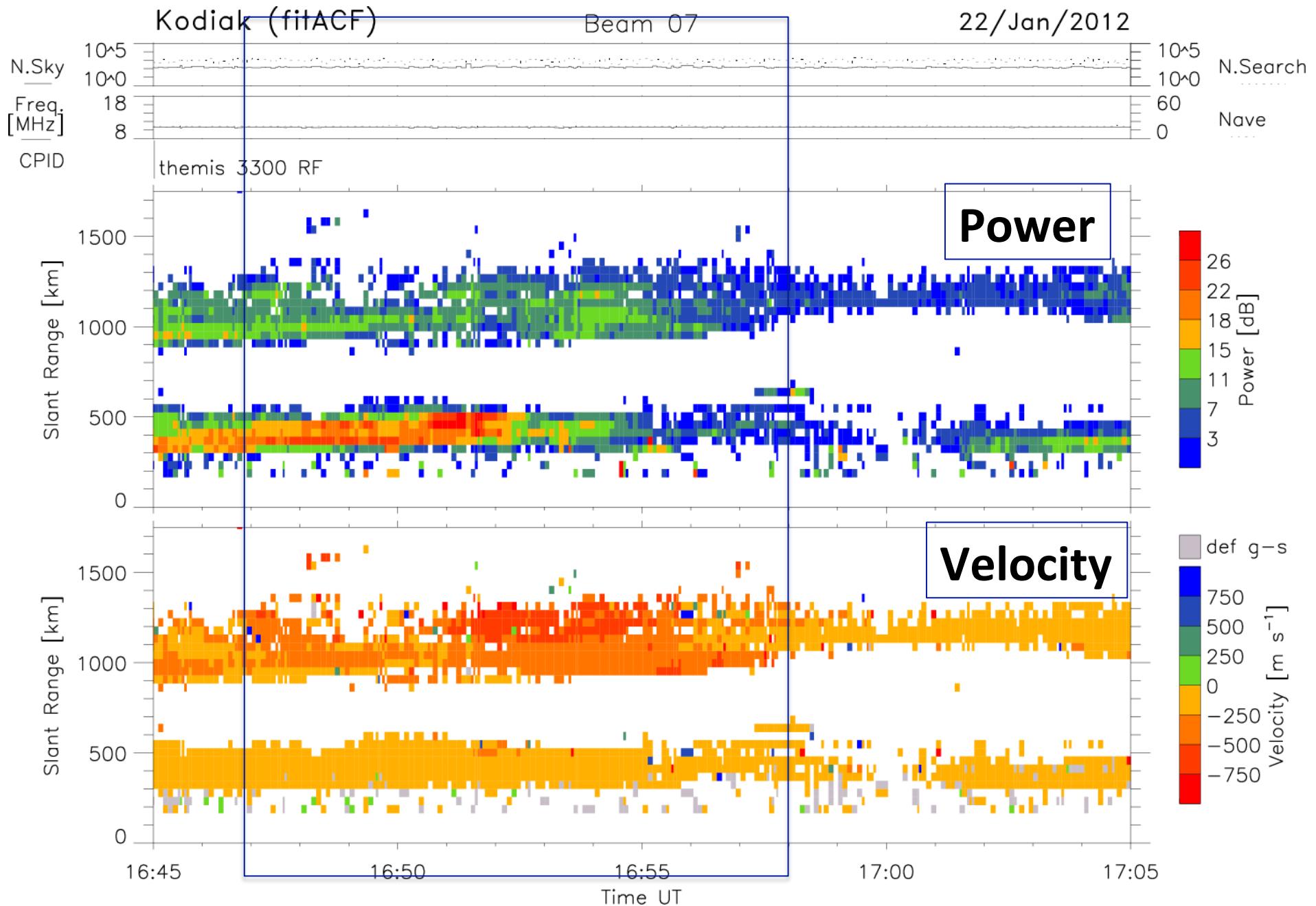
Omega band aurora and Ps6 magnetic pulsation

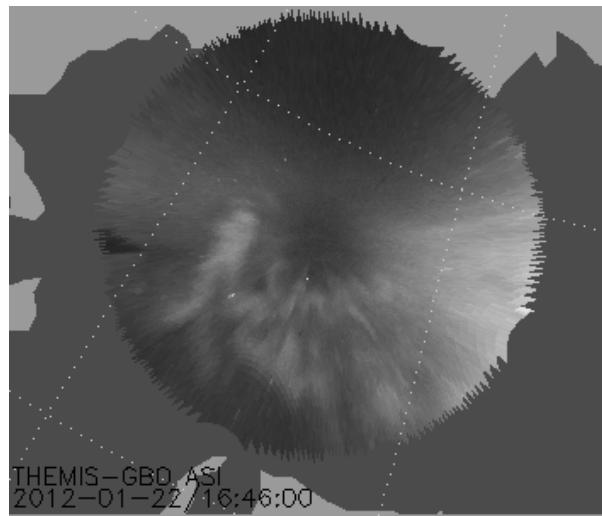


Omega band aurora and Ps6 magnetic pulsation

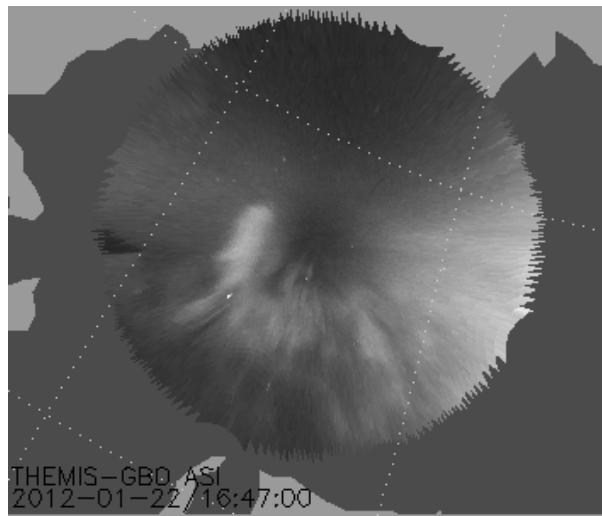




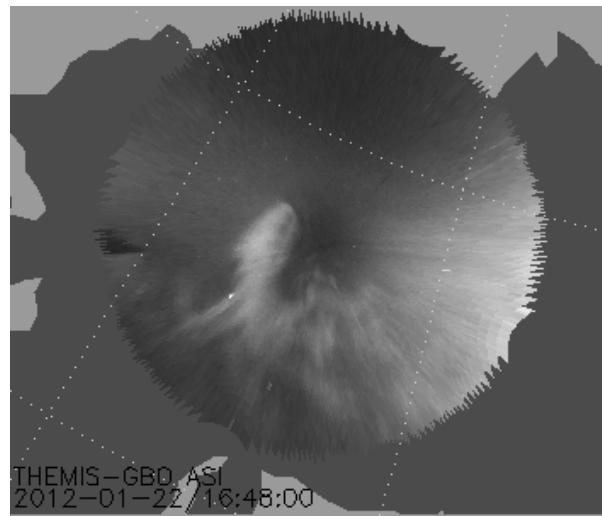




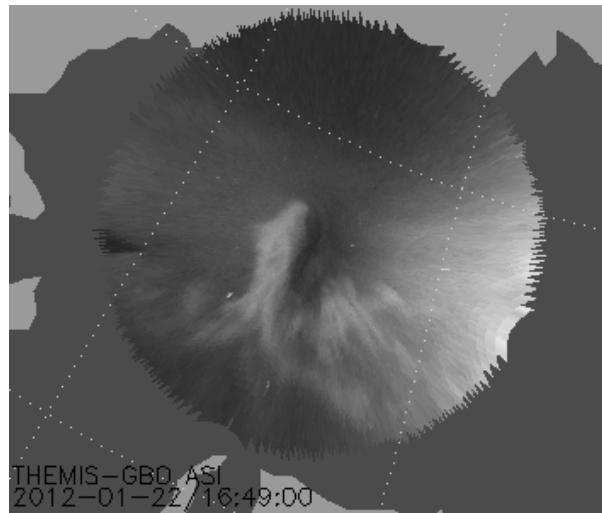
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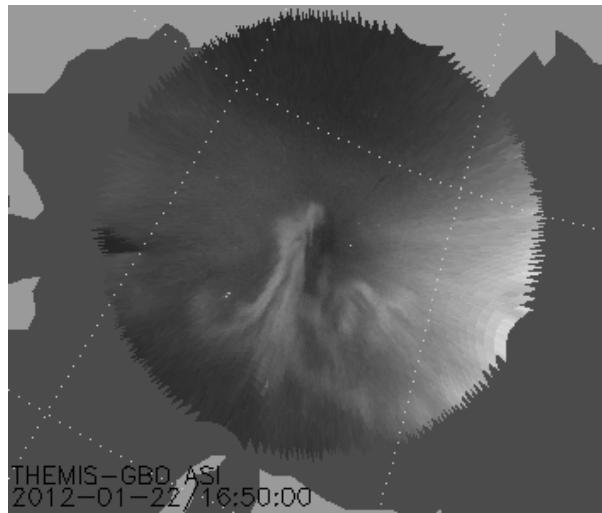
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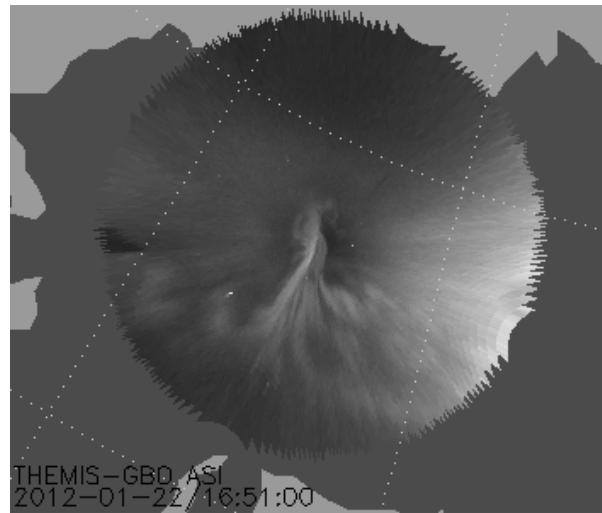
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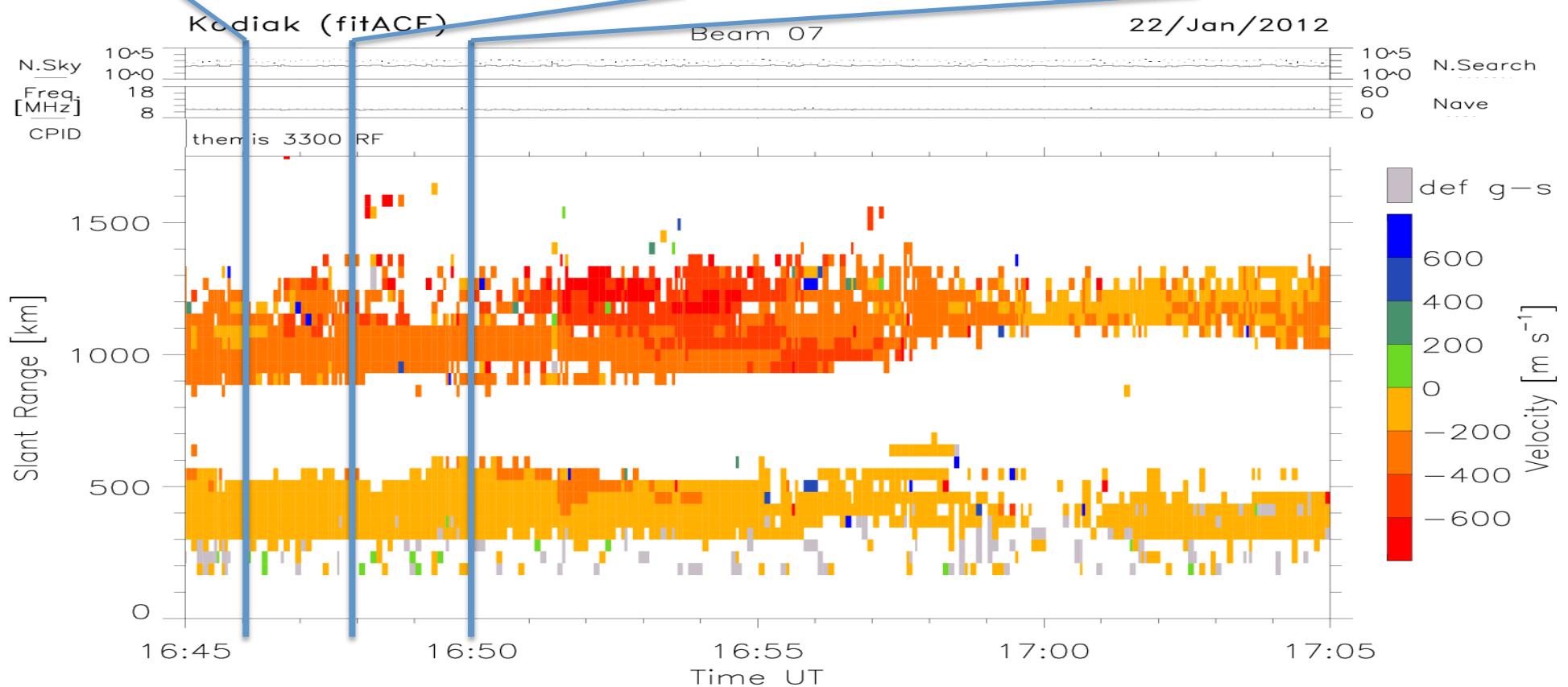
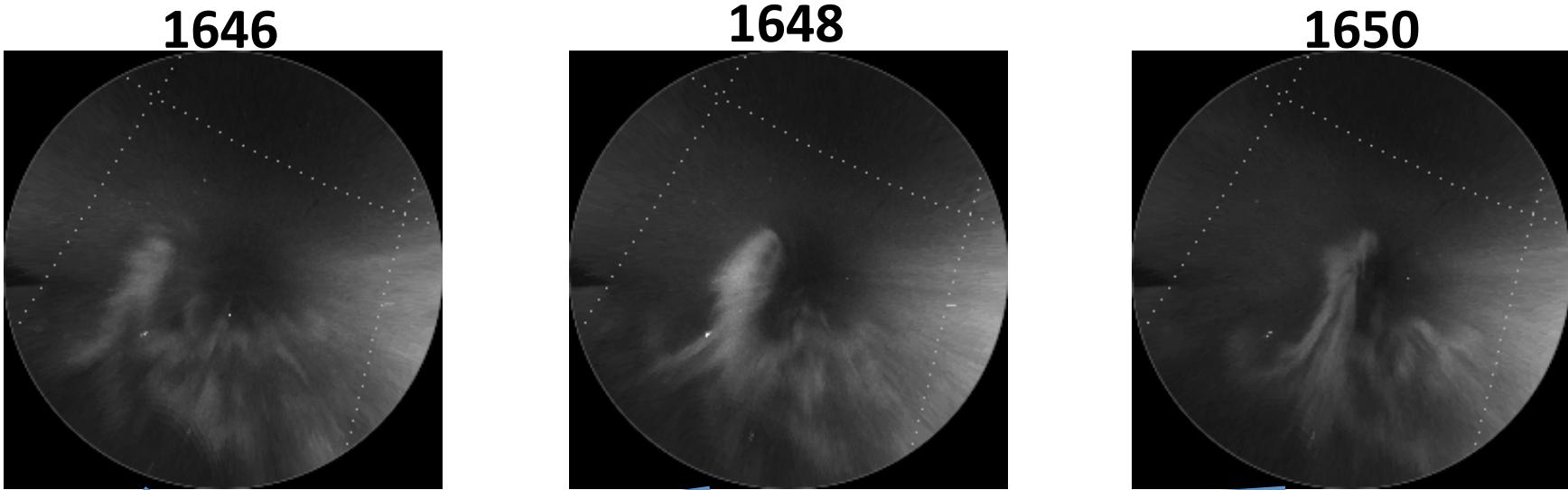
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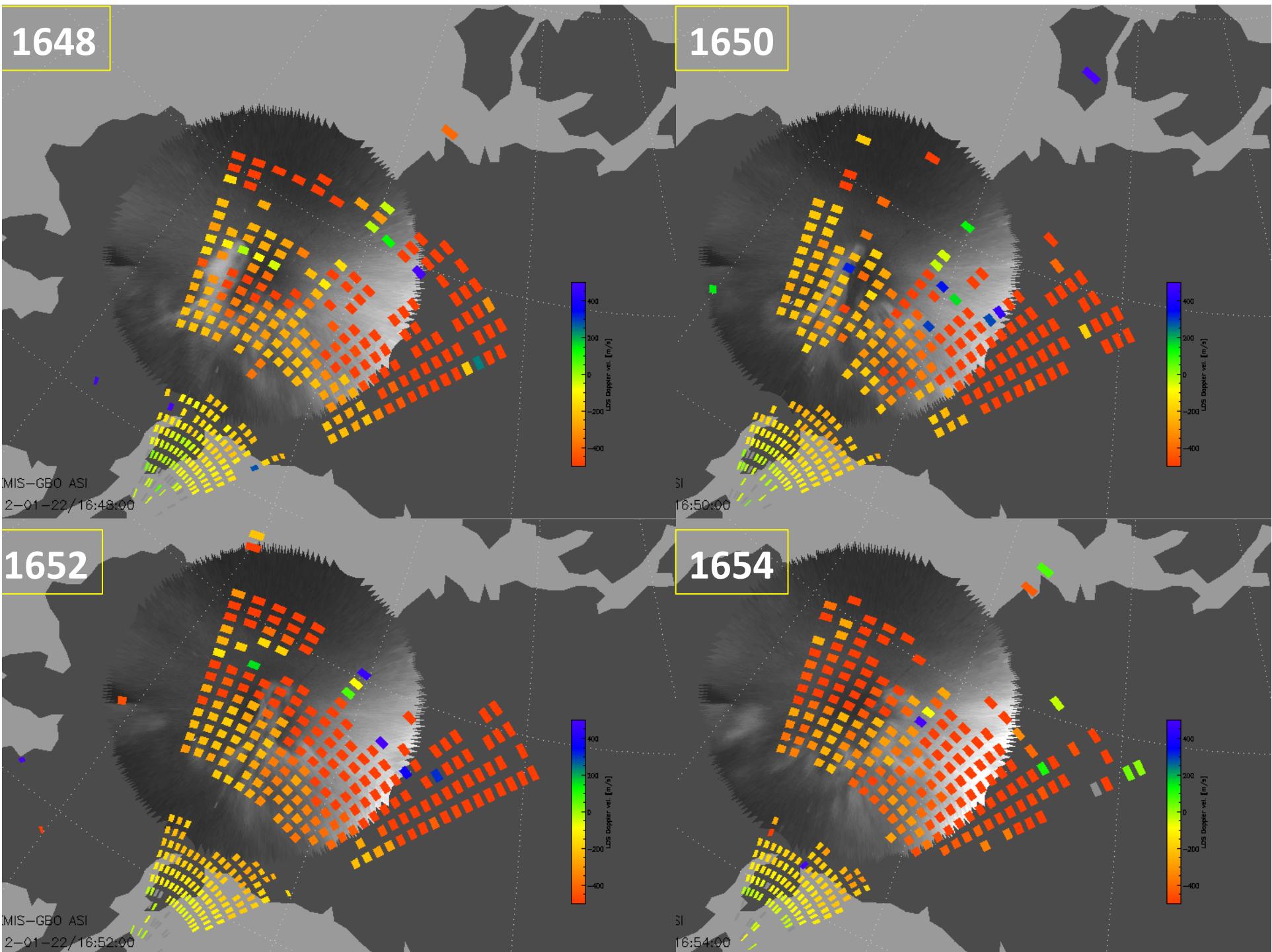


1650

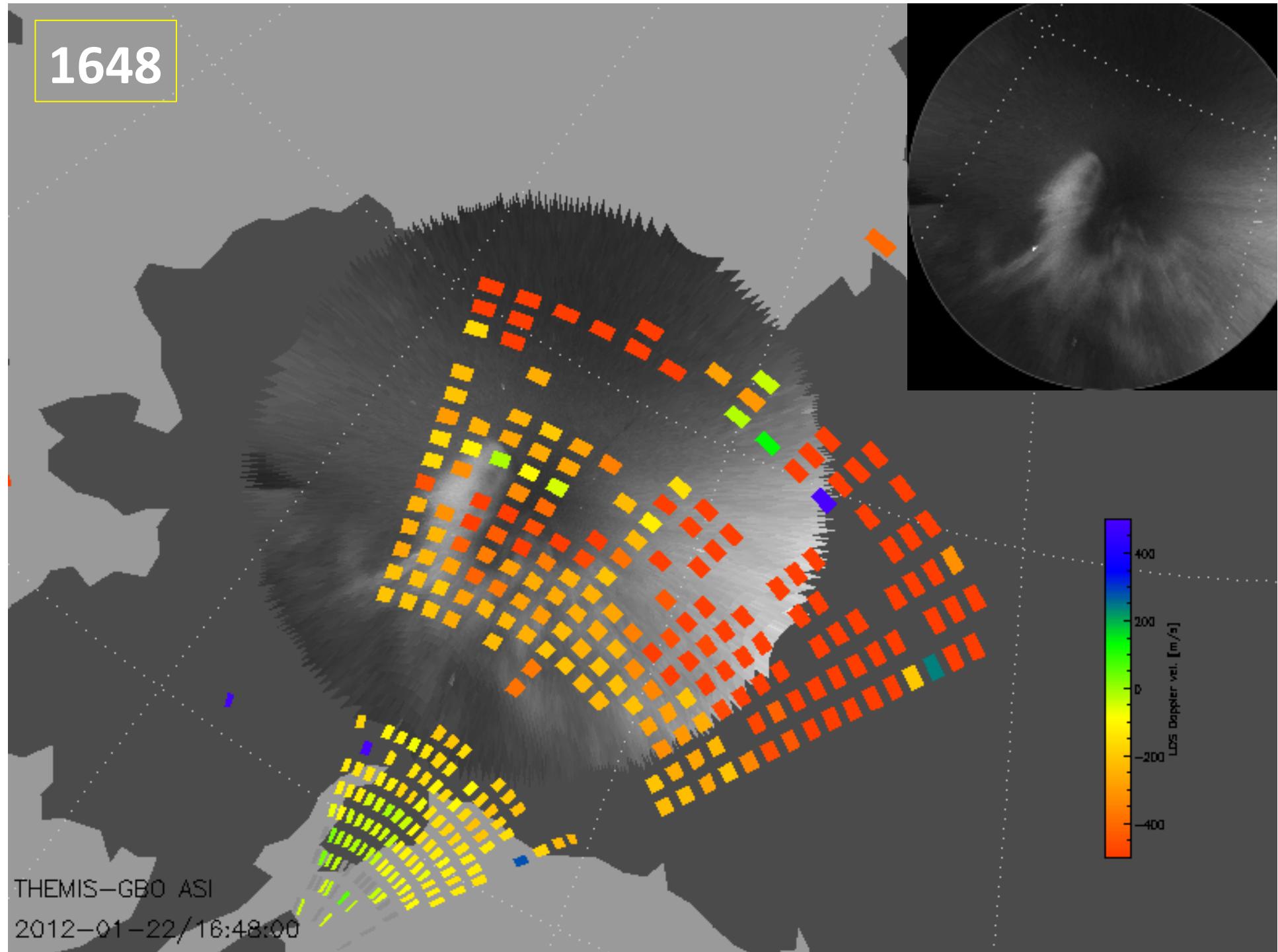


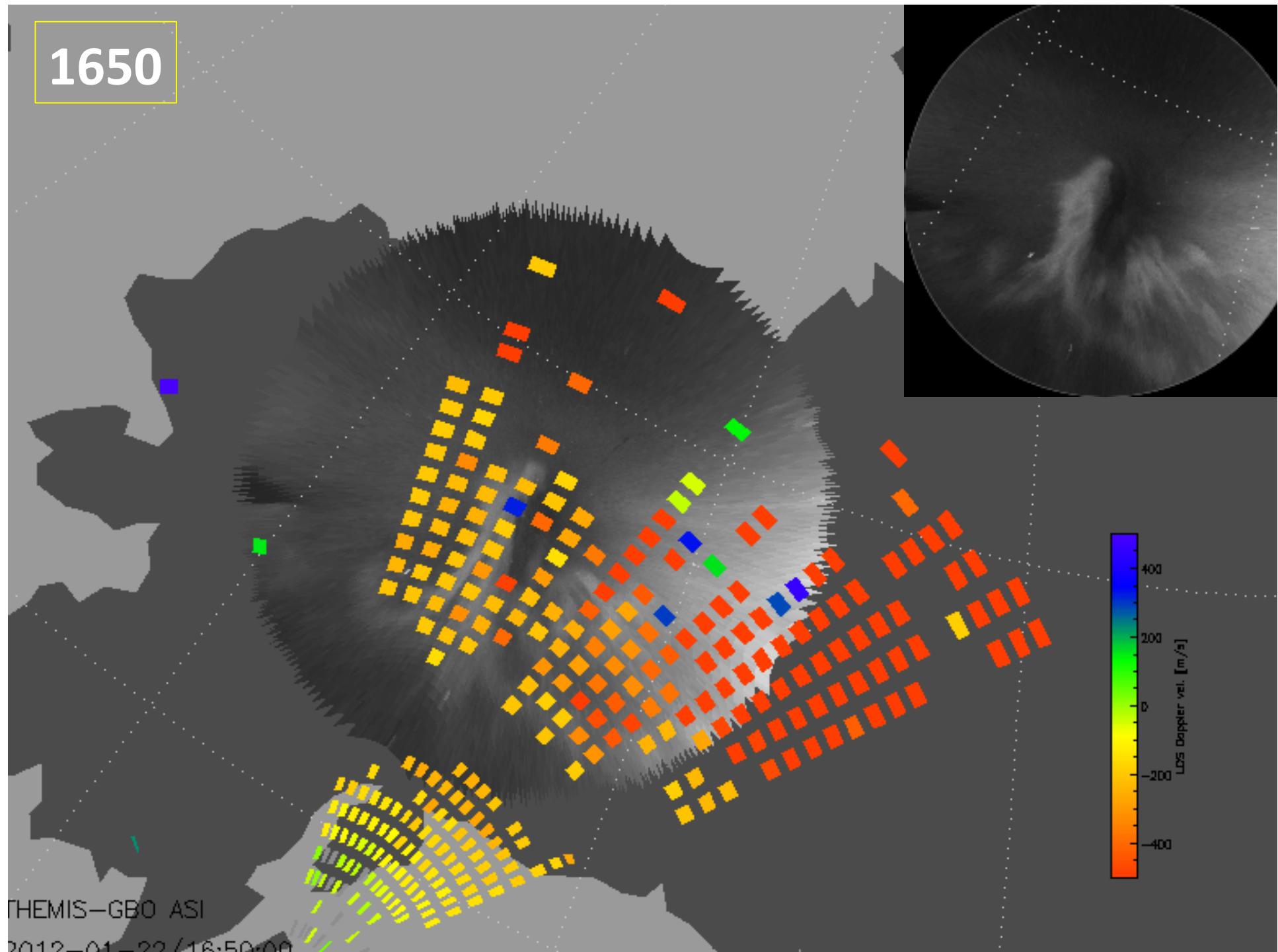
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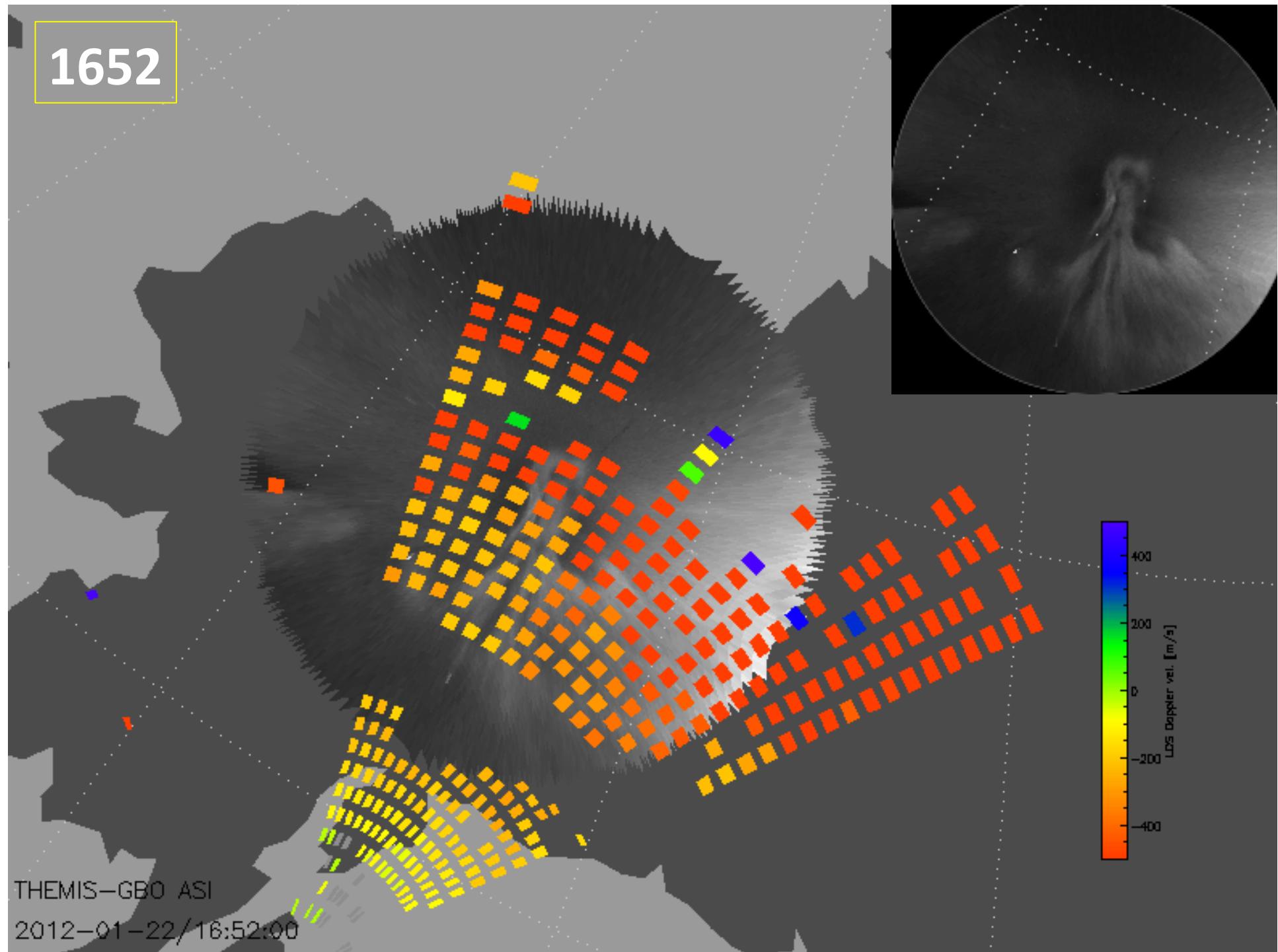


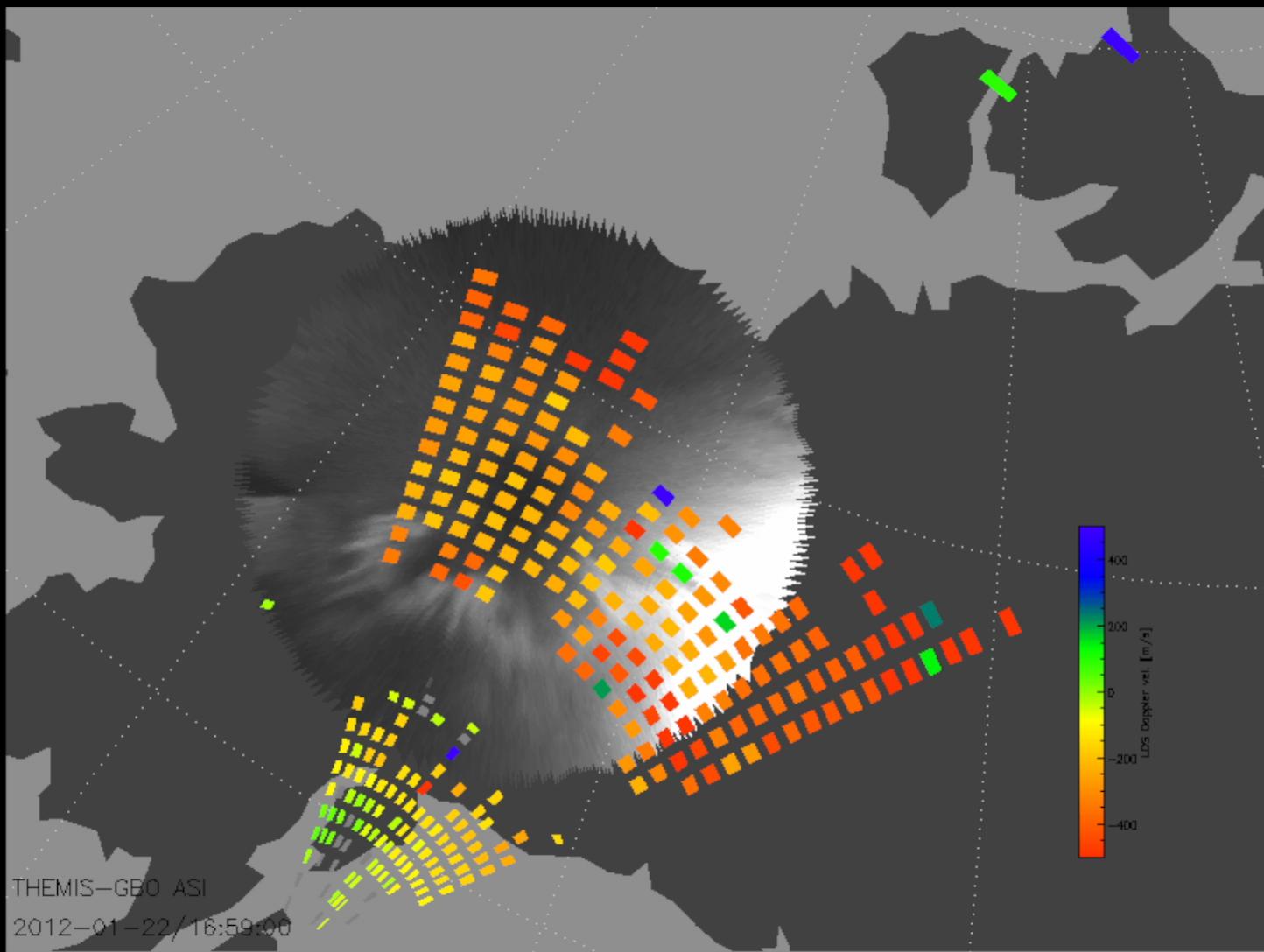


1648





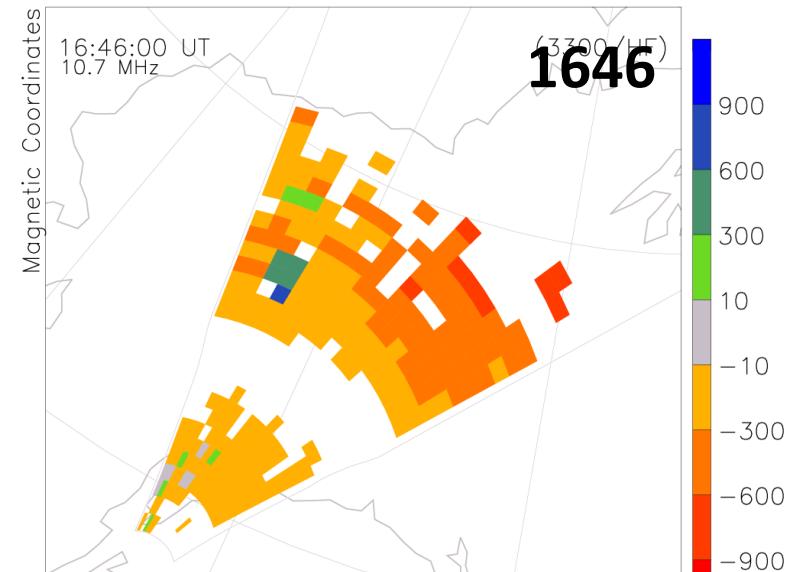




Kodiak (fitACF) Ch A
g-s: $v \leq \pm 10.0$ m/s
Plot every 2 min

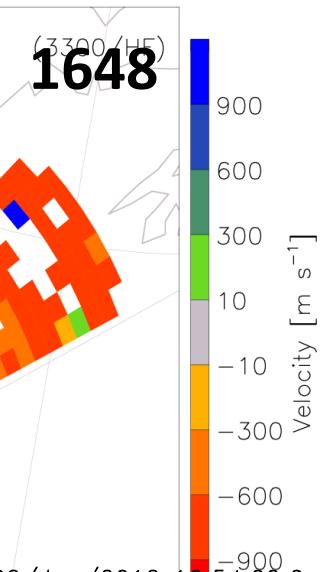
22/Jan/2012 16:46:00.0 Kodiak (fitACF) Ch A
to 22/Jan/2012 16:46:00.0 g-s: $v \leq \pm 10.0$ m/s
Plot every 2 min

22/Jan/2012 16:48:00.0
to 22/Jan/2012 16:48:00.0

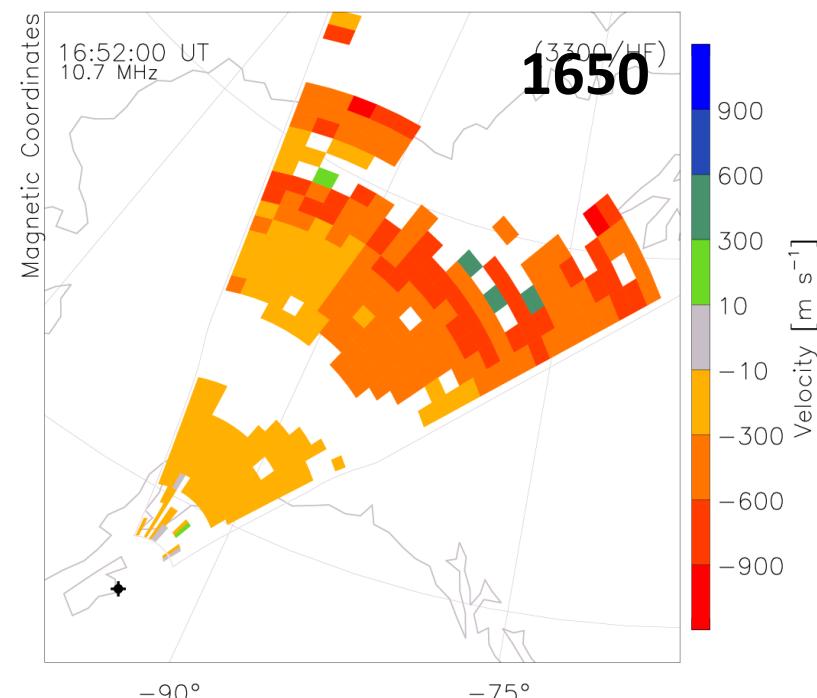


Kodiak (fitACF) Ch A
g-s: $v \leq \pm 10.0$ m/s
Plot every 2 min

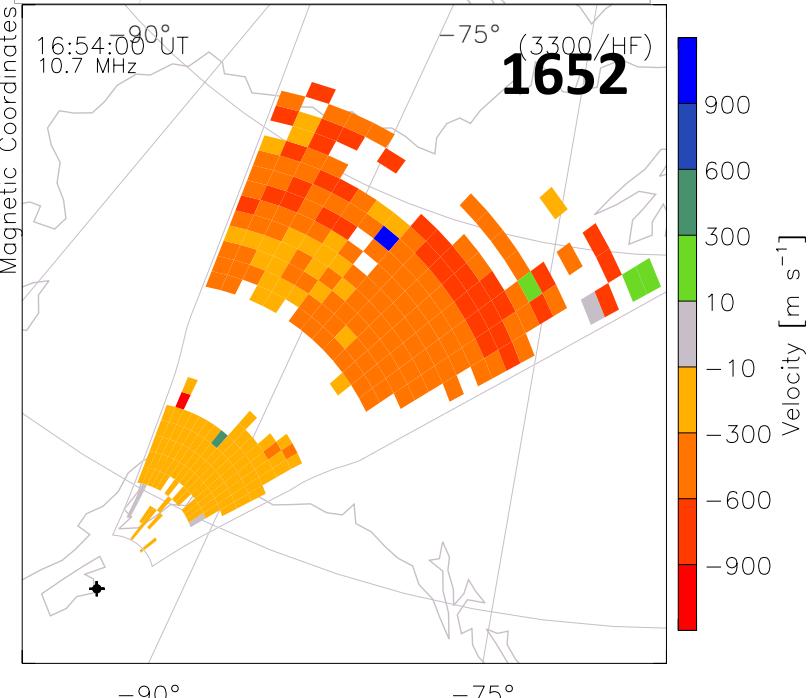
22/Jan/2012 16:52:00.0
to 22/Jan/2012 16:52:00.0 Kodiak (fitACF) Ch A
g-s: $v \leq \pm 10.0$ m/s
Plot every 2 min



Velocity [m s⁻¹]



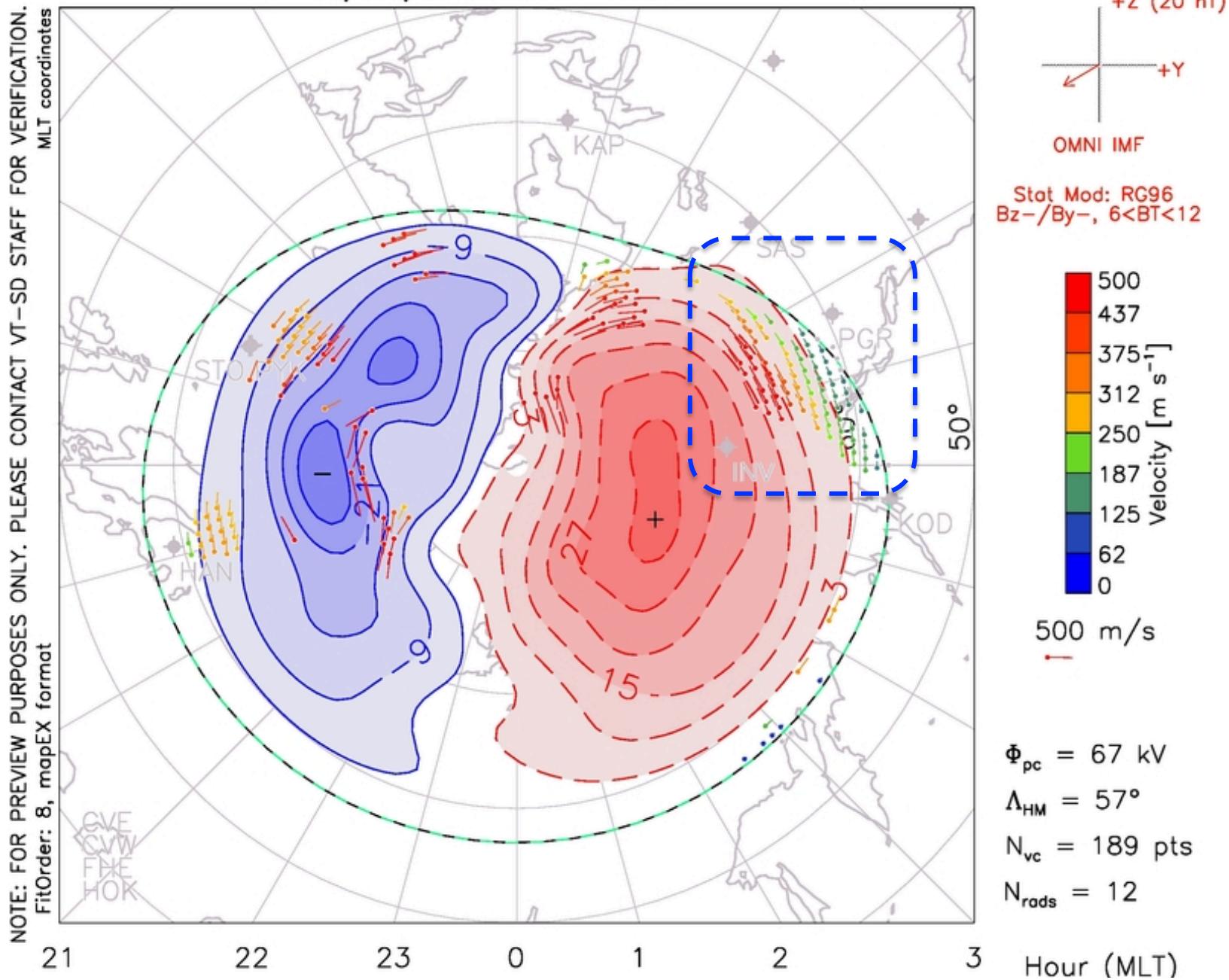
Velocity [m s⁻¹]



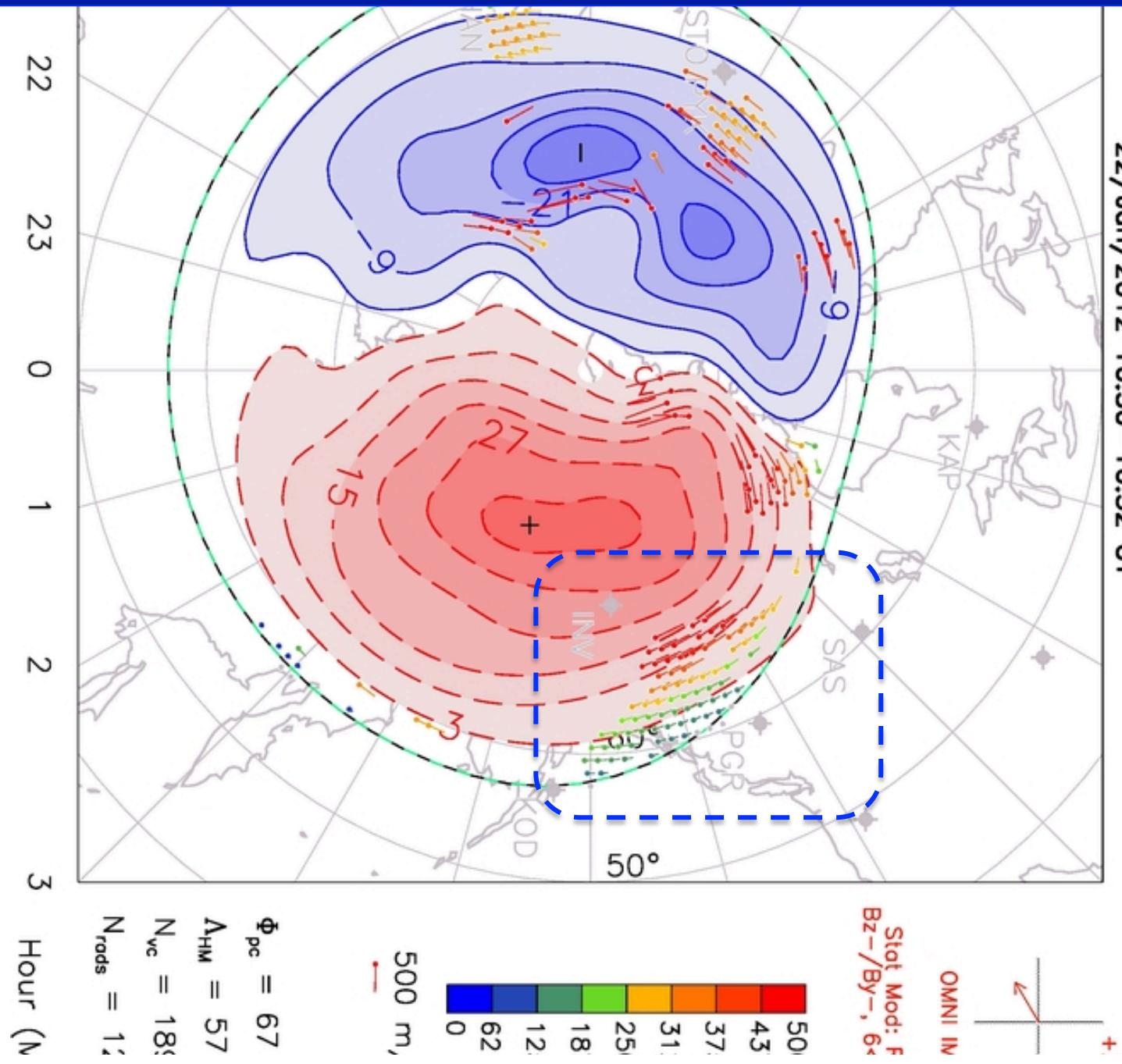
Velocity [m s⁻¹]

Potential Map

22/Jan/2012 16:50–16:52 UT



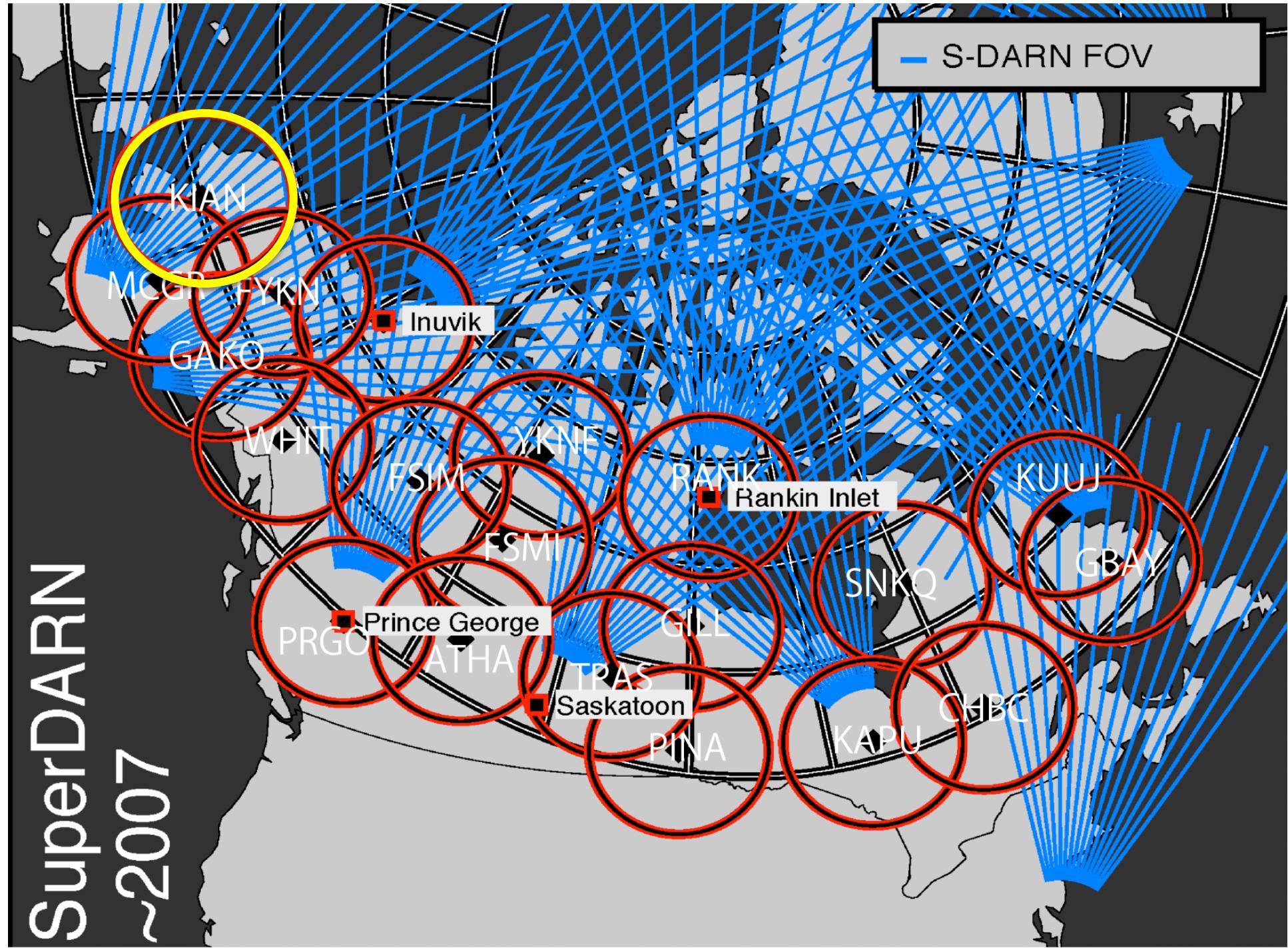
Potential Map

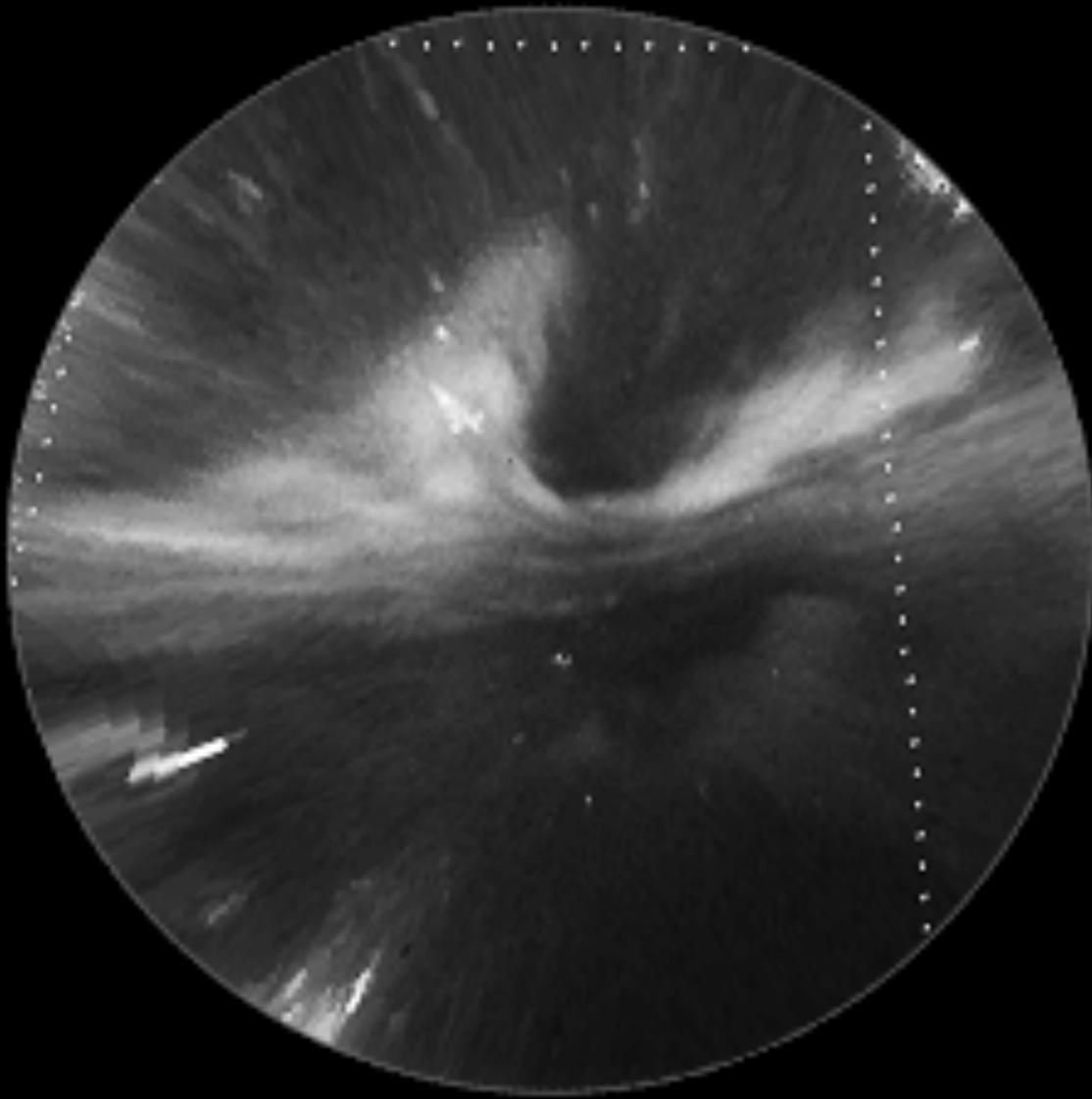


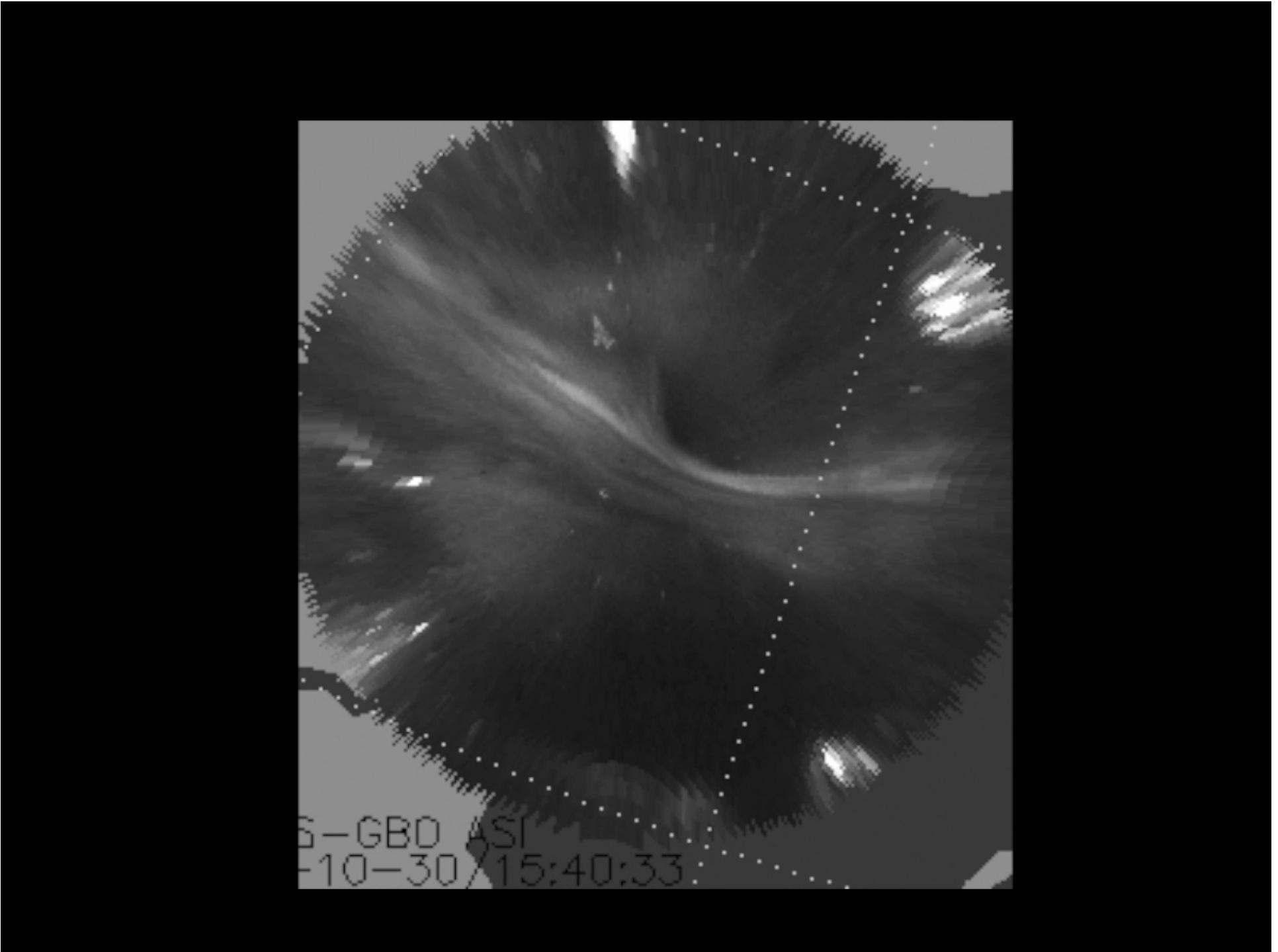
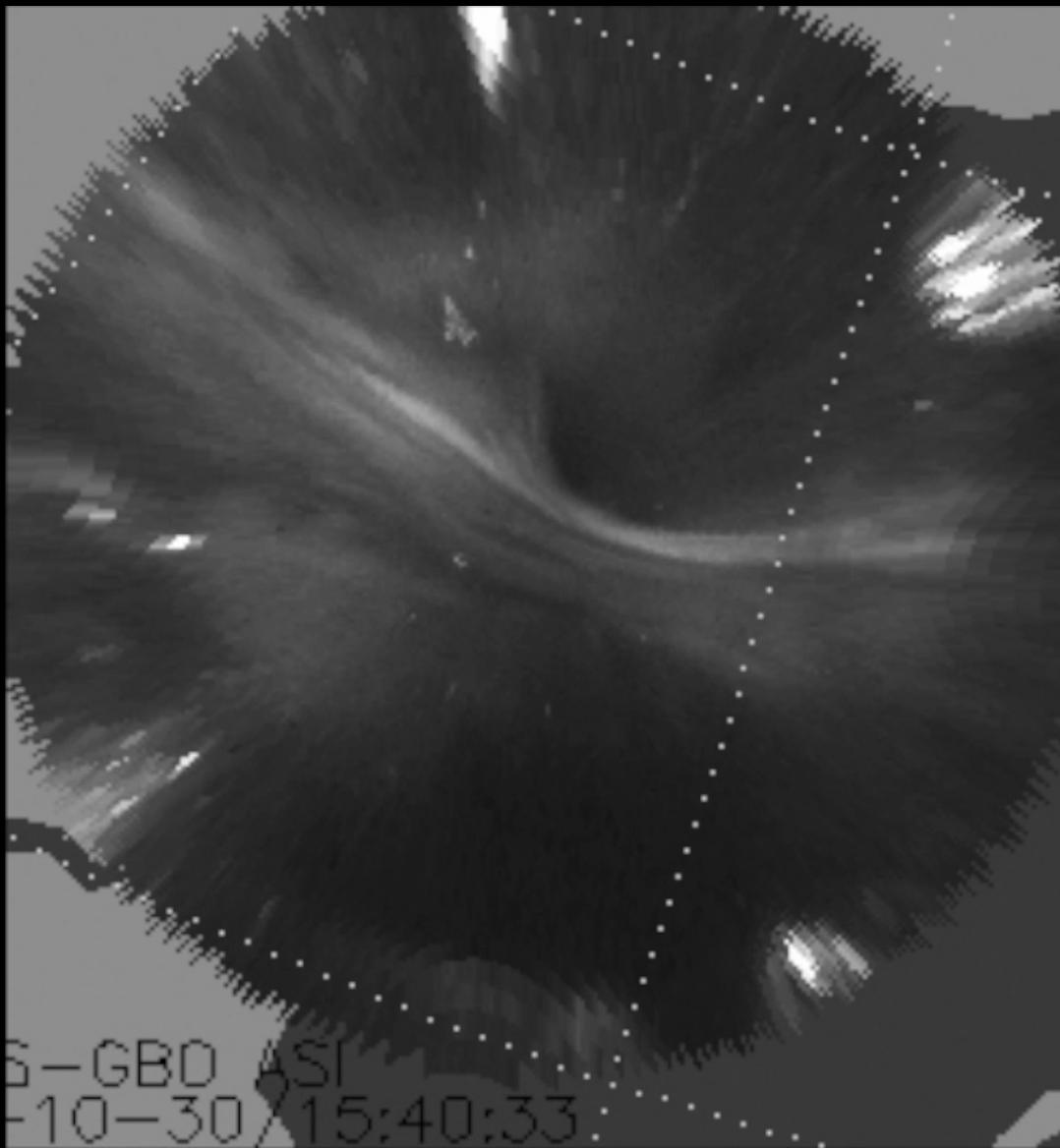


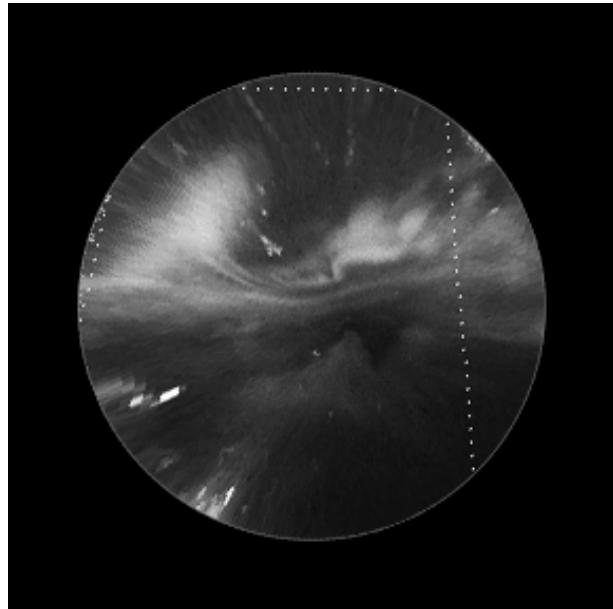
2011.10.30 event
Omega band
observed at **Kiana (KIAN)** in Alaska
compared with
SuperDARN radars at
King Salmon and Kodiak

SuperDARN
~2007

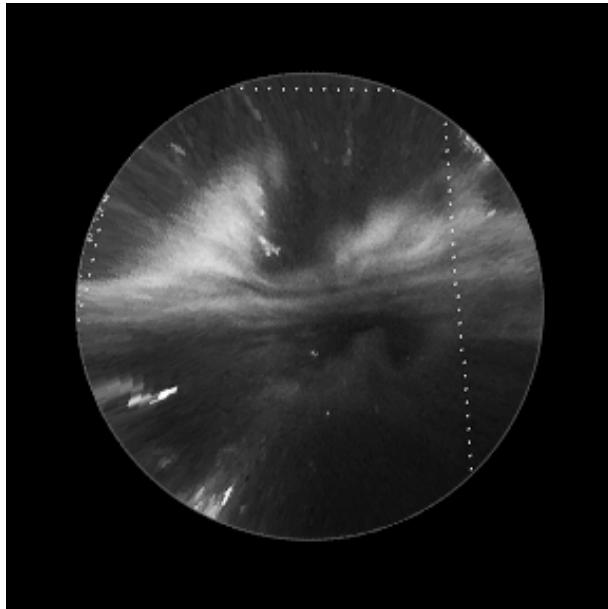




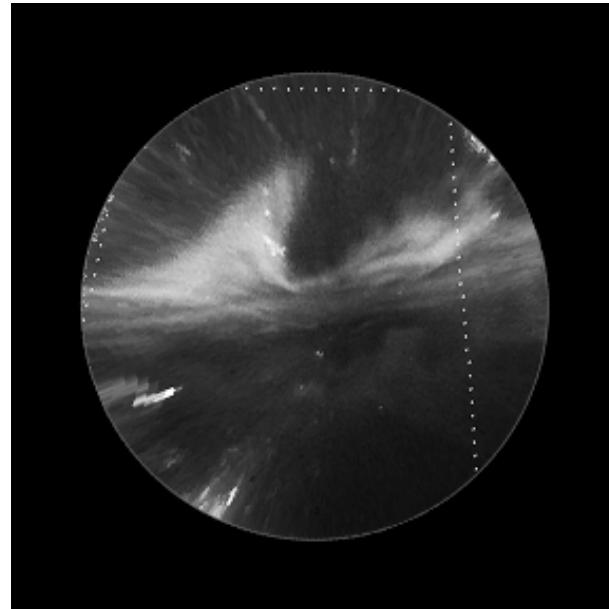




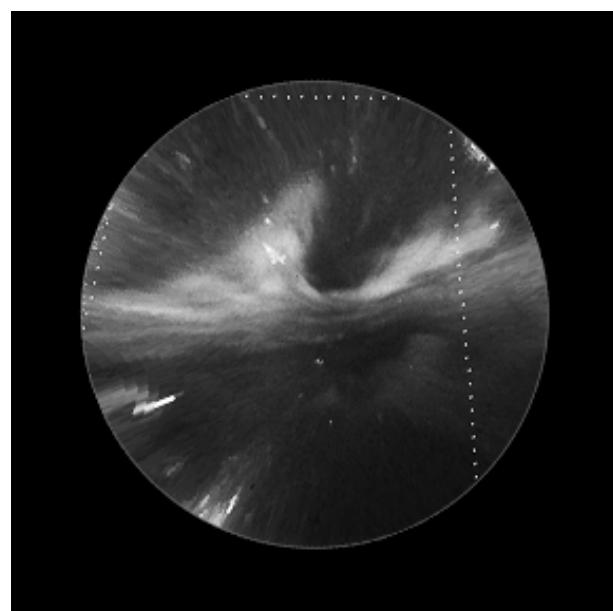
1552 UT



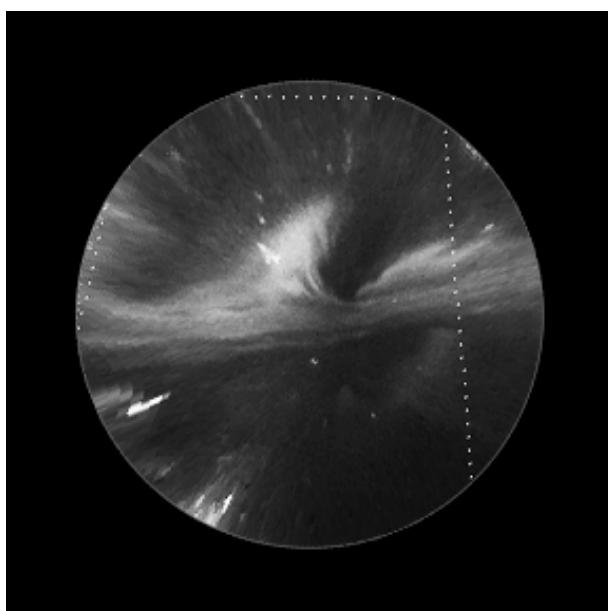
1554 UT



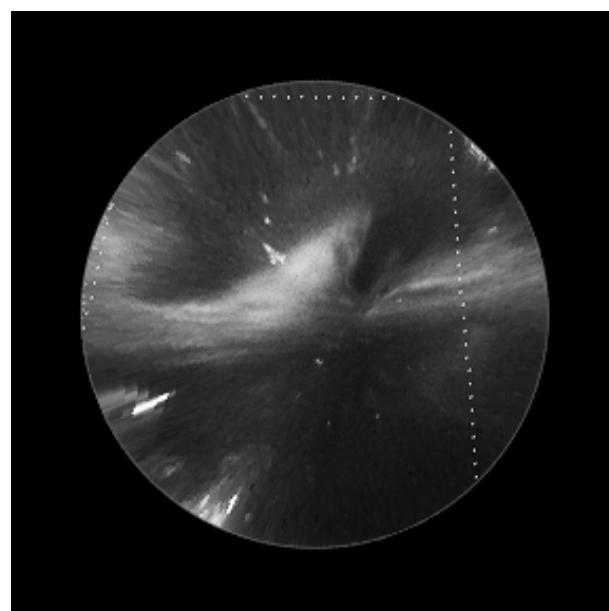
1556 UT



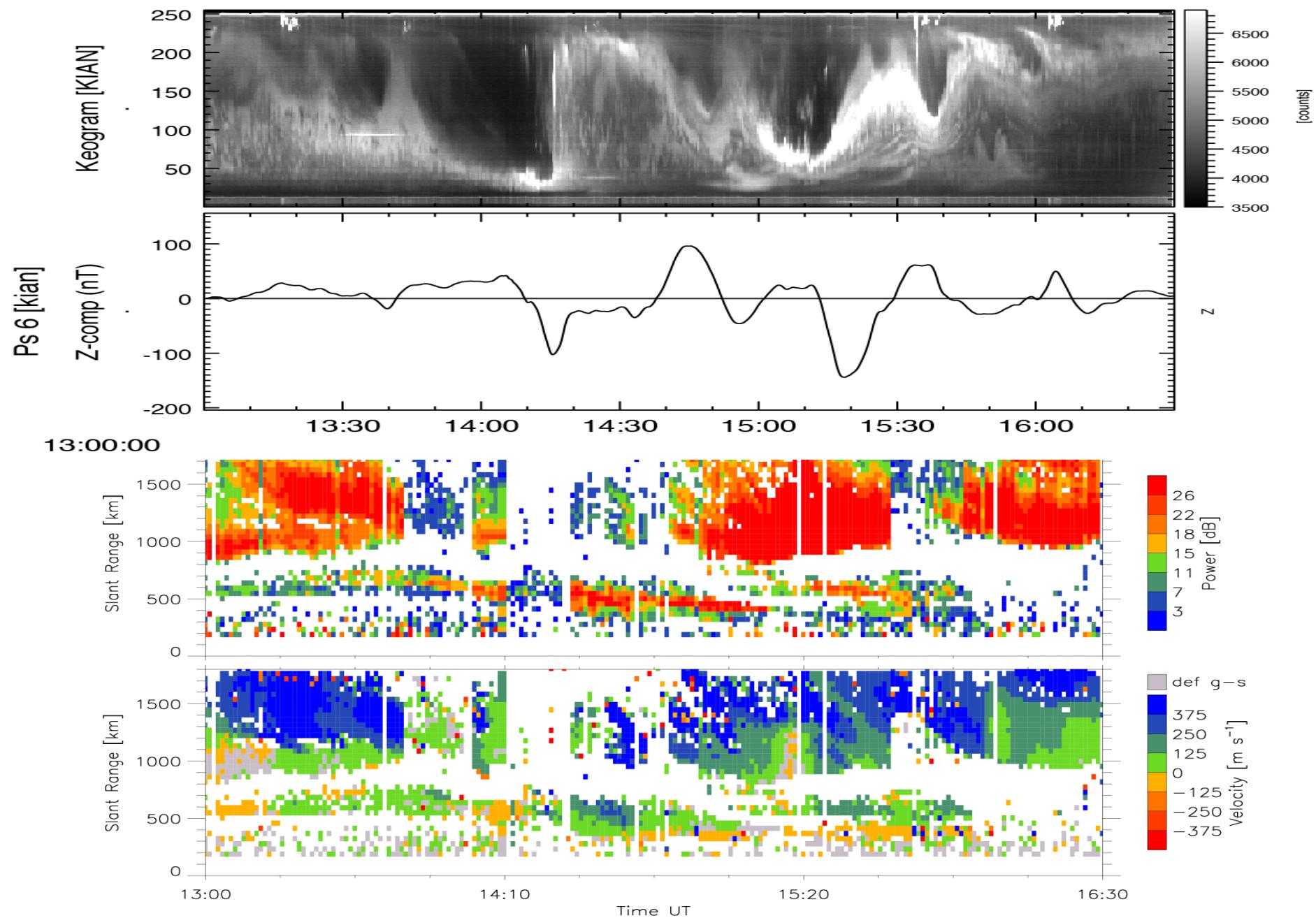
1558 UT

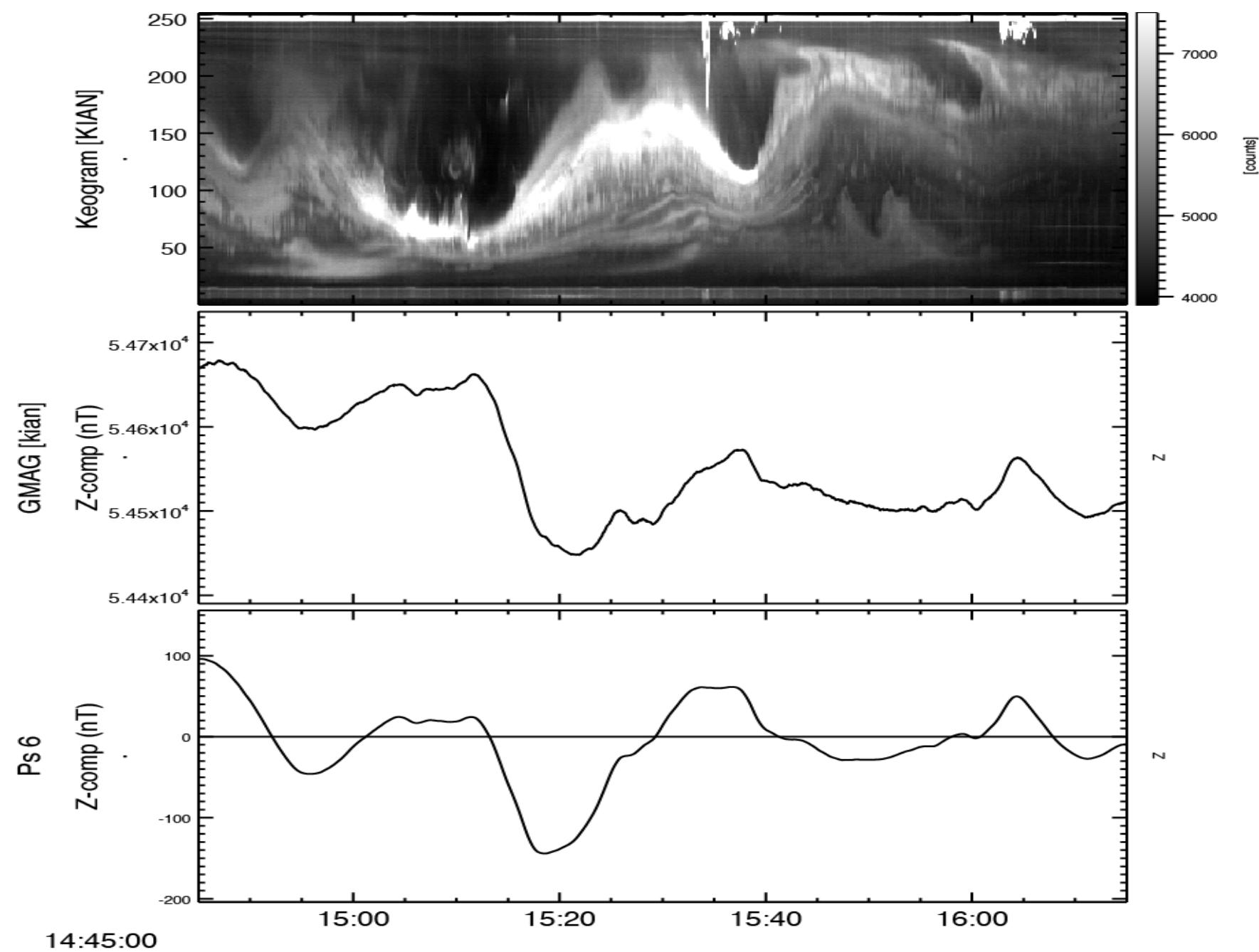


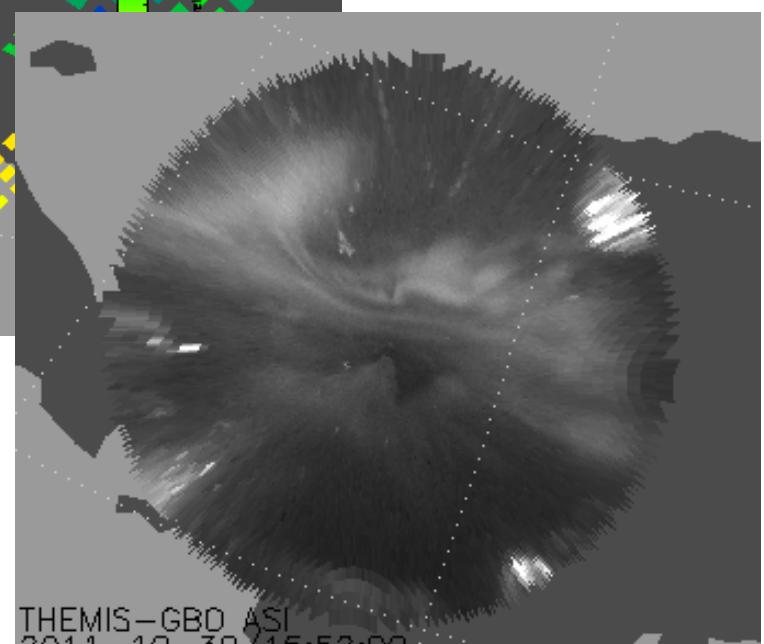
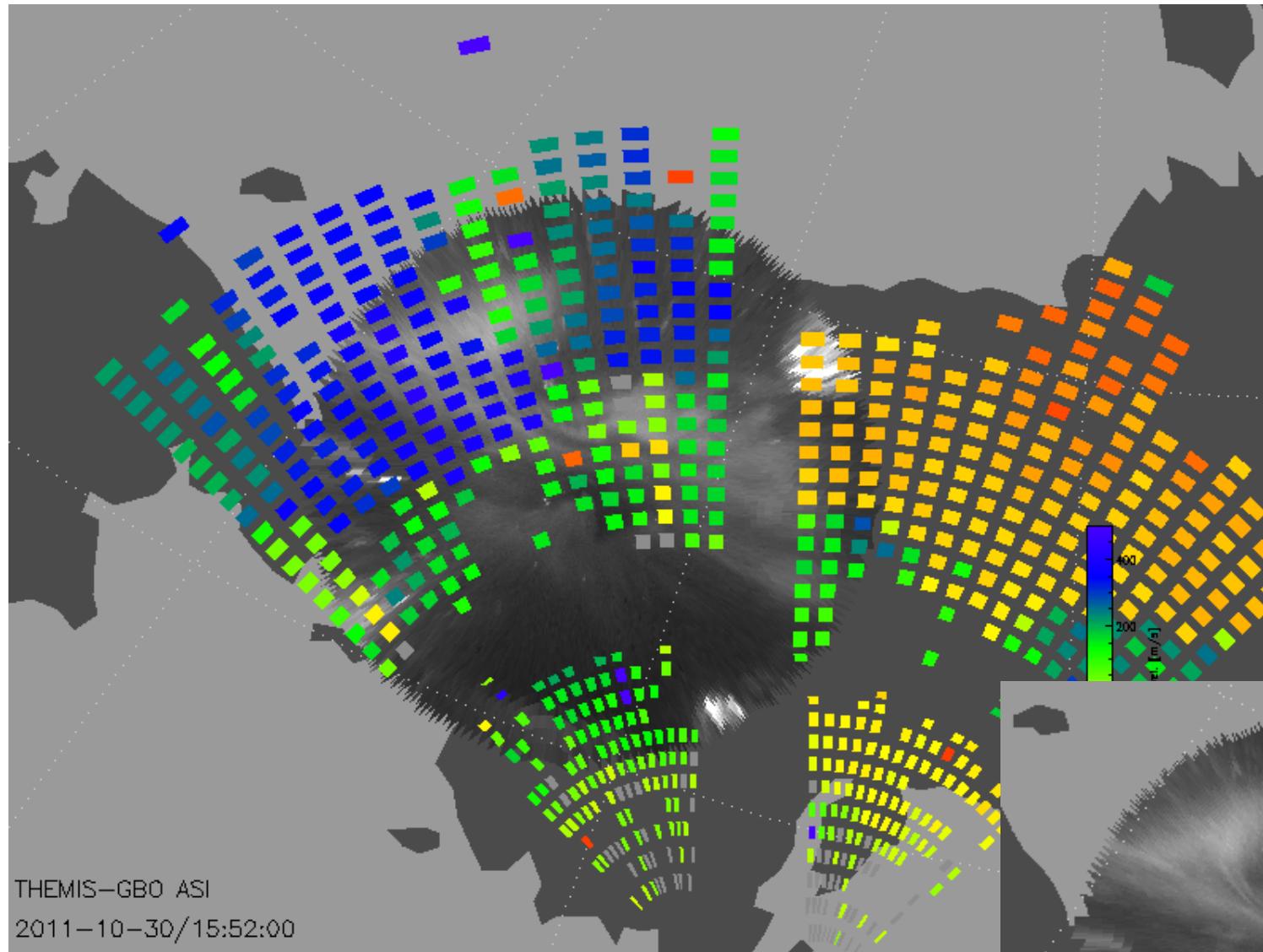
1600 UT

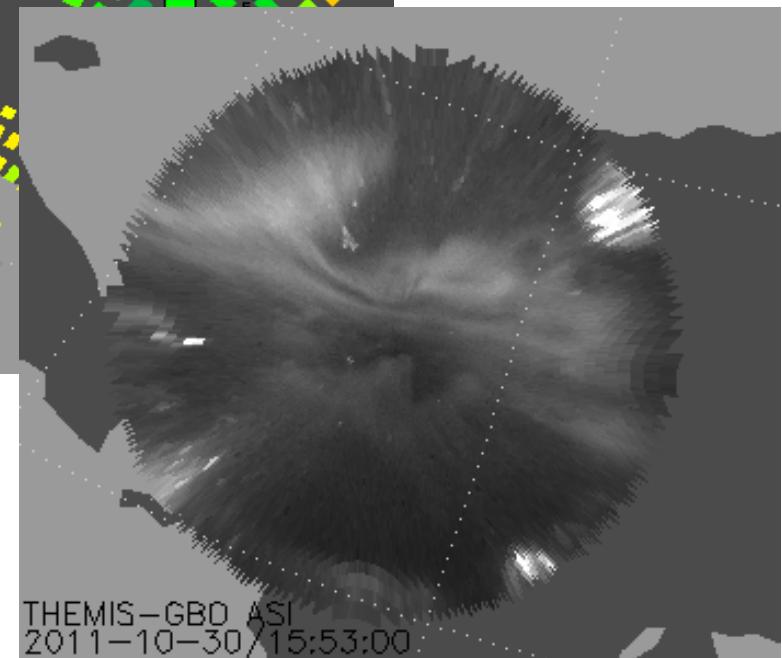
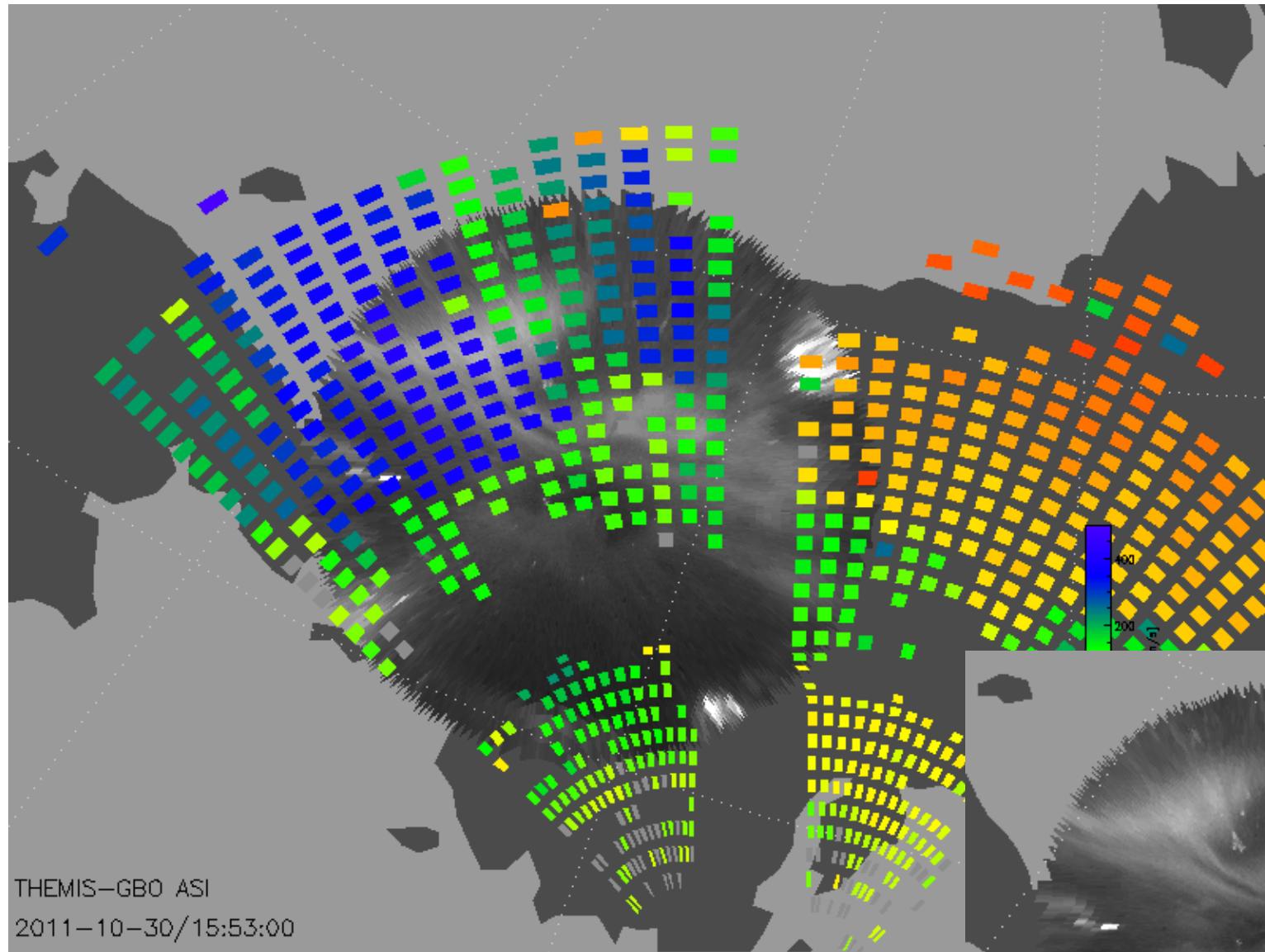


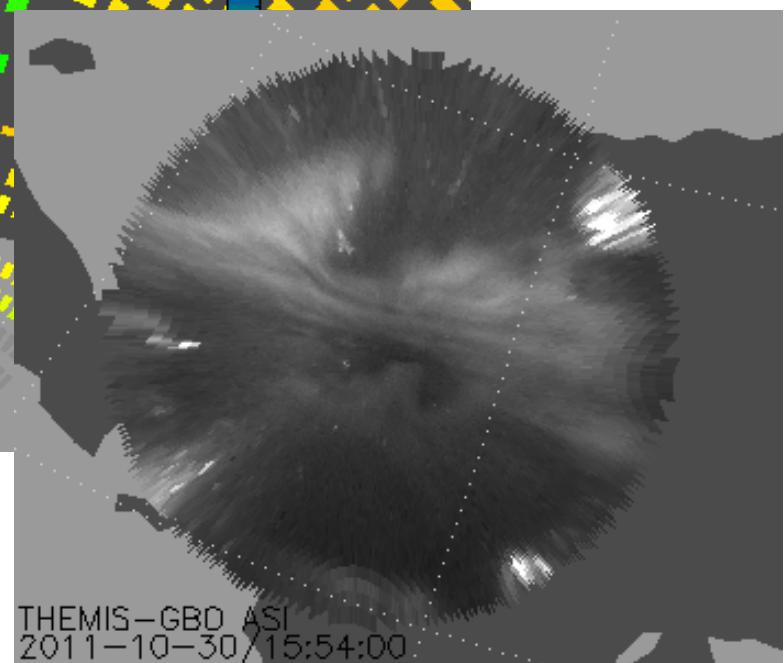
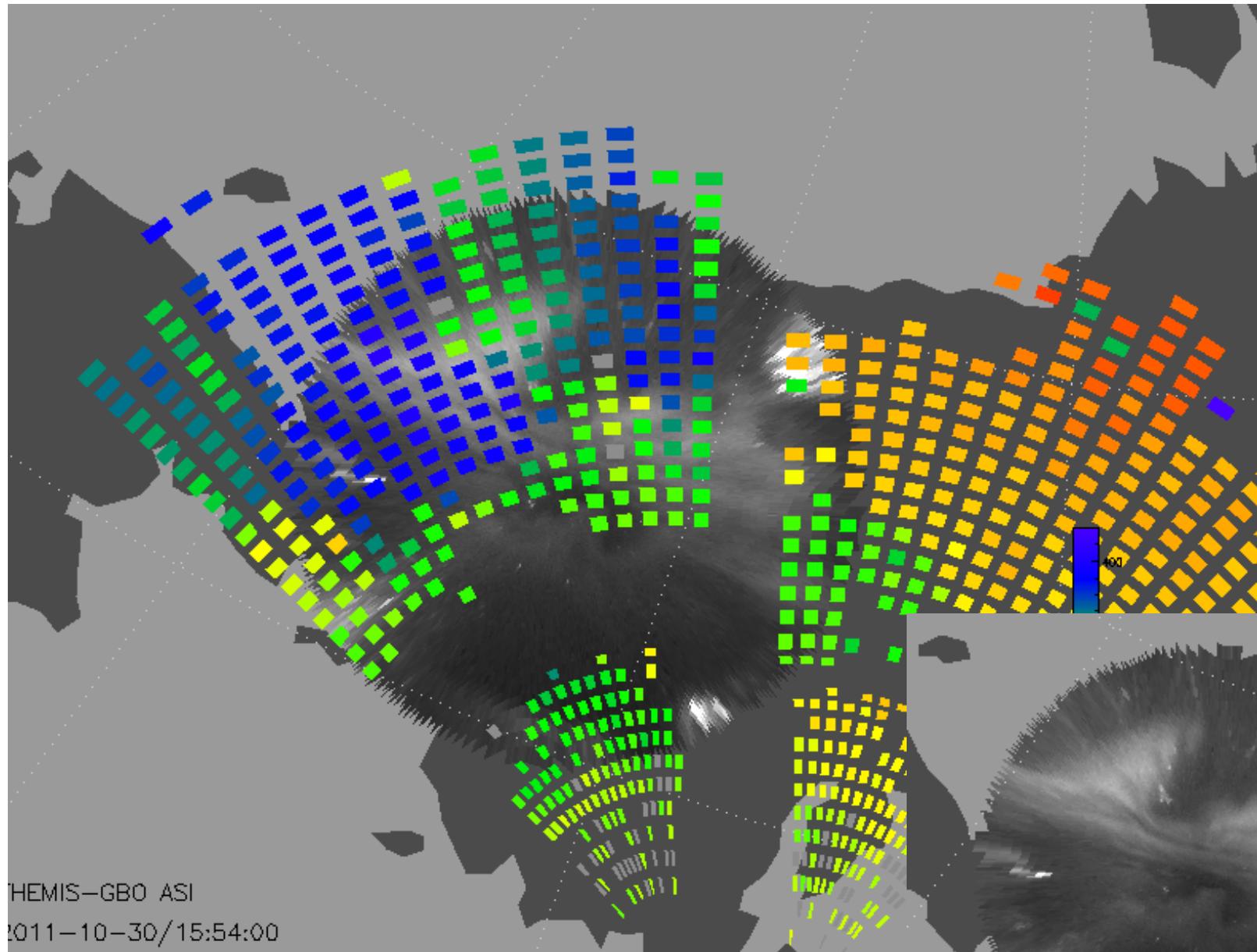
1602 UT

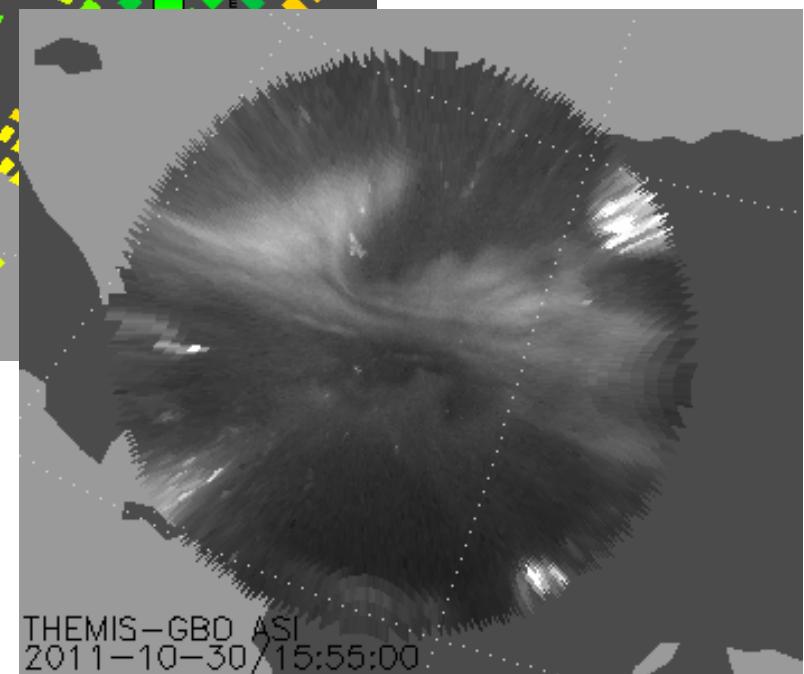
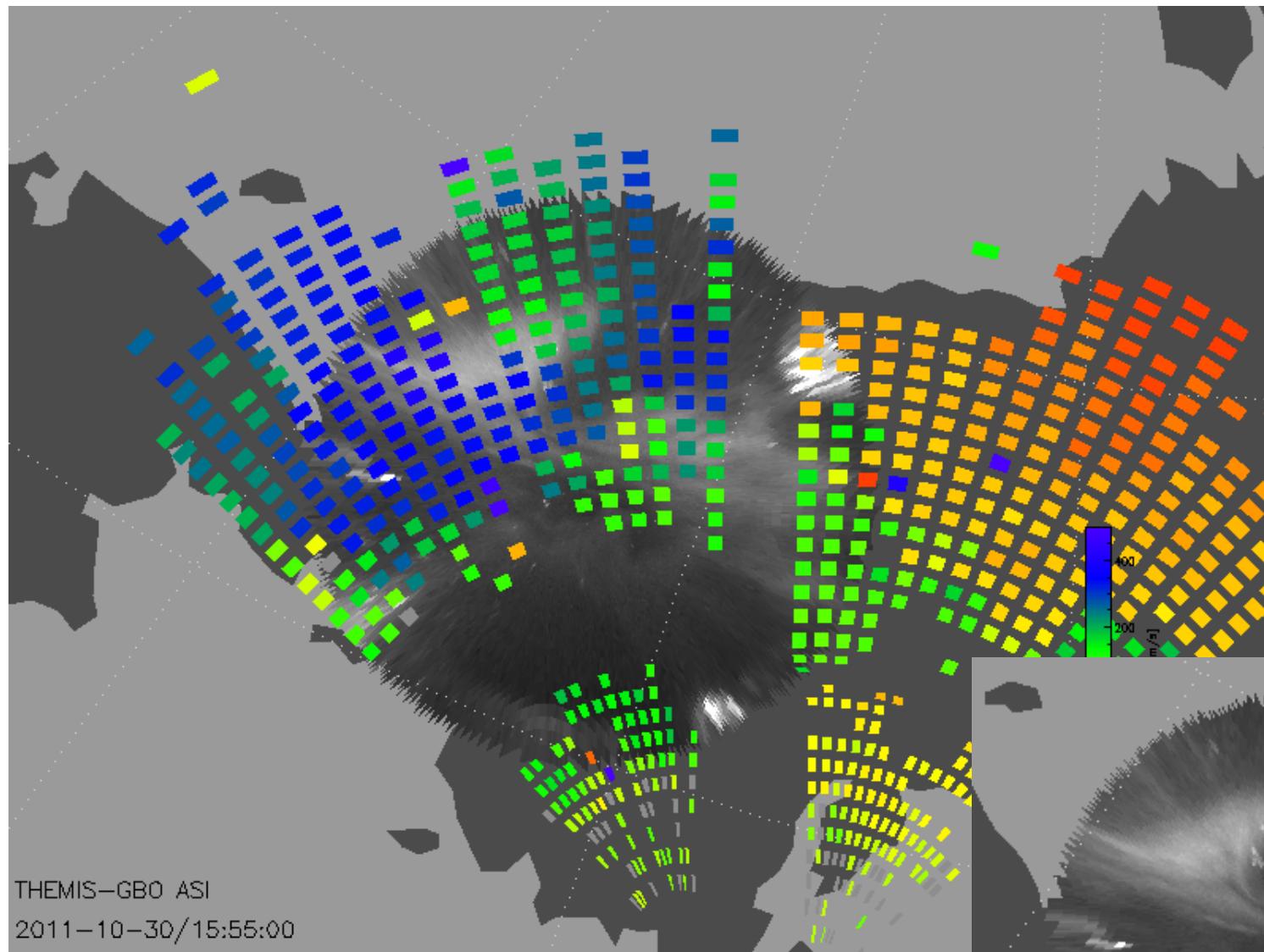


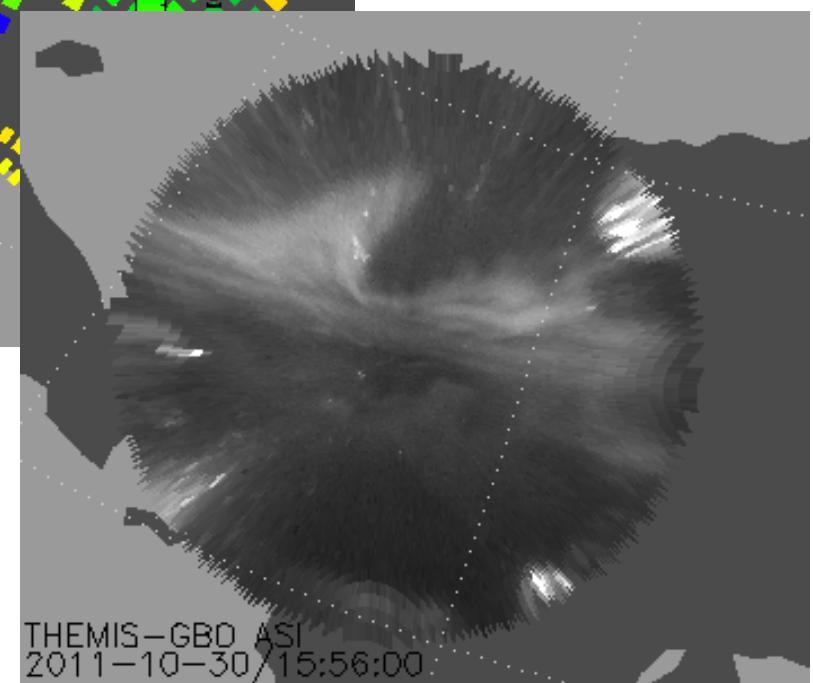
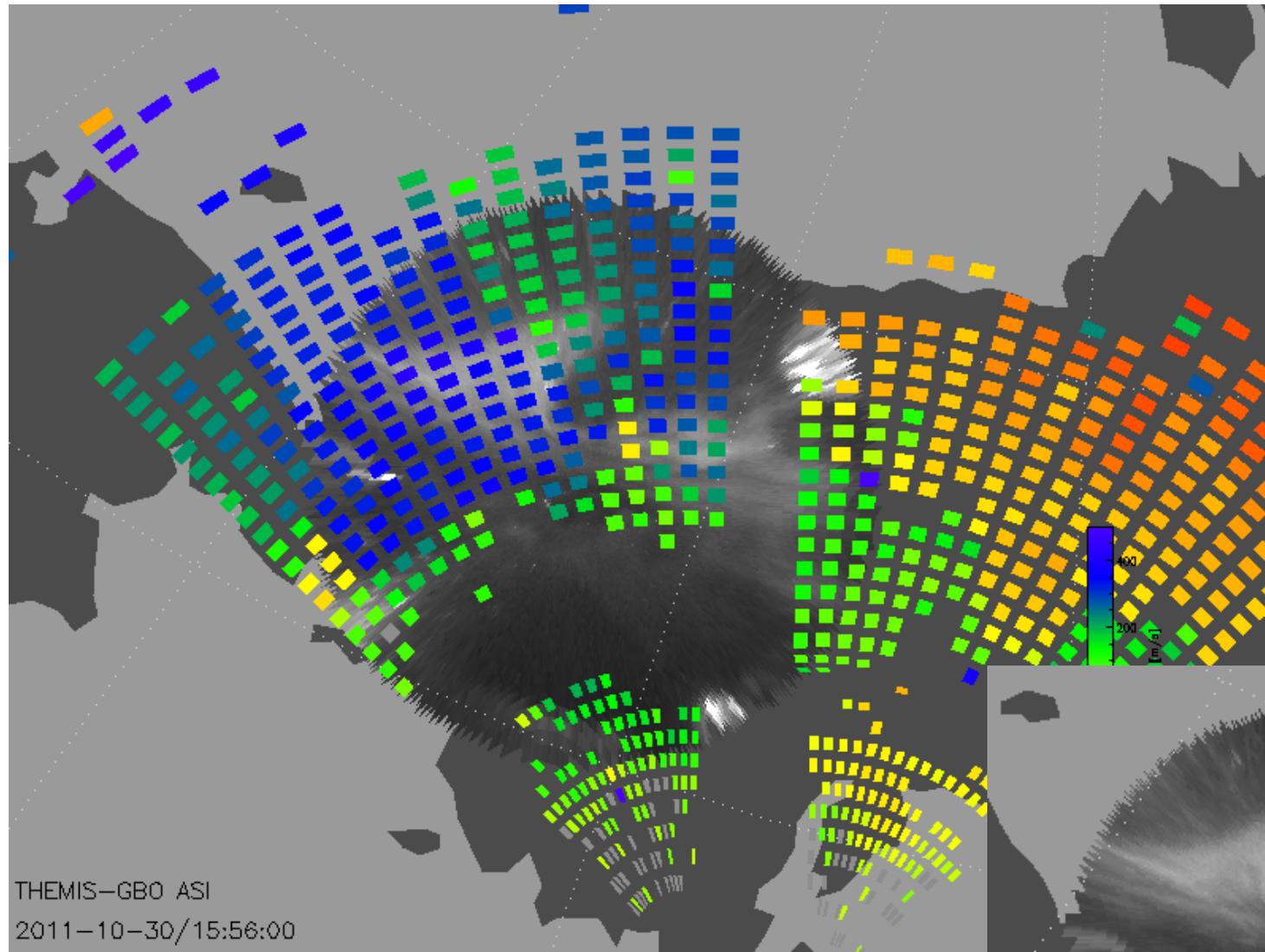












30/Oct/2011 15:54–15:56 UT

