

2015/09/14 1550-1610 @Nagoya U.

CT-TRIGモードによるPc5観測

長妻 努

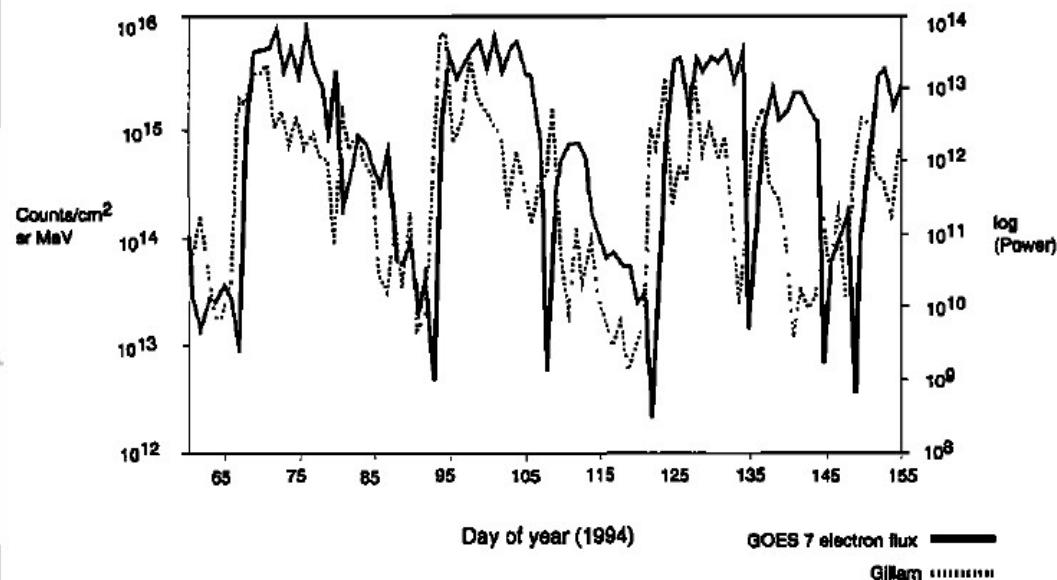
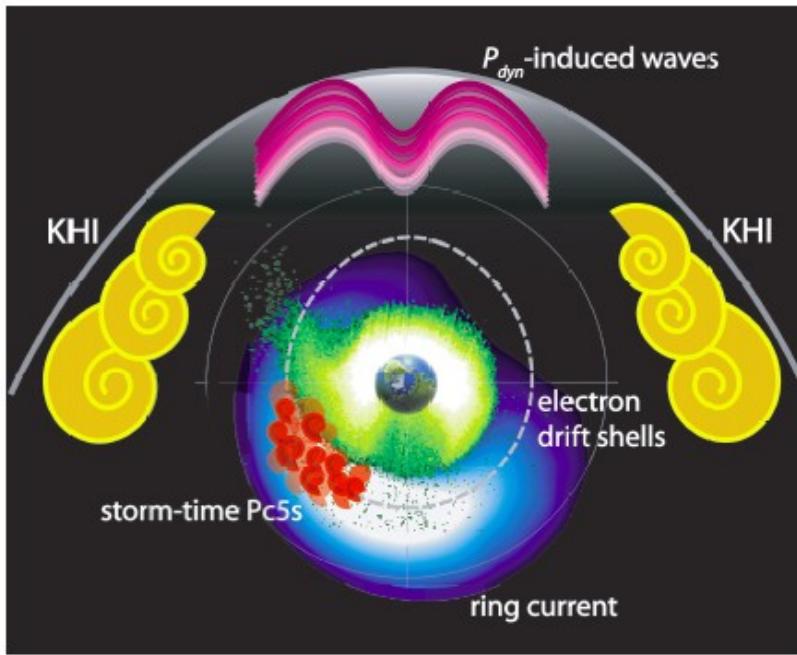
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宇宙環境インフォマティクス研究室

King Salmonの現状

- 観測はおおむね順調。運用上に大きな問題は起きていない。
- 2015/03/13-14にKing Salmonの保守を実施。アンテナ5,6,8,12にVSWRの異常があった。原因是、フィーダーの切斷、バランの故障等。交換によって正常値に戻る。
- アンテナ7については、8-9MHzレンジでのみVSWRの異常あり。点検したところ、エレメントの一番長いアンテナの碍子が破損していた。応急措置のみ実施。次回修理の必要あり。



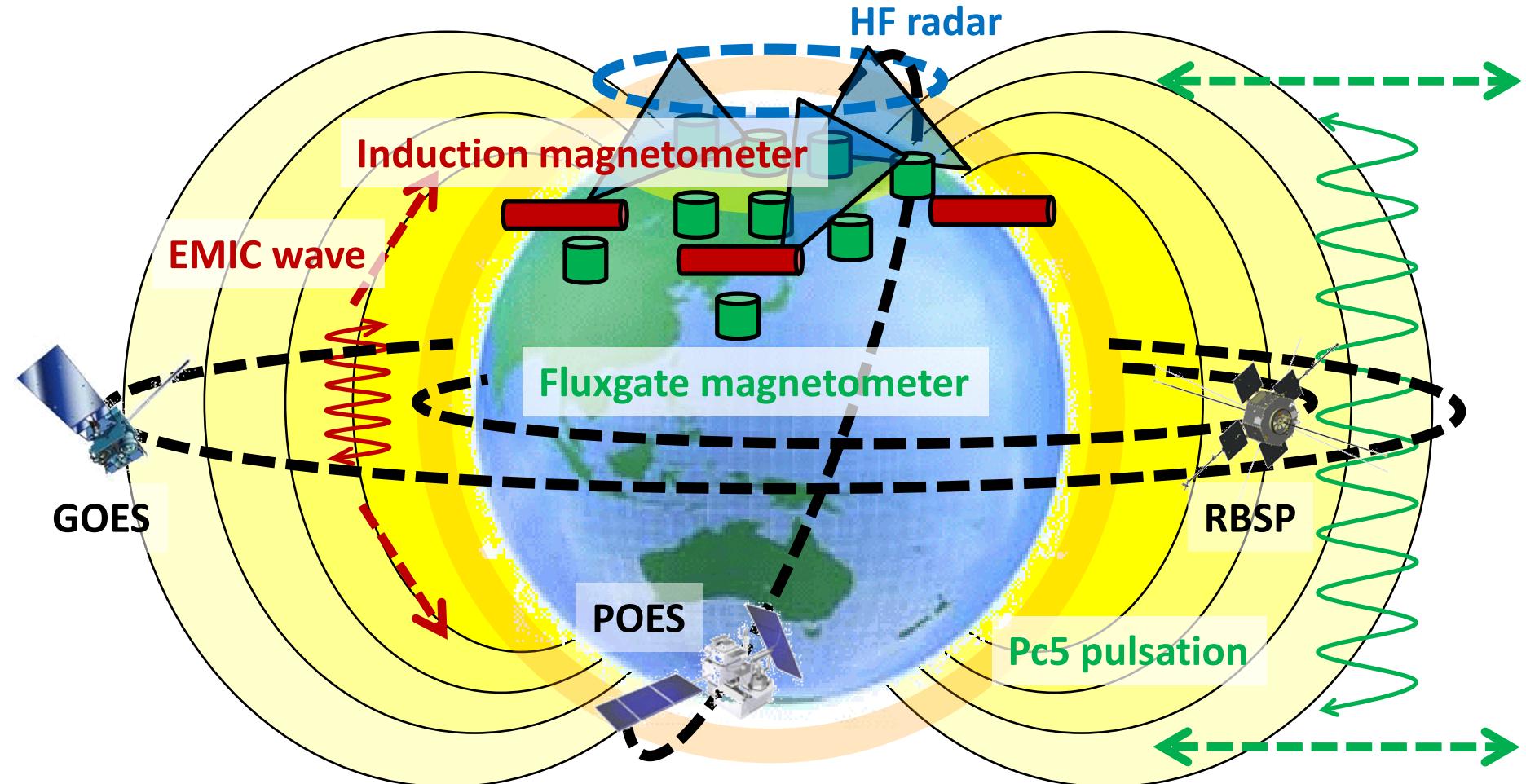
Introduction



[Rostoker et al., 1998]

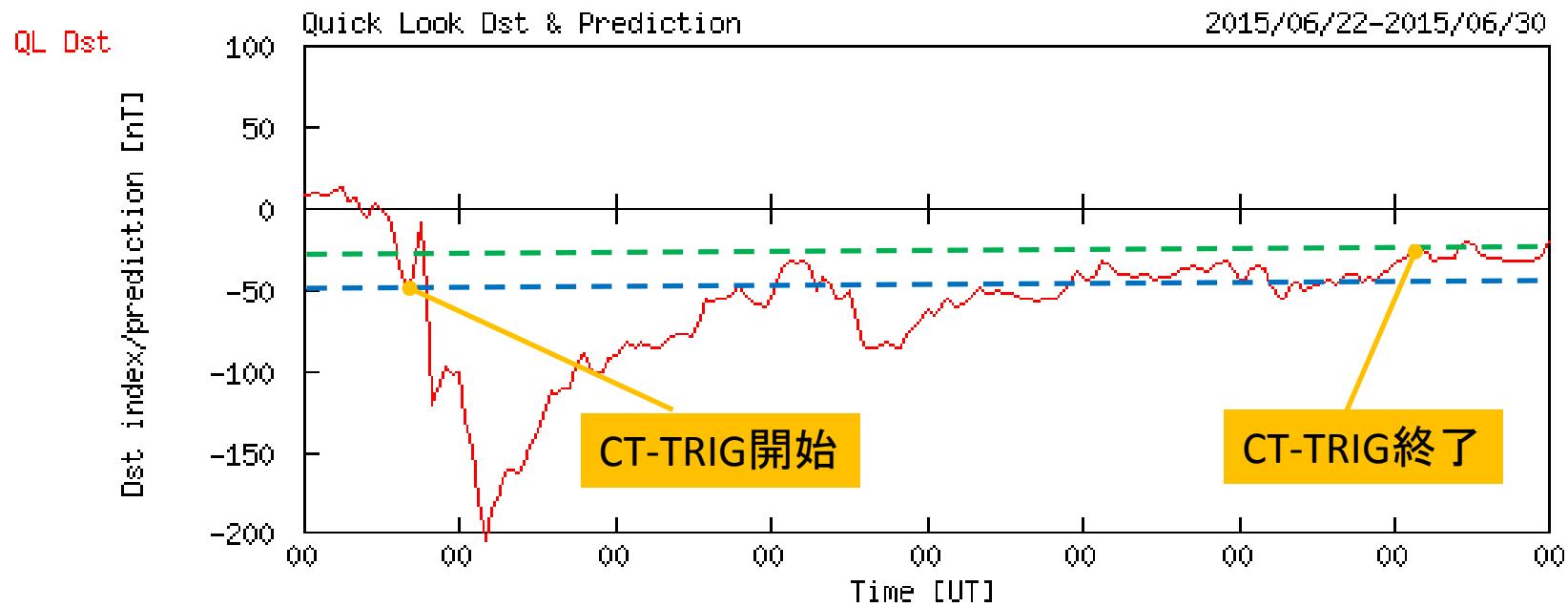
Fig. 1. Pc5 pulsations in the inner magnetosphere can be classified by their energy sources. The external pulsations are driven by solar wind variations at the day side magnetopause, while the internal pulsations are the result of low frequency instabilities of ring current ions.
[Ukhorskiy, et al., 2009]

Three dimensional monitoring networks based on ground-based and satellite-based observations



- Comprehensive understanding of Geospace environment
- Input of data-driven model / validation of model

CT-TRIG mode —地磁気嵐時の特別観測—



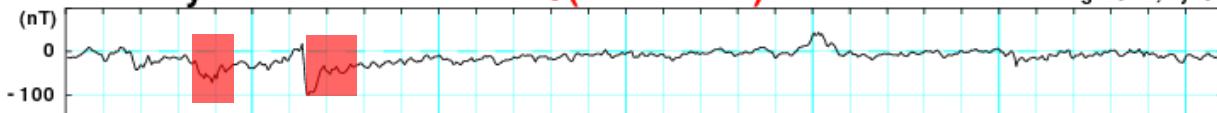
Dst指数-50nT以下でCT-TRIGモード開始。
Dst指数-30nT以上でCT-TRIGモード終了。

King Salmonでの実施状況

January 2015

Dst (Real-Time)

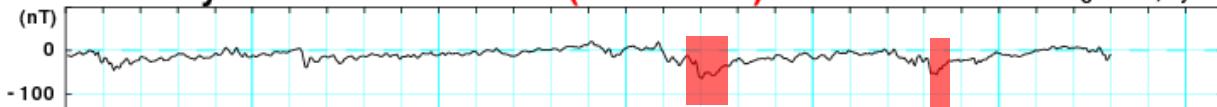
WDC for Geomagnetism, Kyoto



February 2015

Dst (Real-Time)

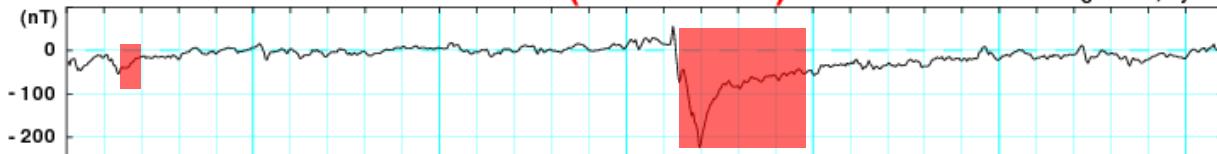
WDC for Geomagnetism, Kyoto



March 2015

Dst (Provisional)

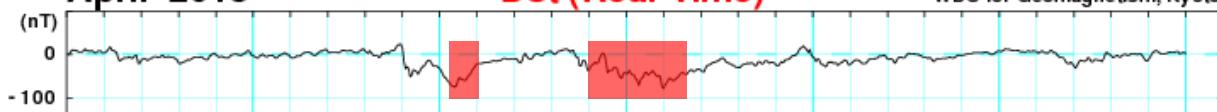
WDC for Geomagnetism, Kyoto



April 2015

Dst (Real-Time)

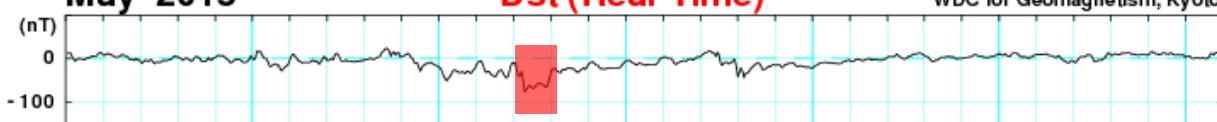
WDC for Geomagnetism, Kyoto



May 2015

Dst (Real-Time)

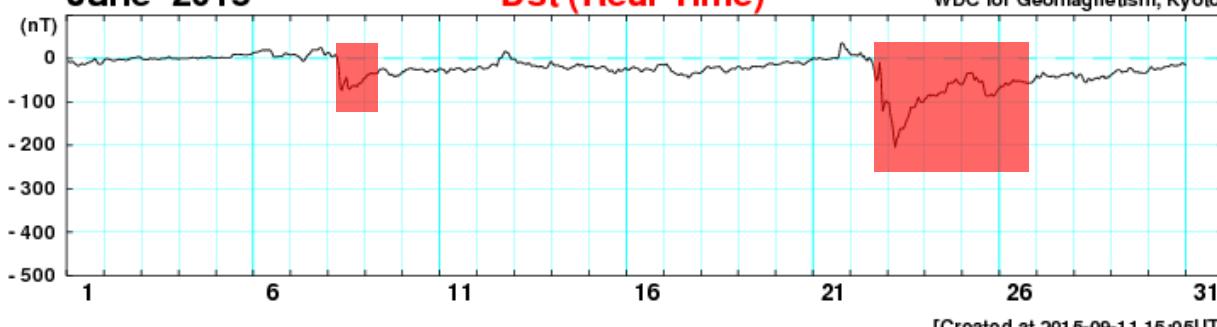
WDC for Geomagnetism, Kyoto



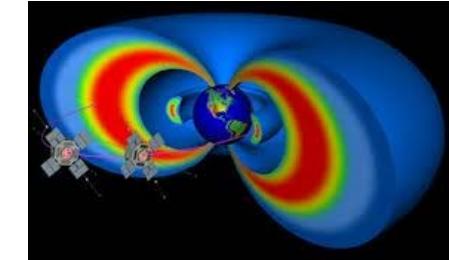
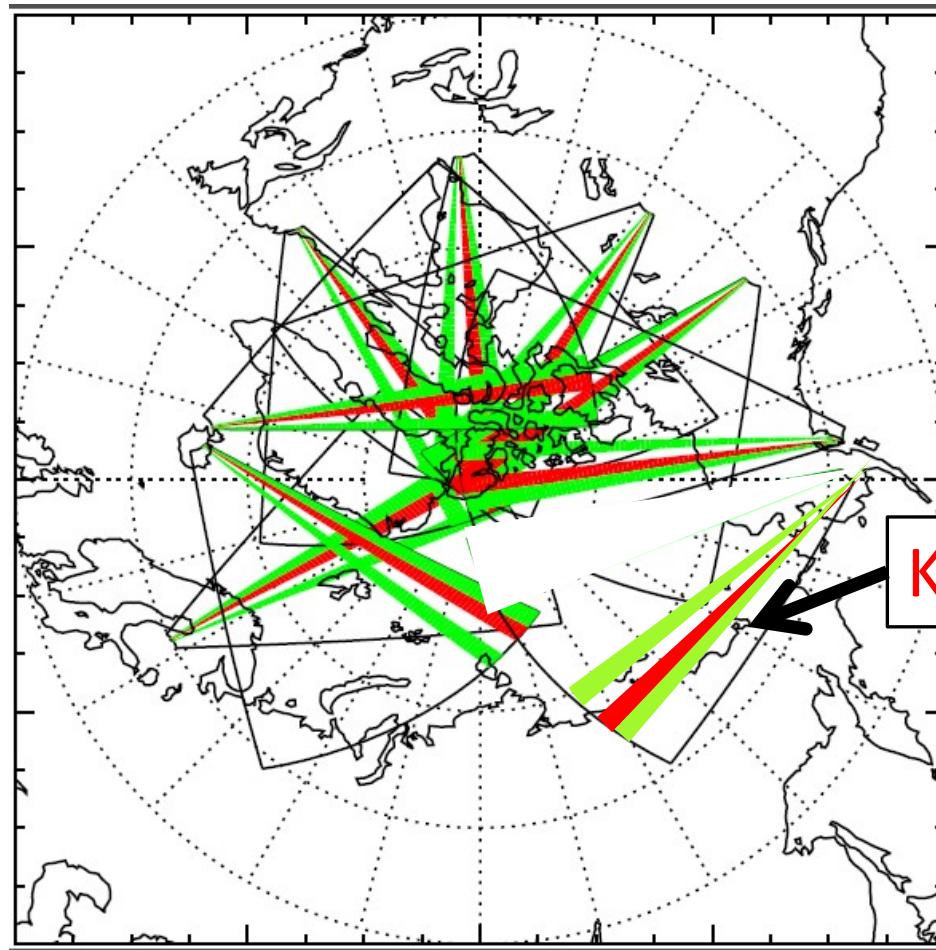
June 2015

Dst (Real-Time)

WDC for Geomagnetism, Kyoto



Camping beam orientations for CP-TRIG mode



更に
中緯度レーダーも！

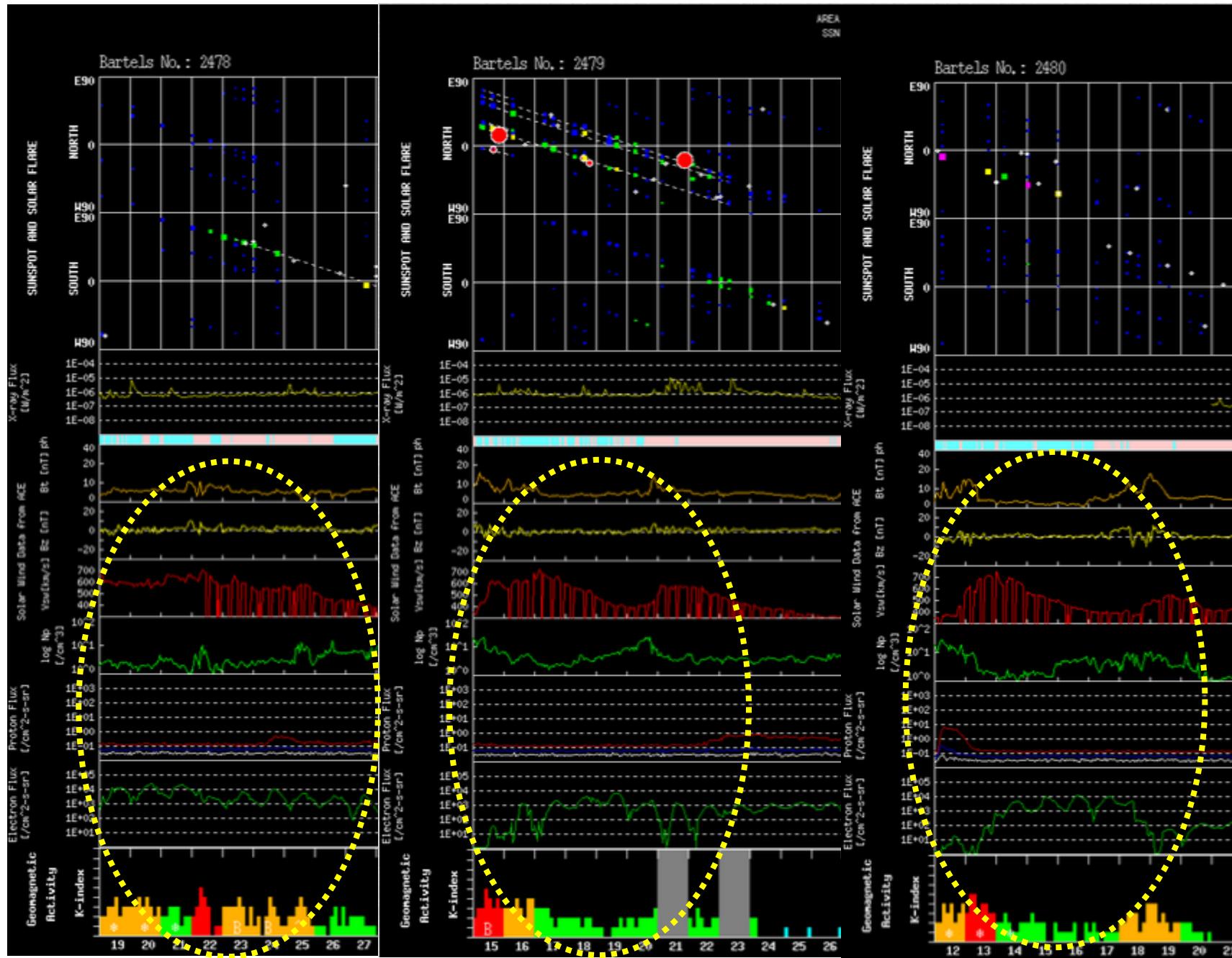
Pc5 pulsation by 3 camping beam (KSR uses 2, 3, 5)
and 2min. Full scan for background plasma convection

CT-TRIGの運用状況(北半球)

- 実施(割合はまちまち) 10
 - Adak East, Blackstone, Fort Hays East&West, Hokkaido East, Inuvik, Kapuskasing, King Salmon, Prince George, Rankin Inlet
- 全く運用せず 8
 - Adak West, Chirstmas Valley East&West, Goose Bay, Hankasalmi, Hokkaido West, Kodiak, Pikkivier
- (ERGの運用までには、実施率を向上させたい。そのためには、データ利用率の向上も重要。)

CT-TRIG Period

- 2015/03/17 0900 – 03/21 2300
- 2015/04/15 2100 – 04/16 1700
- 2015/05/16 0800 – 05/16 1600



Space Environment Data Acquisition Monitor (SEDA) onboard Himawari-8,9



Items	Description
Number of Channels	Protons : 8 (individual 8 sensor elements) Electrons : 8 (8 stacked plates in one elements)
Energy Range	Protons : 20 MeV – 100 MeV Electrons : 0.2 MeV – 5 MeV
Time Resolution	10 sec.
Field of View	Protons : ± 39.35 deg. Electrons : ± 78.3 deg.



- High-energy particle environment over Japanese sector will be monitored by SEDA.
- Near-real time SEDA data is provided from JMA to NICT. We will provide SEDA data as part of space weather information.

Longitude: ~140 deg.

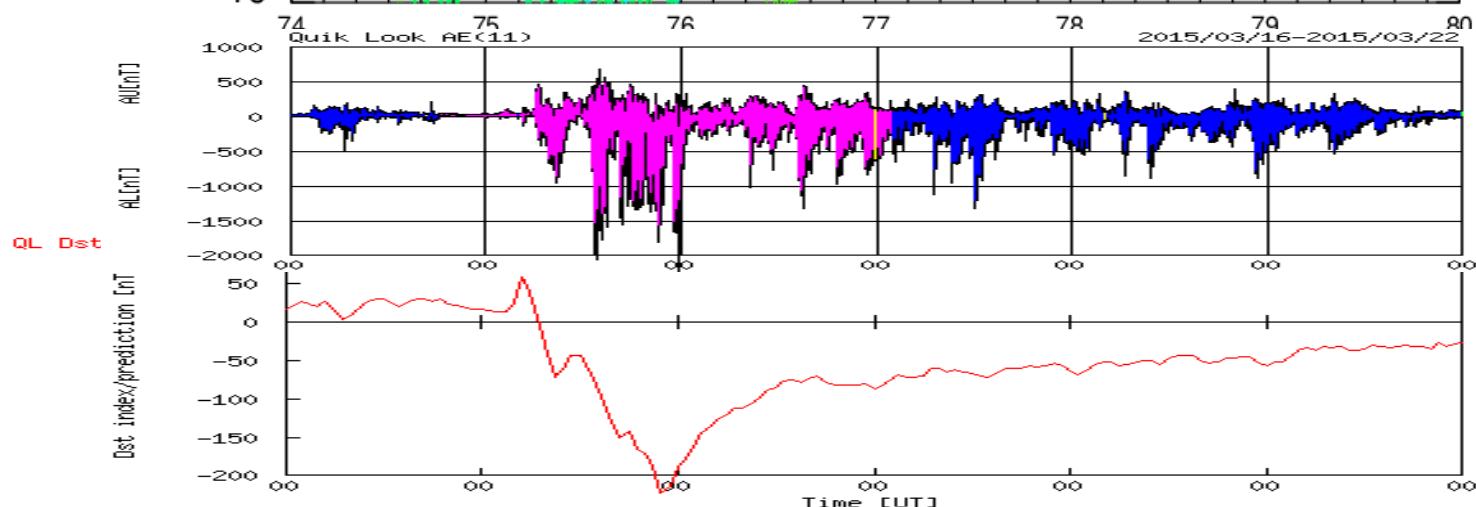
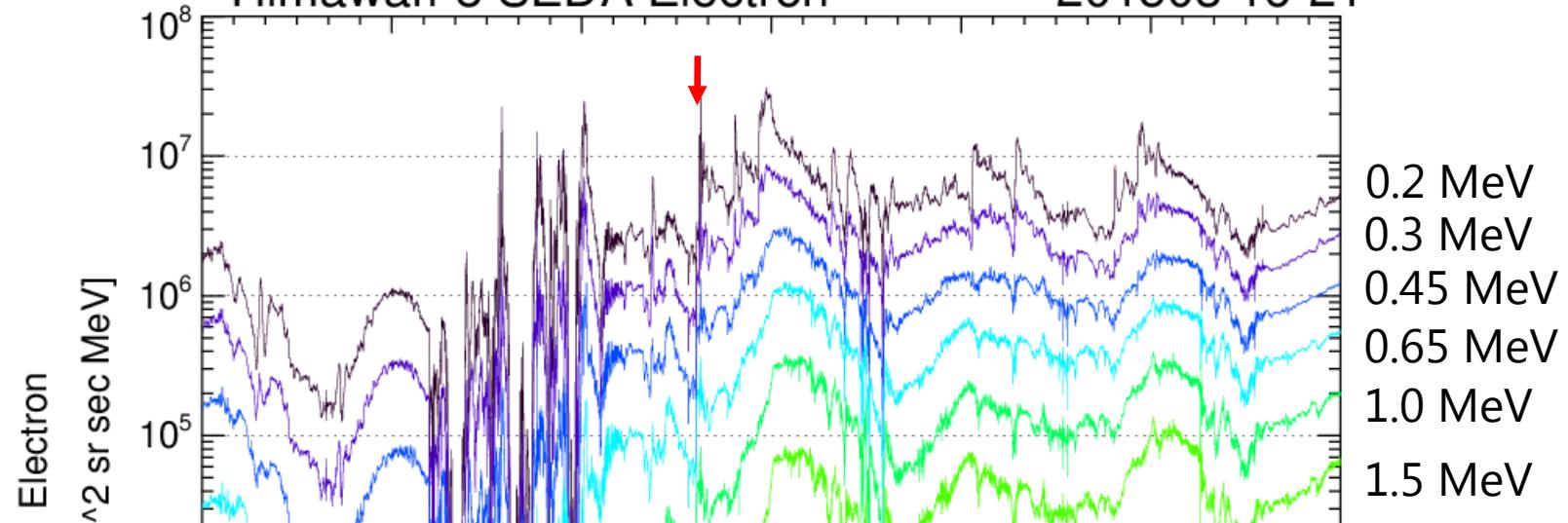
Himawari-8 Launch: 2014/10/07

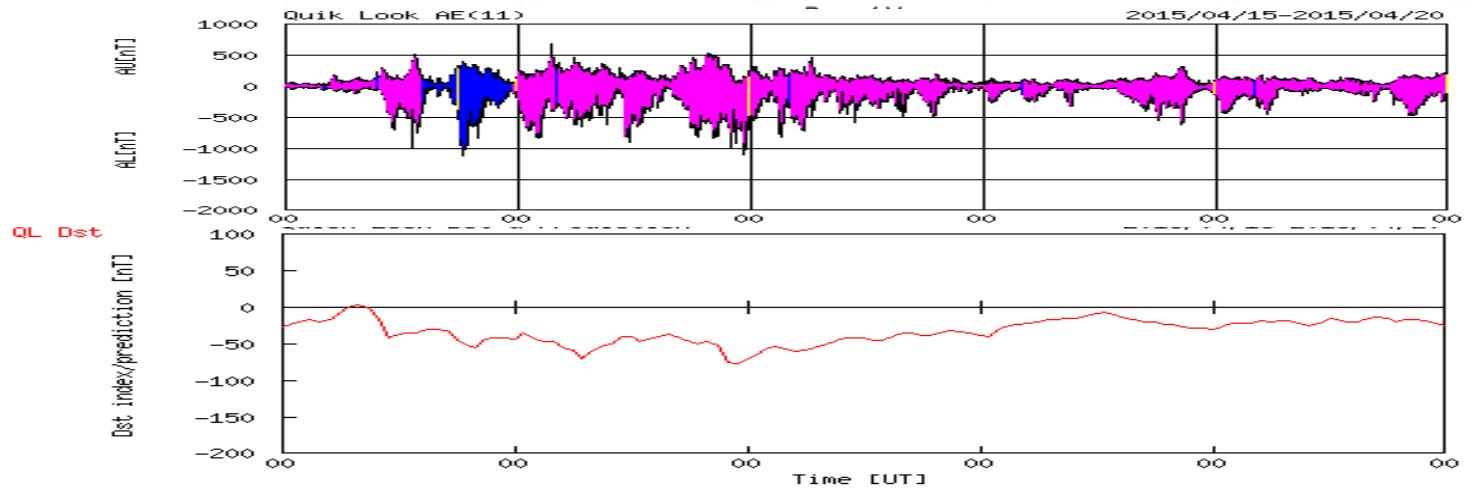
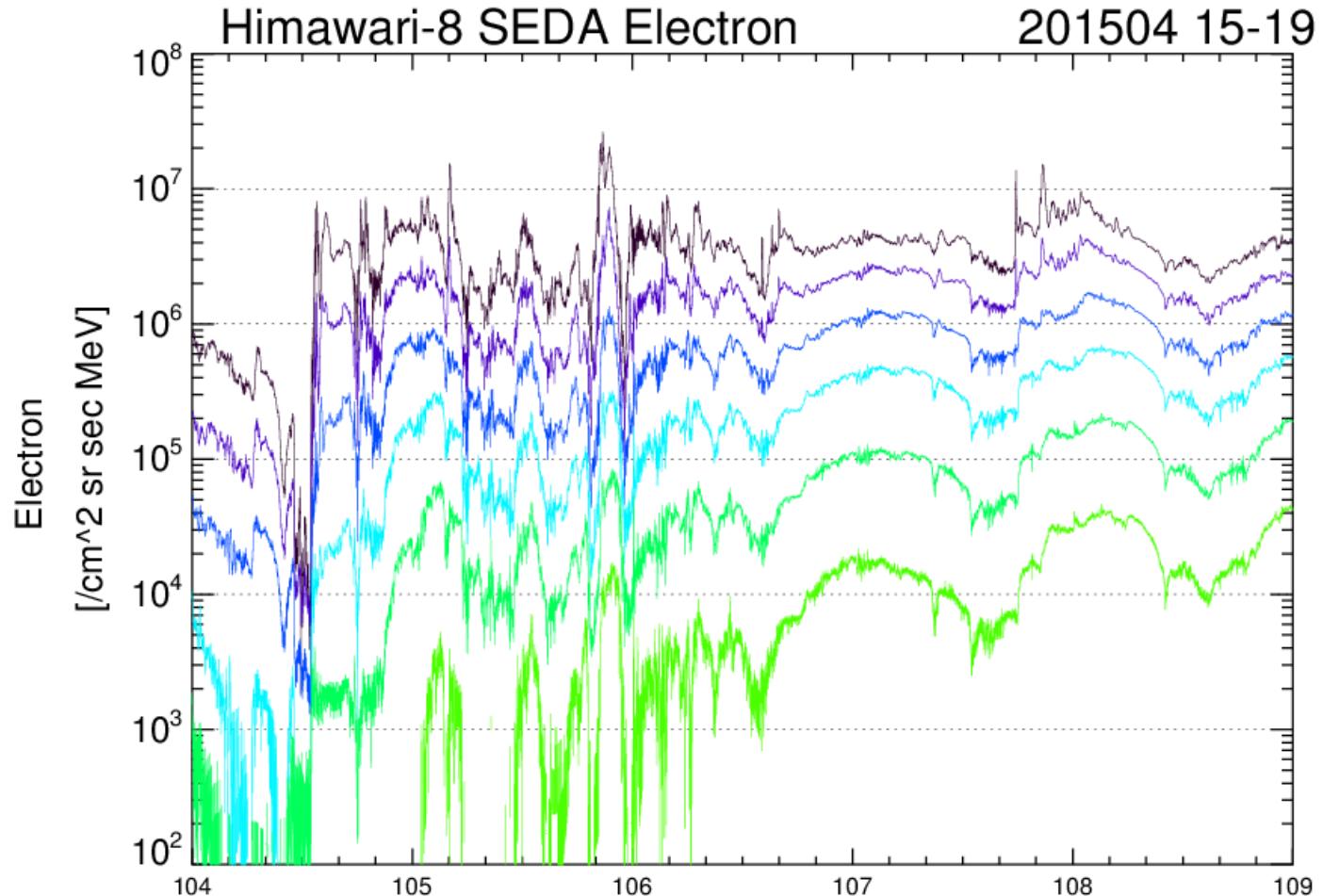
Himawari-9 Launch: 2016

SEDA data is available from Nov. 03, 2014.

Himawari-8 SEDA Electron

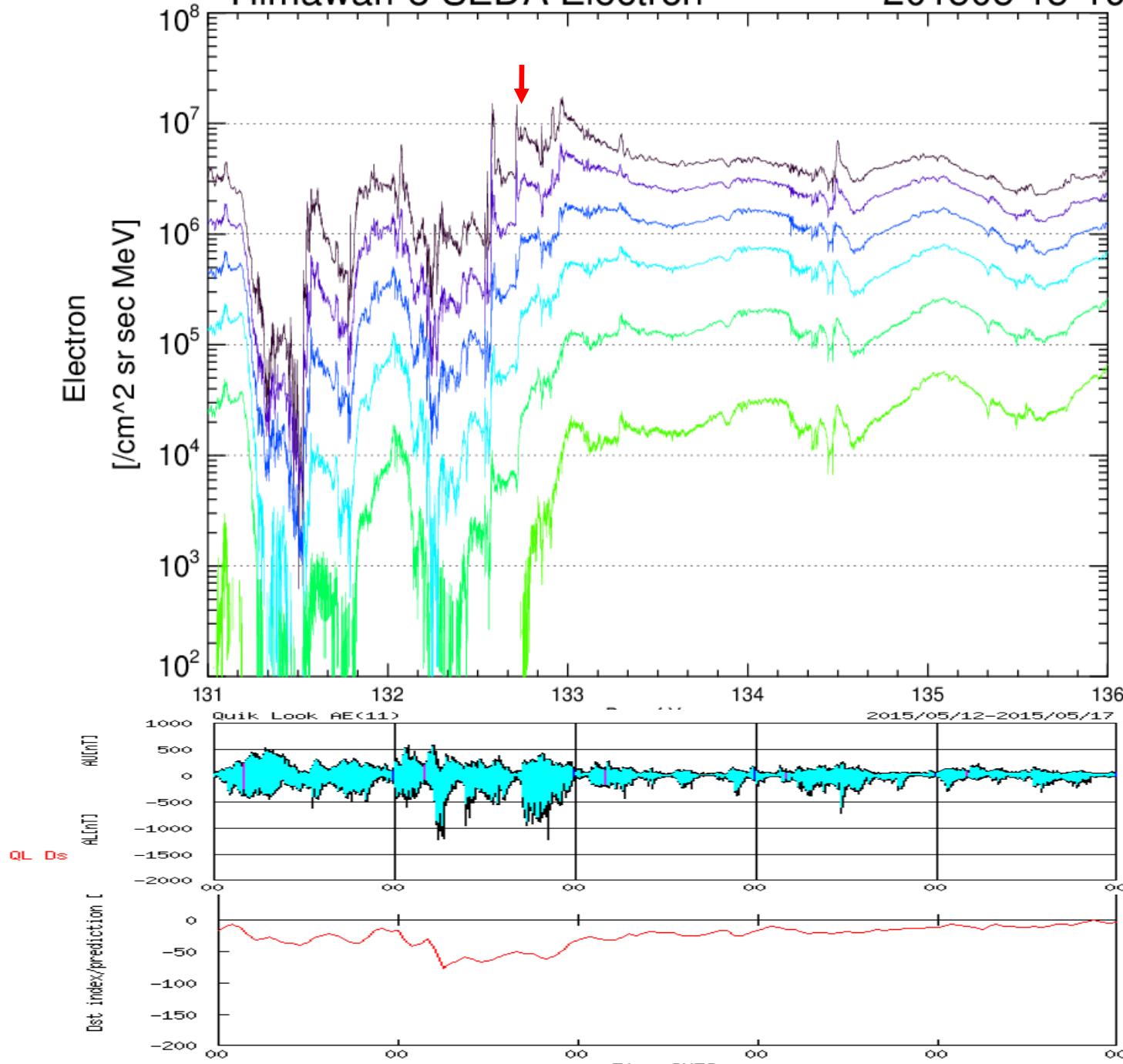
201503 16-21





Himawari-8 SEDA Electron

201505 15-19



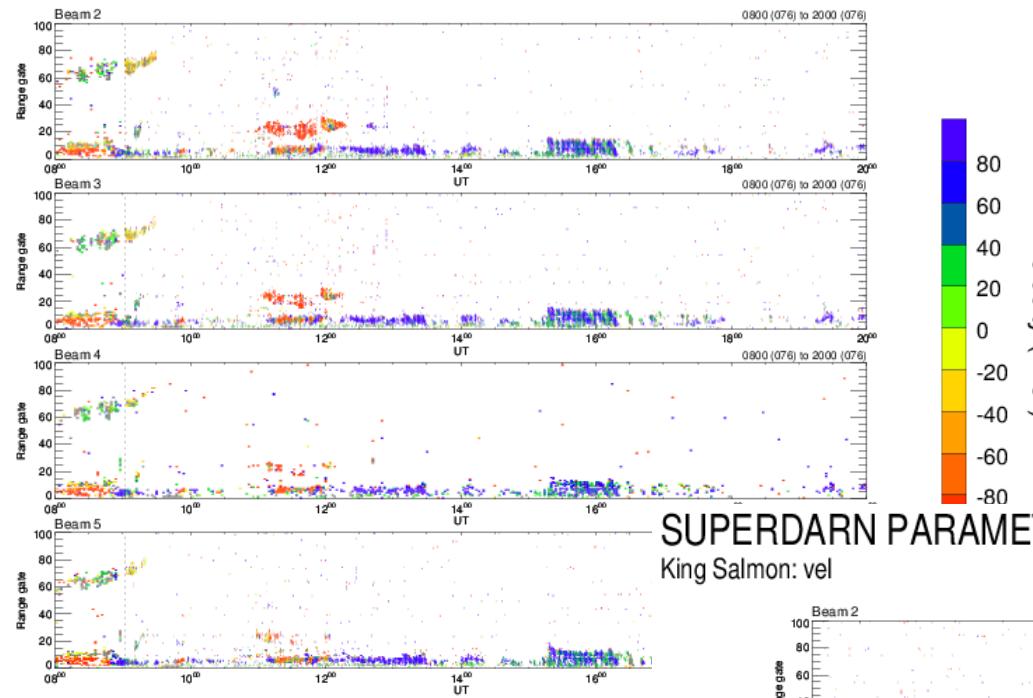
SUPERDARN PARAMETER PLOT

King Salmon: vel

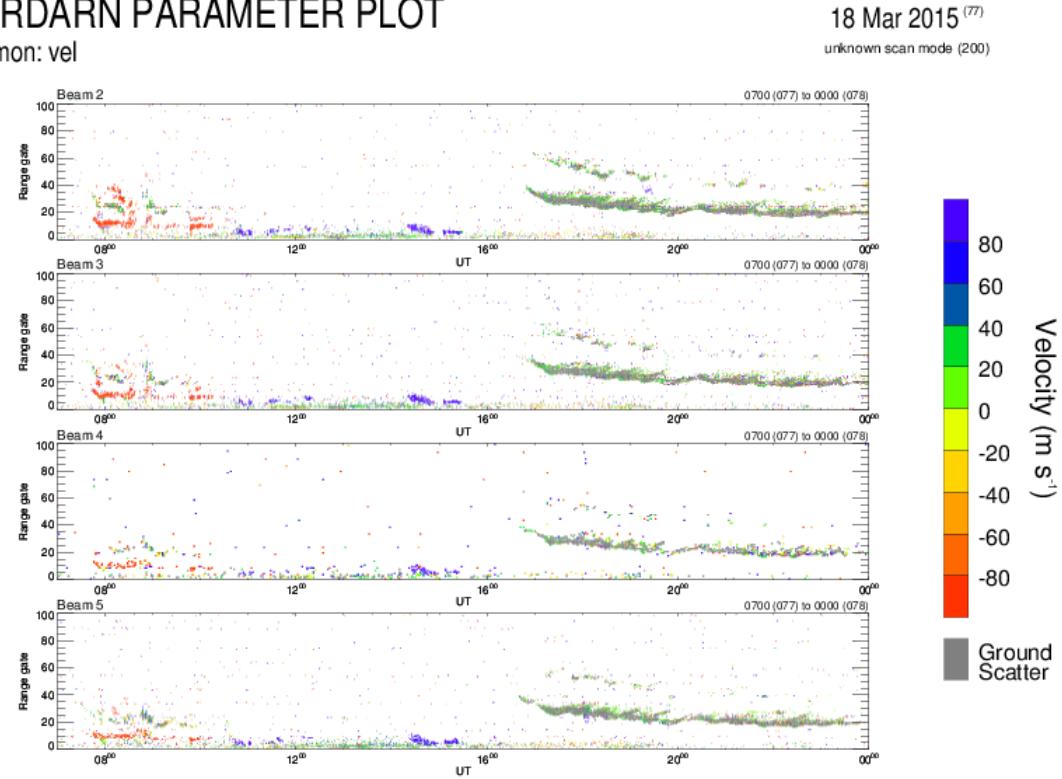
17 Mar 2015⁽⁷⁶⁾

unknown scan mode (3300)

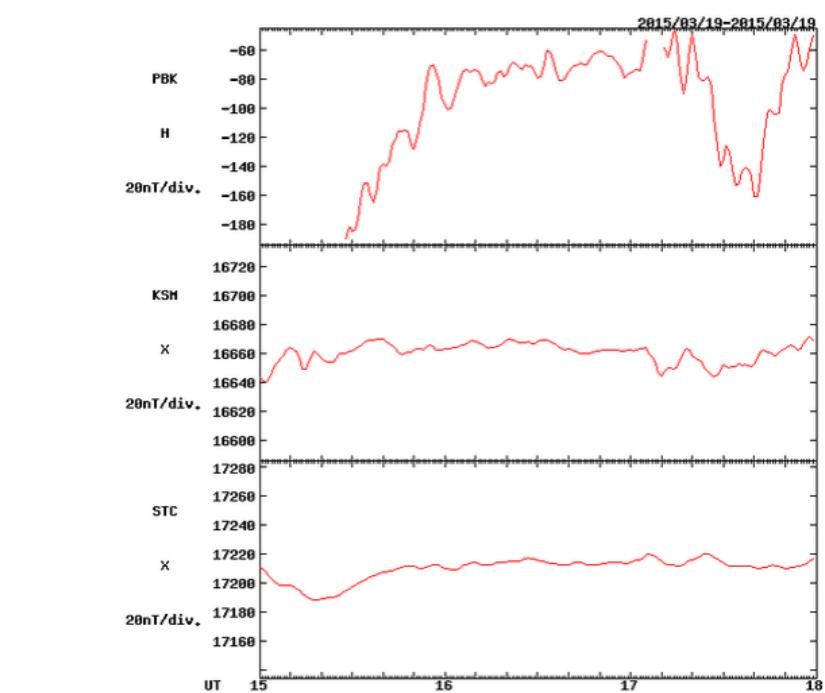
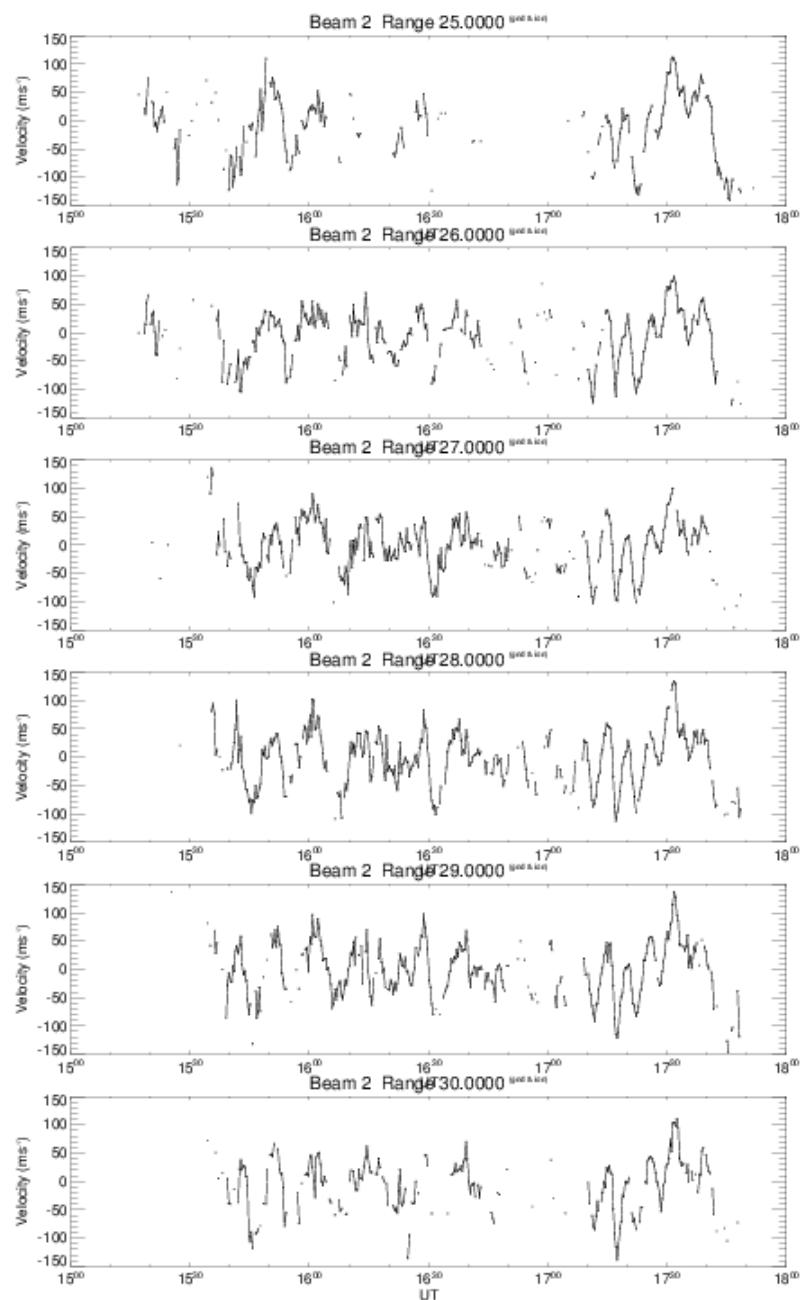
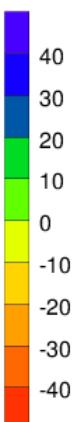
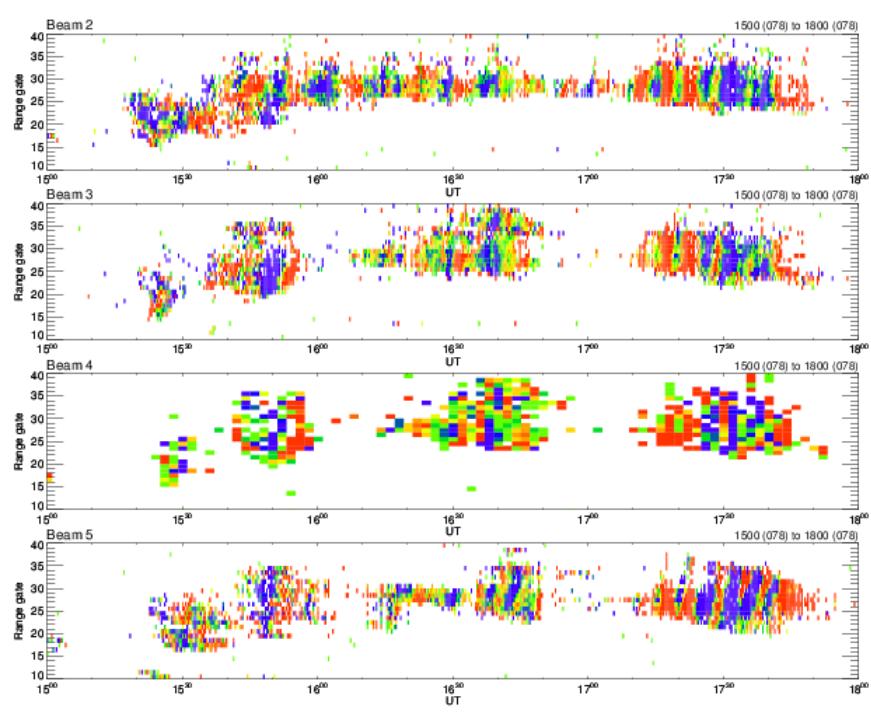
2015/03/17-18



Few effective echoes
during storm main
phase!



2015/03/19

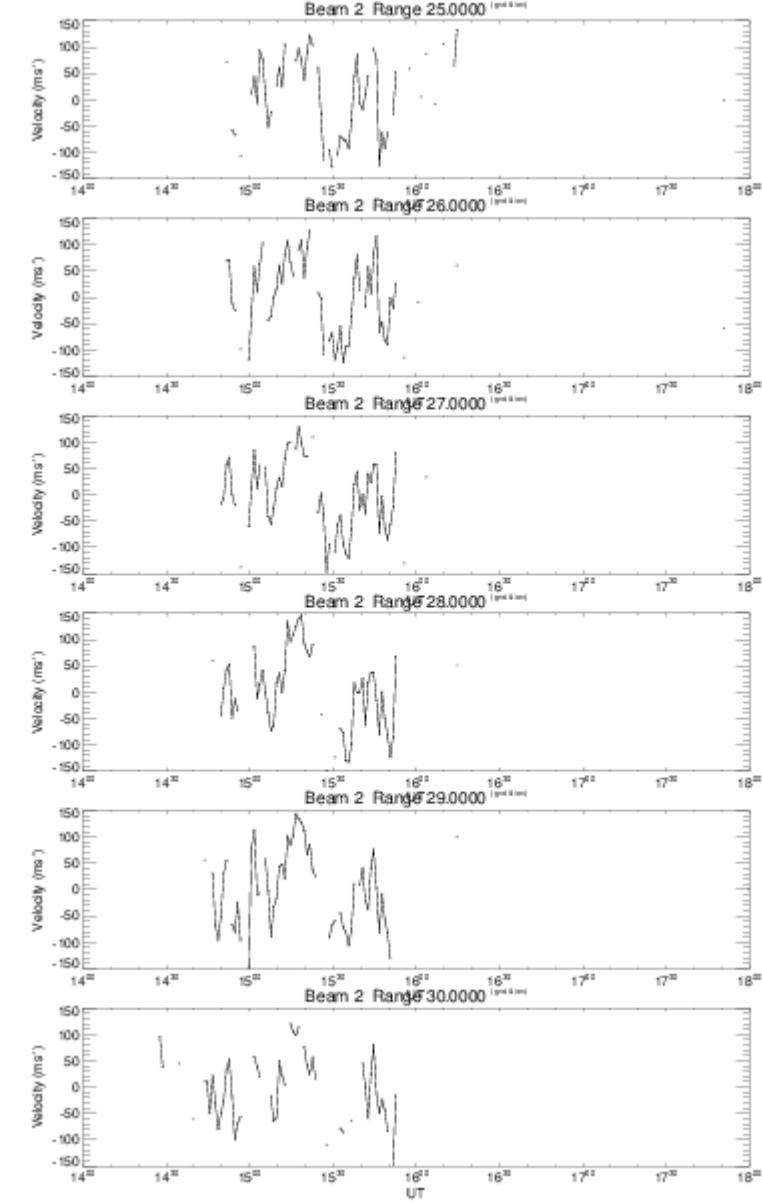
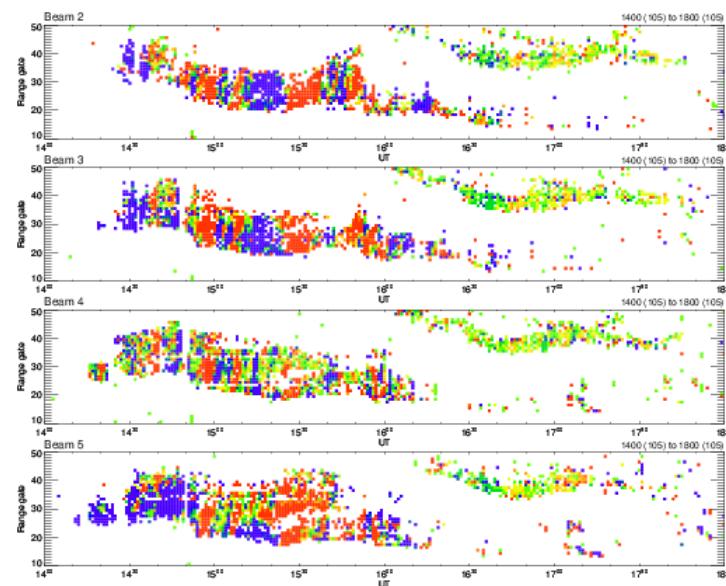
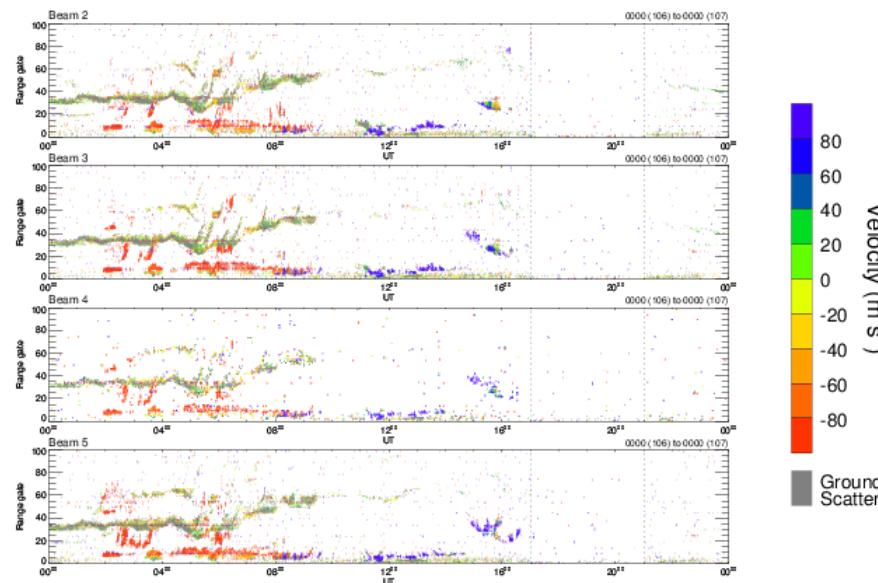


SUPERDARN PARAMETER PLOT

King Salmon: vel

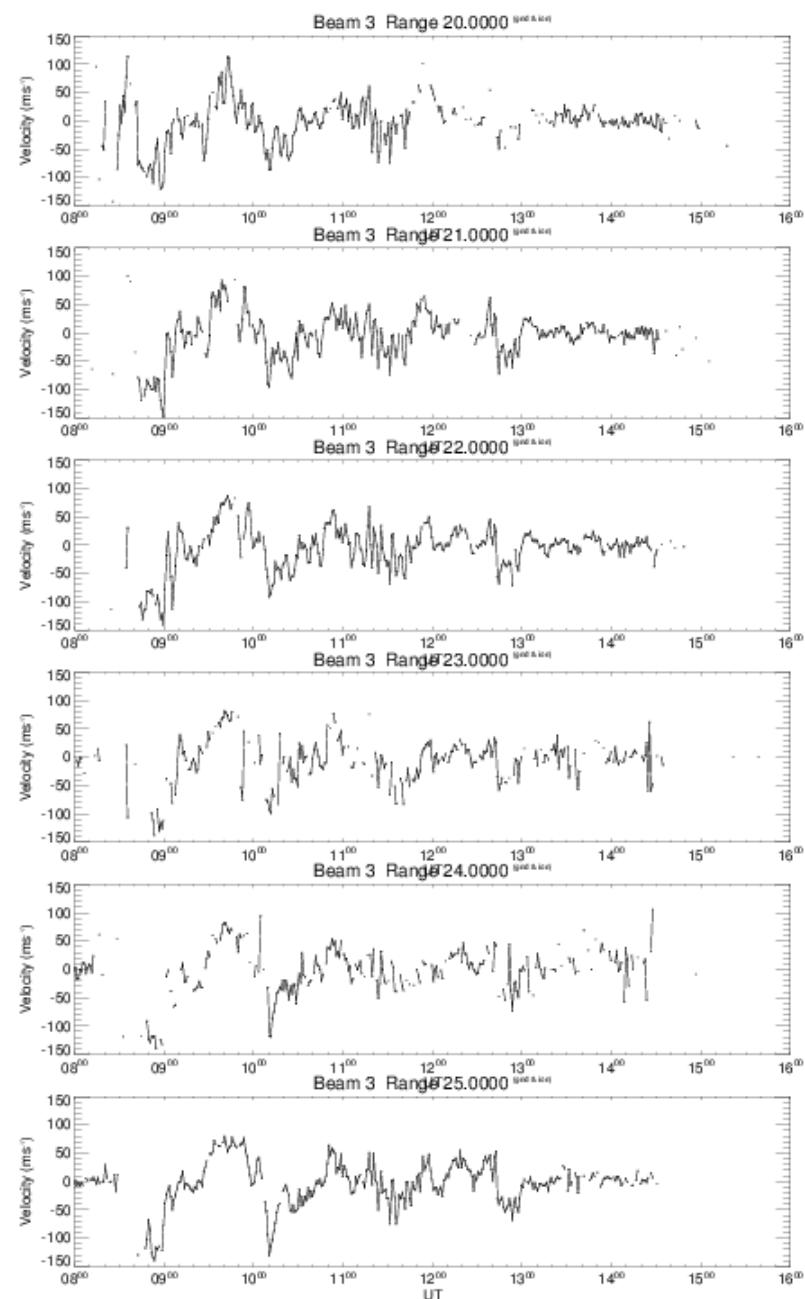
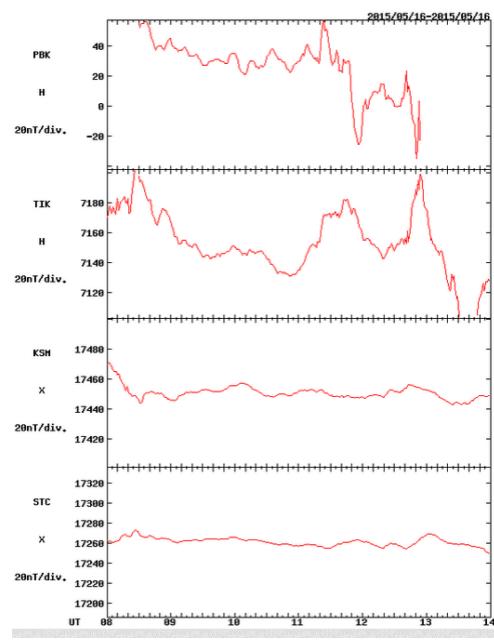
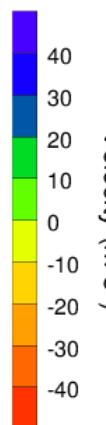
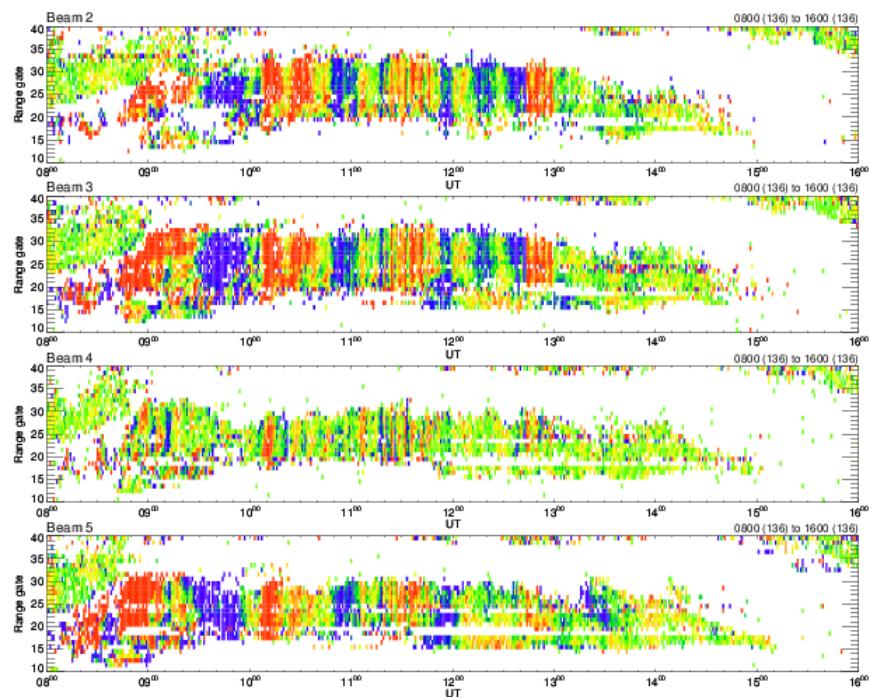
16 Apr 2015 (106)
unknown scan mode (200)

2015/04/15-16



This is not a 'CT-TRIG' period.

2015/05/16



まとめ

- CT-TRIGモード運用の実施率は北半球で半分程度なので、もう少し向上させる必要有。
- CT-TRIG モードは地磁気嵐の主相よりも回復相で Pc5の活動度を良く捕らえている。
- 現状のCT-TRIG モードは、弱い地磁気嵐を十分にキャプチャーできないので、高速太陽風に伴う放射線帯外帯電子の増加をミスする場合がある。→ 太陽風速度をトリガーにするべきか？