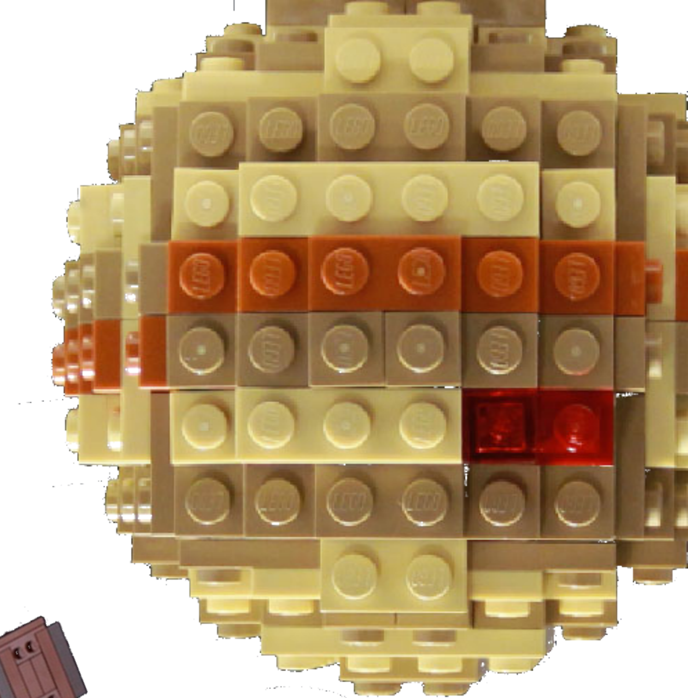
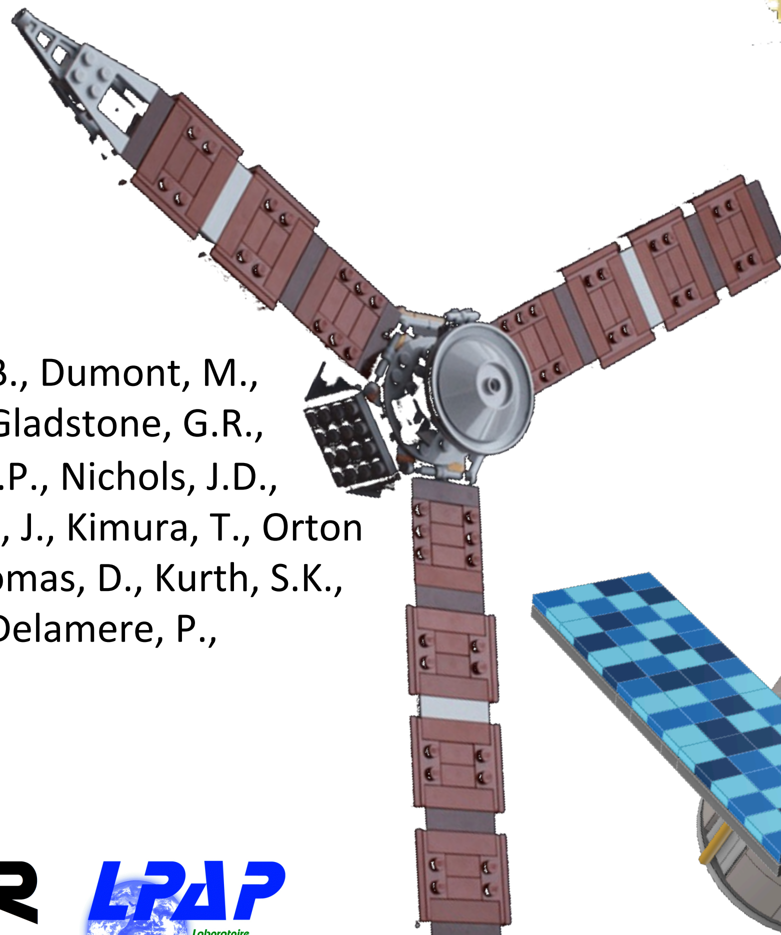
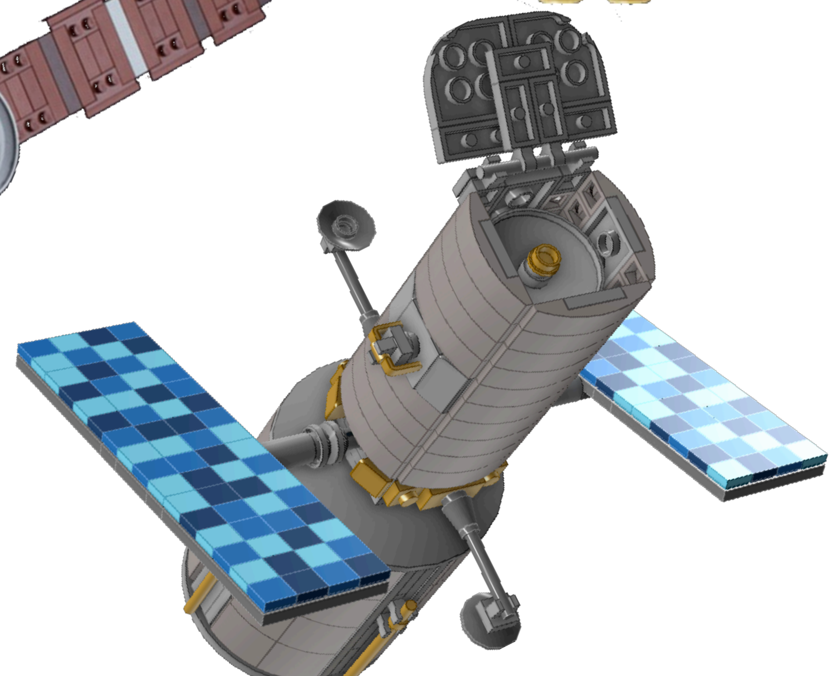
Jupiter’s mesmerizing auroral show (PJ13);

HST ultraviolet observations near and far from Juno perijoves





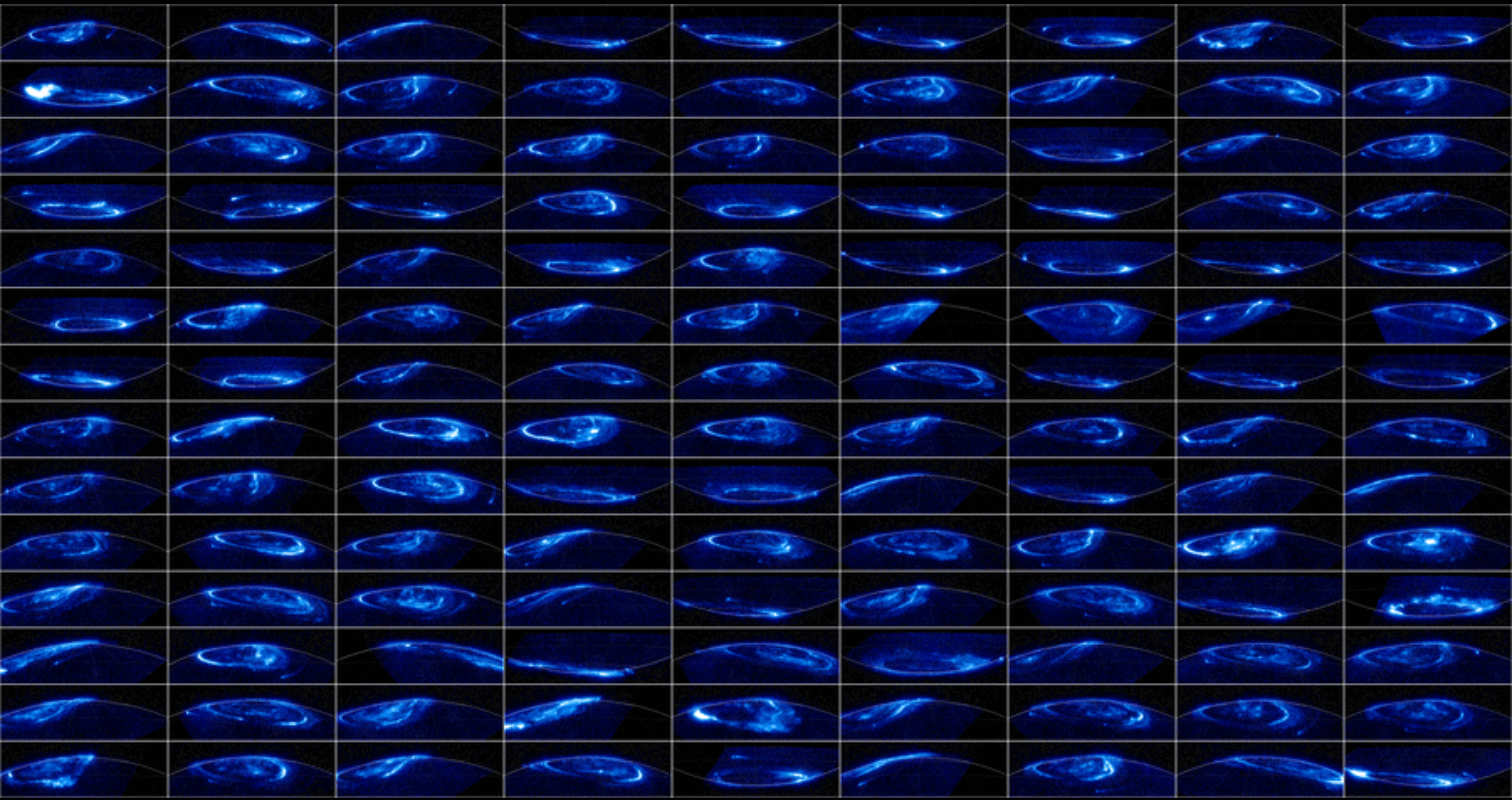


Denis GRODENT,
Zhonghua YAO,

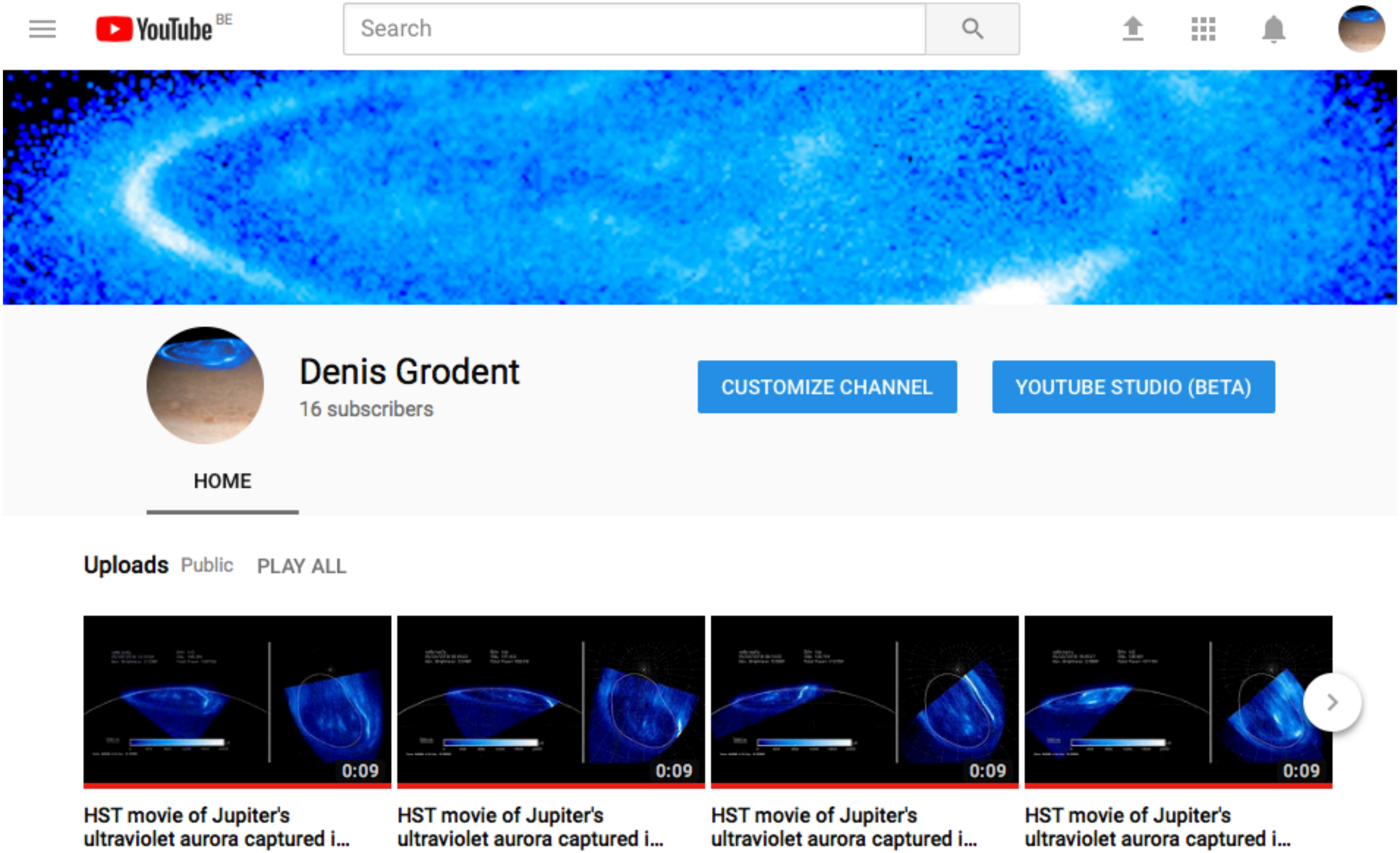
Bonfond, B., Palmaerts, B., Dumont, M., Gérard, J.C., Radioti, A., Gladstone, G.R., Mauk, B., Connerney, J.E.P., Nichols, J.D., Bunce, E.J., Roth, L., Saur, J., Kimura, T., Orton G.S., Badman, S.V., McComas, D., Kurth, S.K., Adriani, A., Valek, P.W., Delamere, P., Bagenal, F.

LIÈGE université STAR LPAP Laboratoire de Physique Atmosphérique & Planétaire

d.grodent@uliege.be – MOP 2018



126 movies HST GO 14634 Juno HST Campaign www.lpap.uliege.be/ ...


YouTube BE
Search
Denis Grodent
16 subscribers
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YOUTUBE STUDIO (BETA)
HOME
Uploads
Public
PLAY ALL
0:09
HST movie of Jupiter's ultraviolet aurora captured i...
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HST movie of Jupiter's ultraviolet aurora captured i...
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HST movie of Jupiter's ultraviolet aurora captured i...
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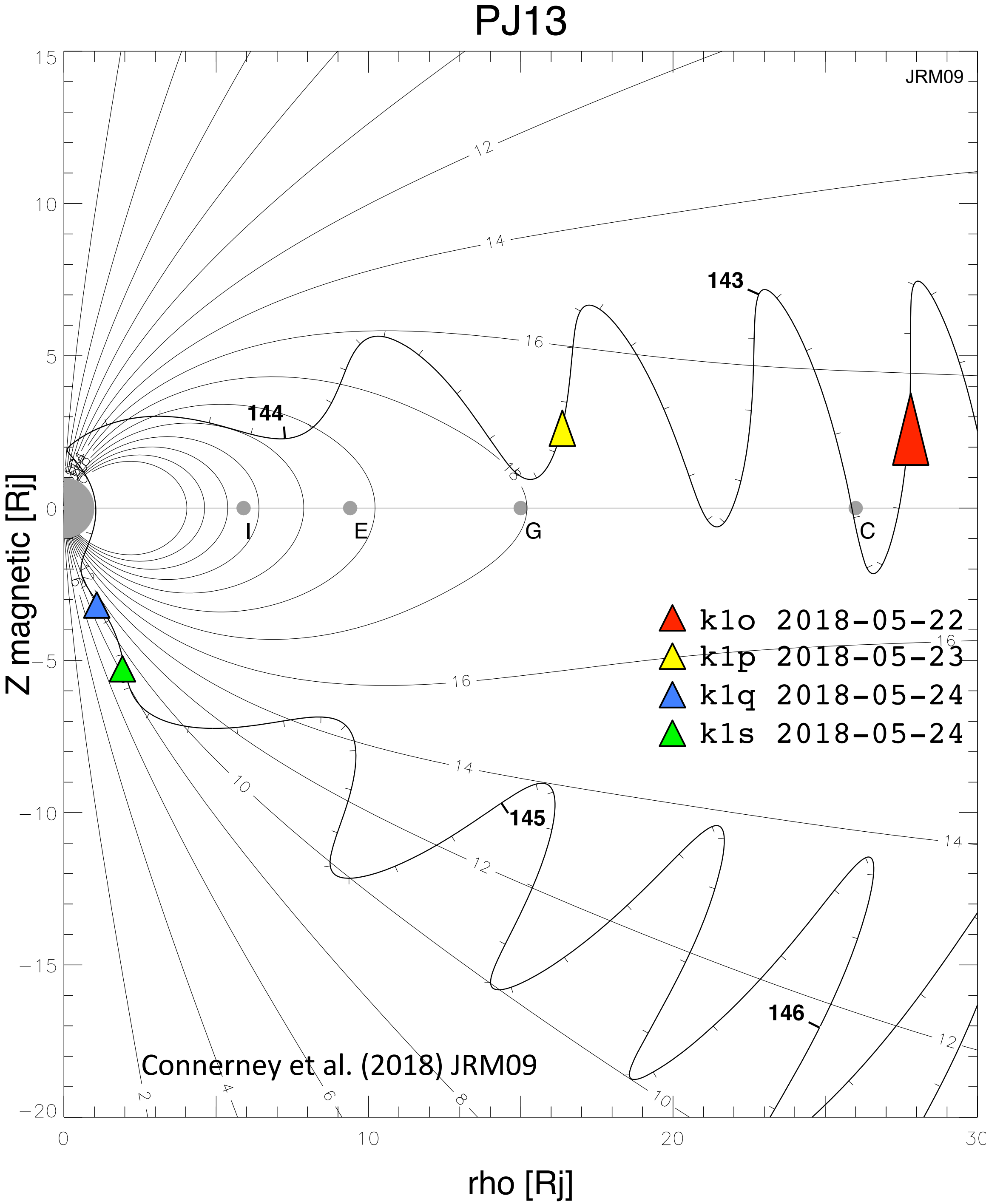
HST movie of Jupiter's ultraviolet aurora captured i...



HST GO-14634
STIS ttag
Jupiter North
fUV Aurora

PJ13

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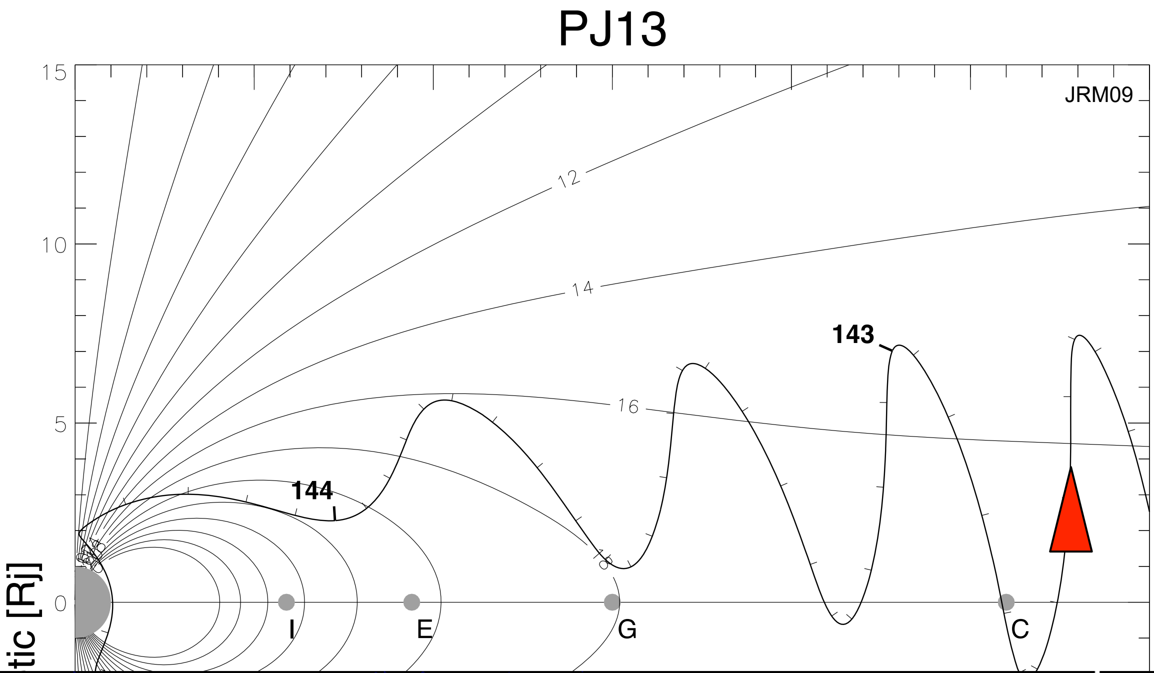
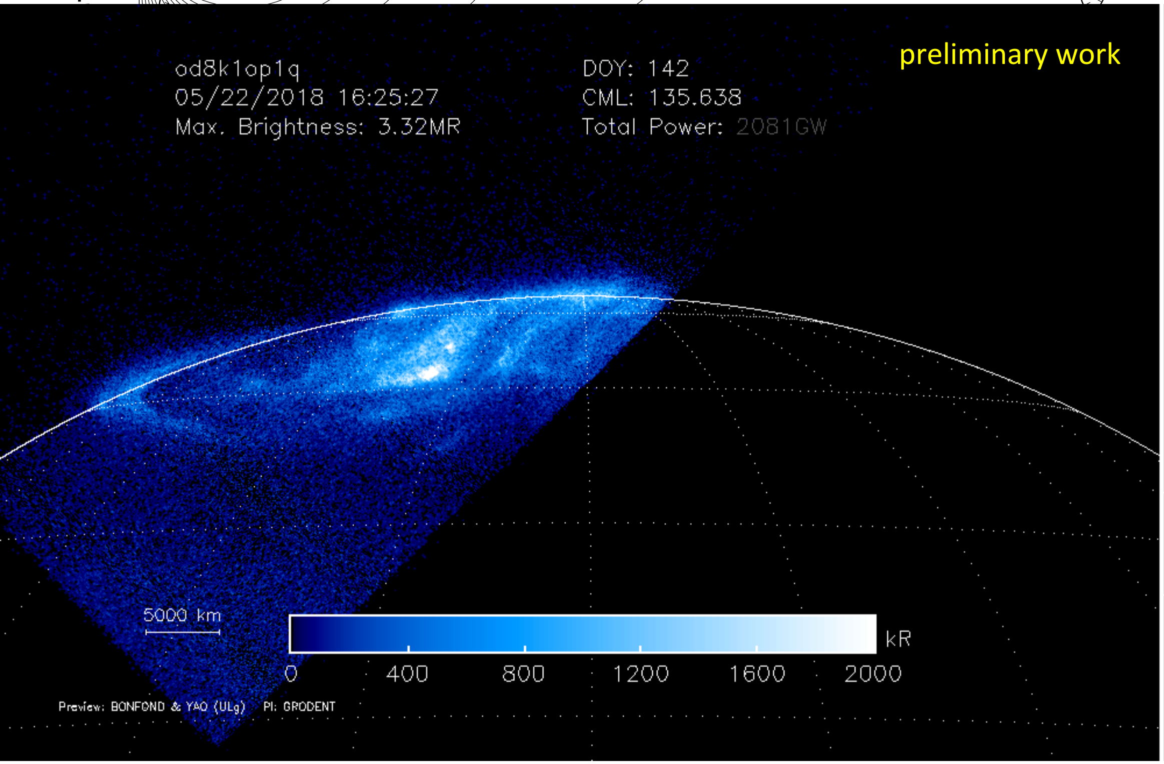
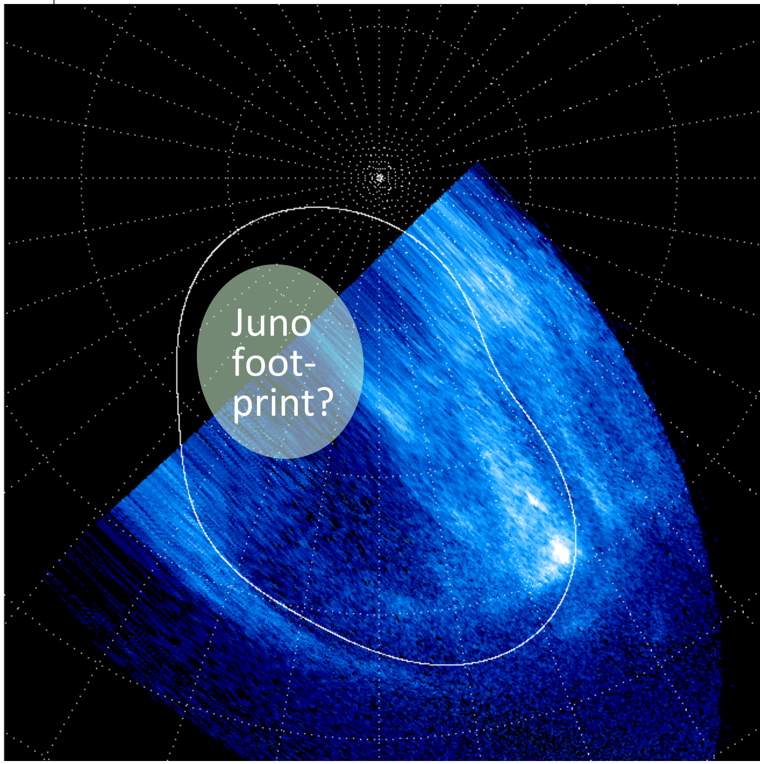
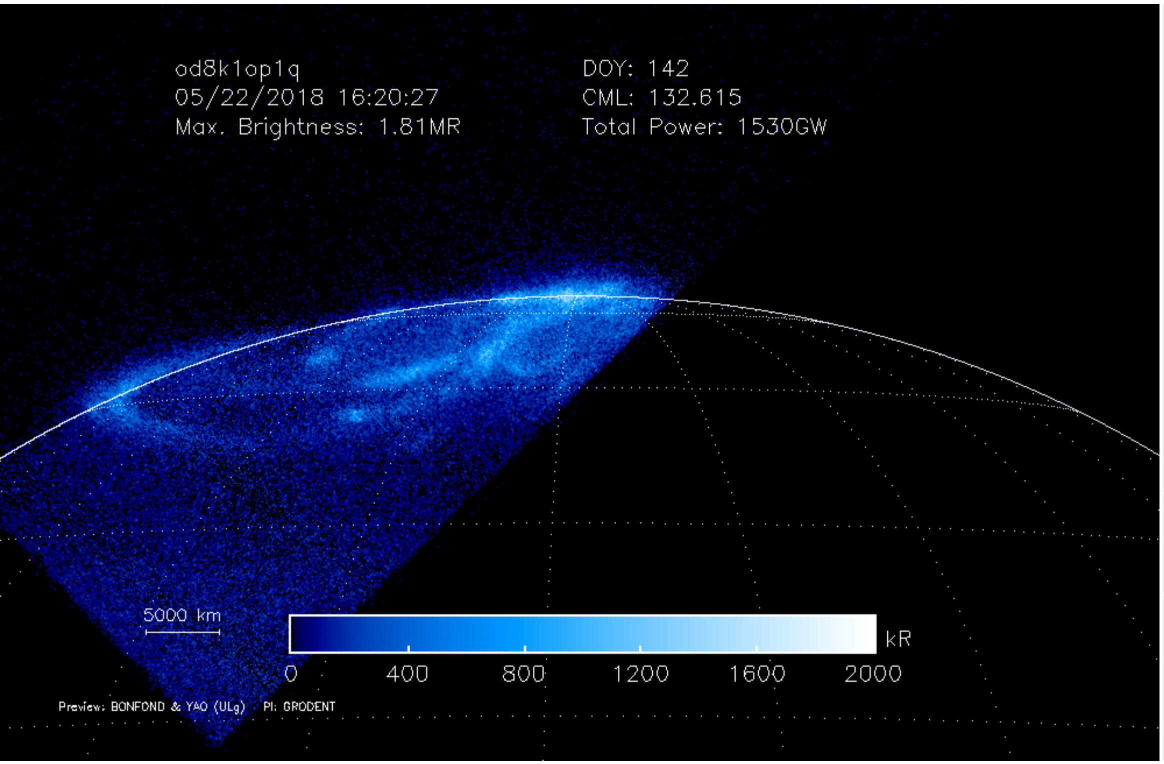


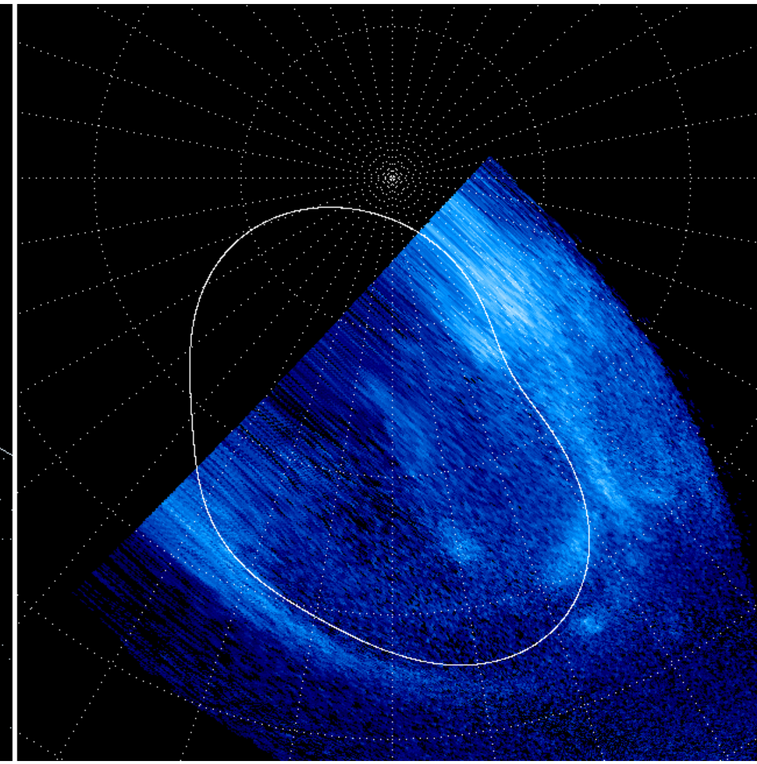
“QUIET” aurora

probably resulting from a long period (days?) of low SW activity









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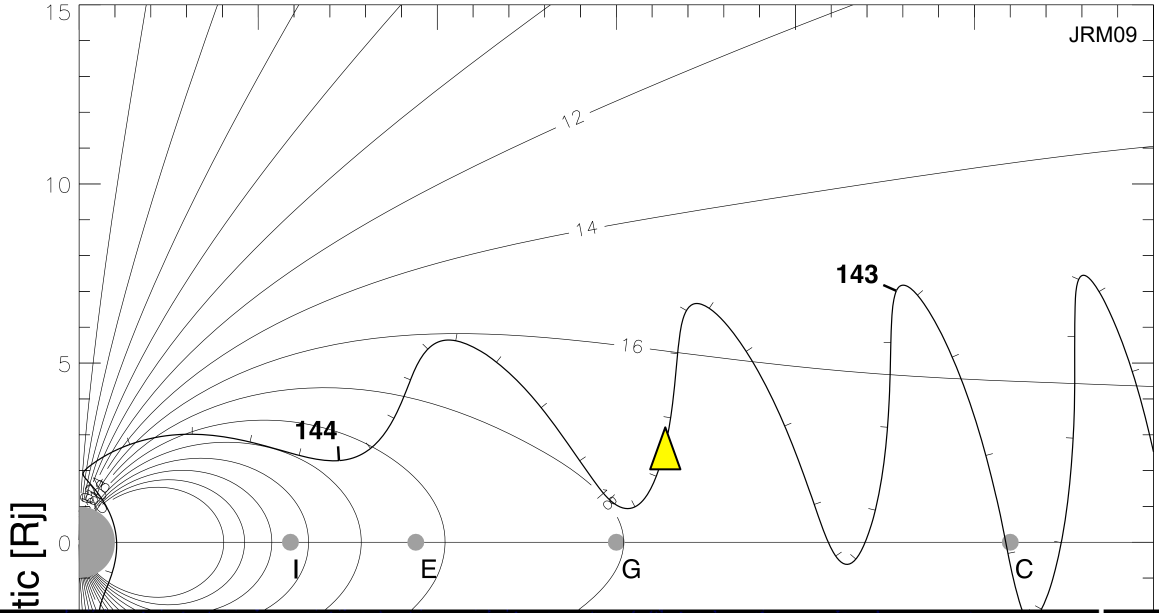
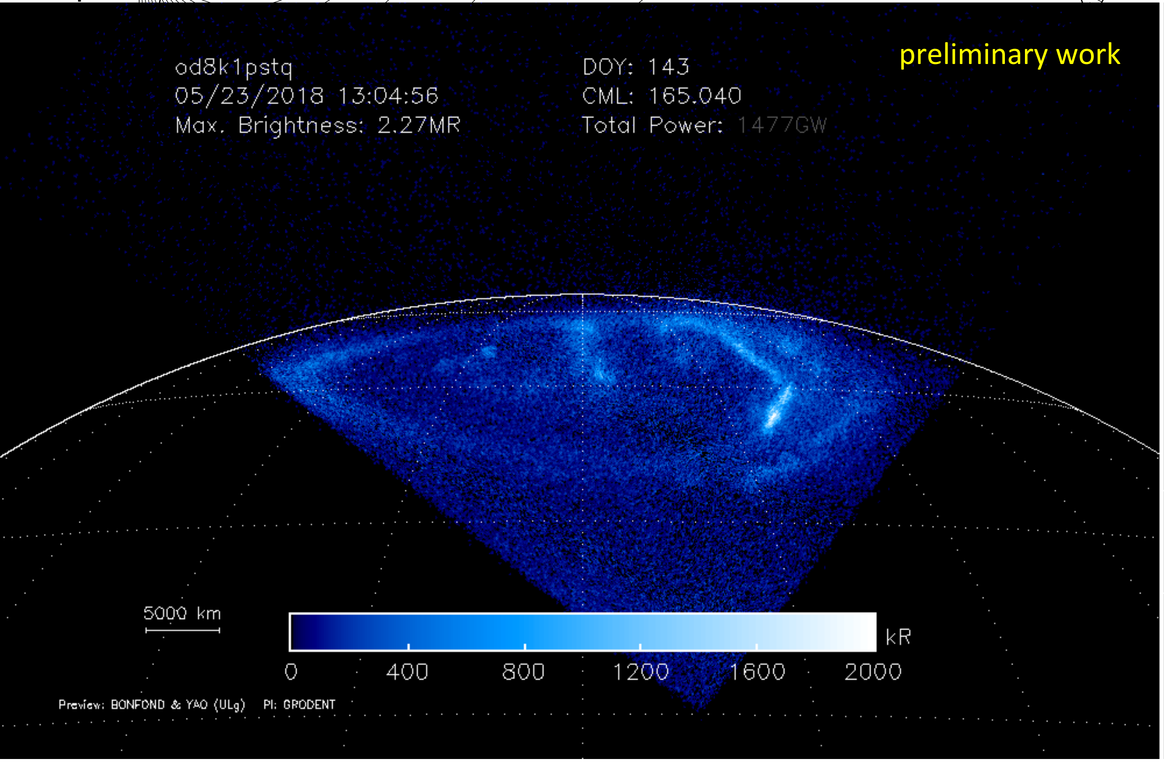
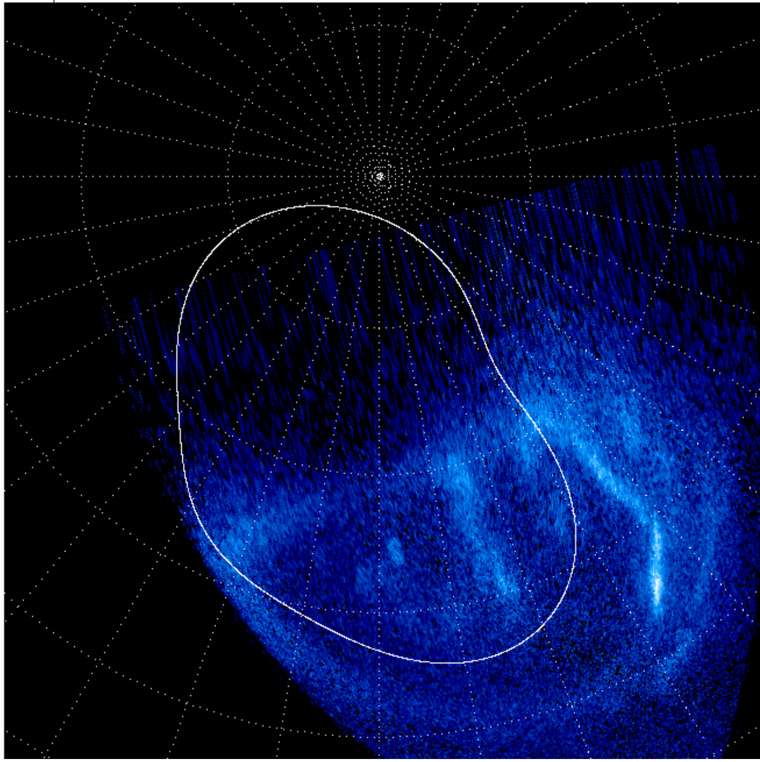
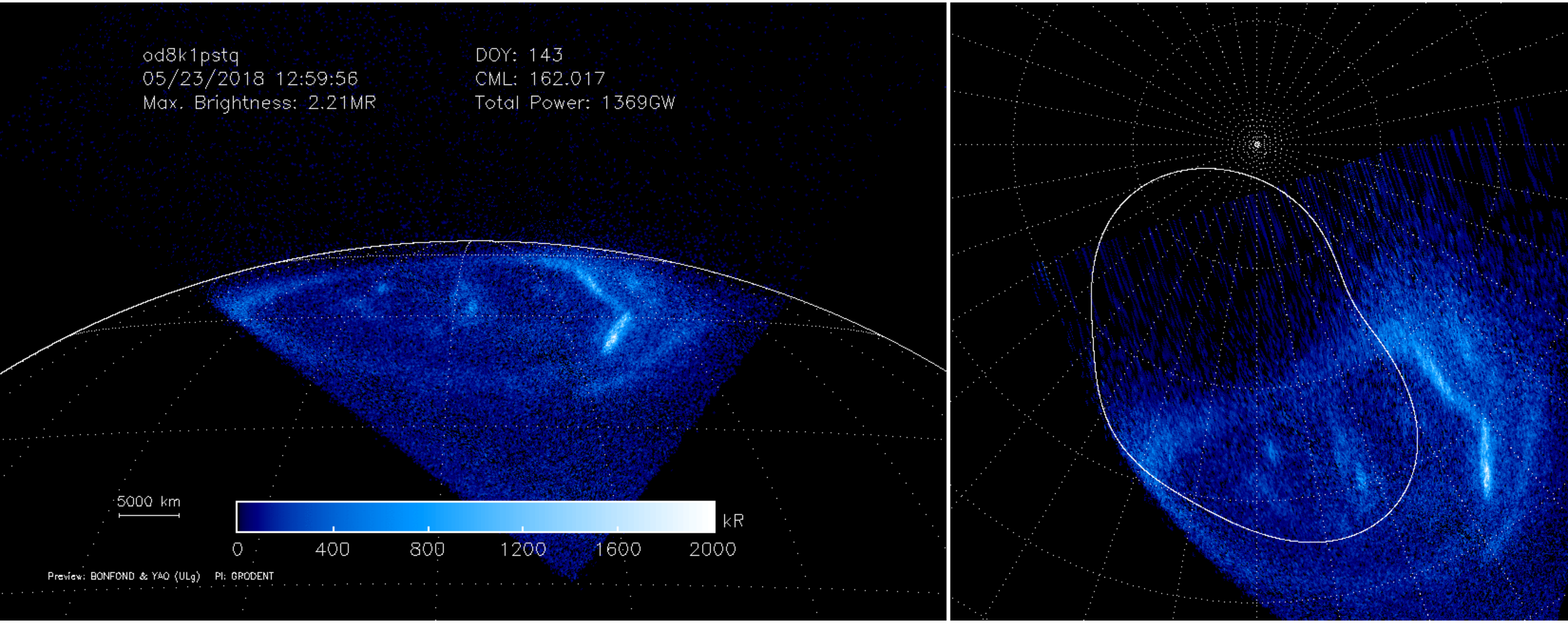
PJ13

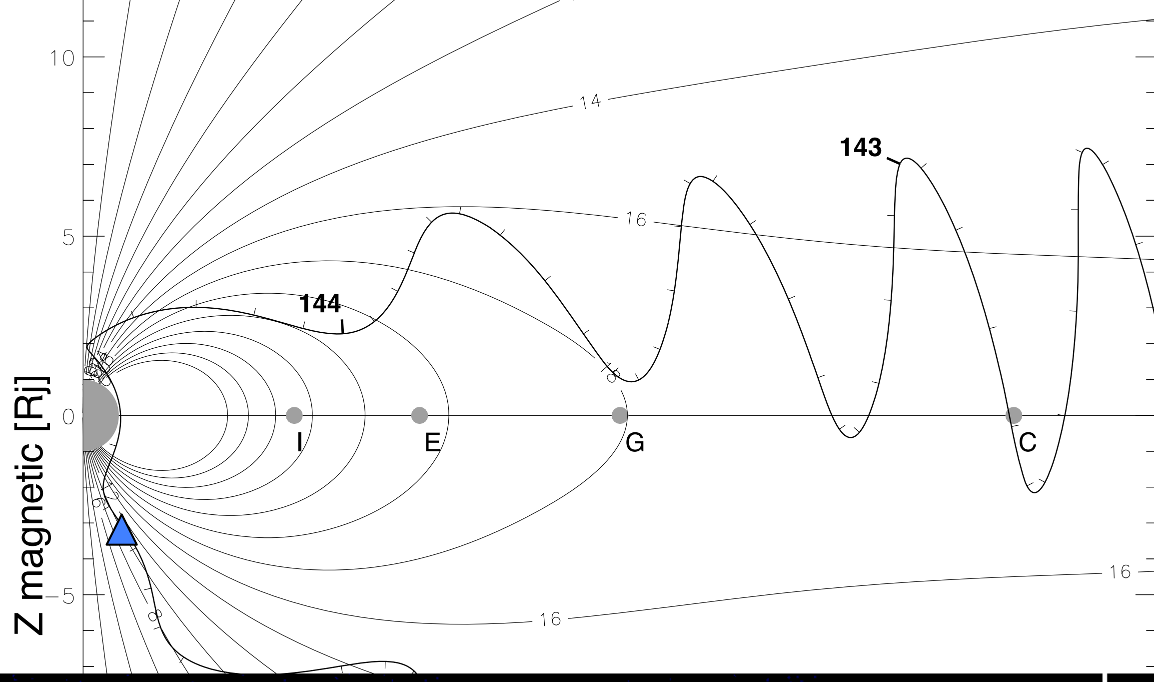


“QUIET” aurora

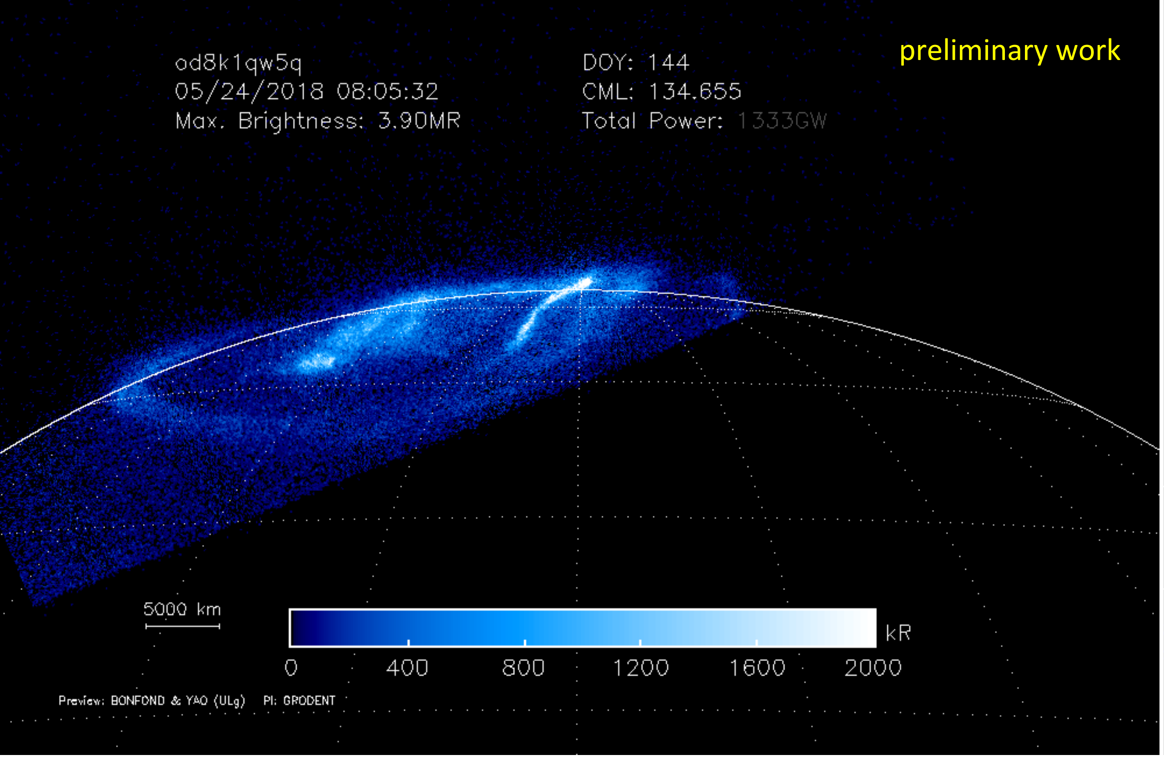


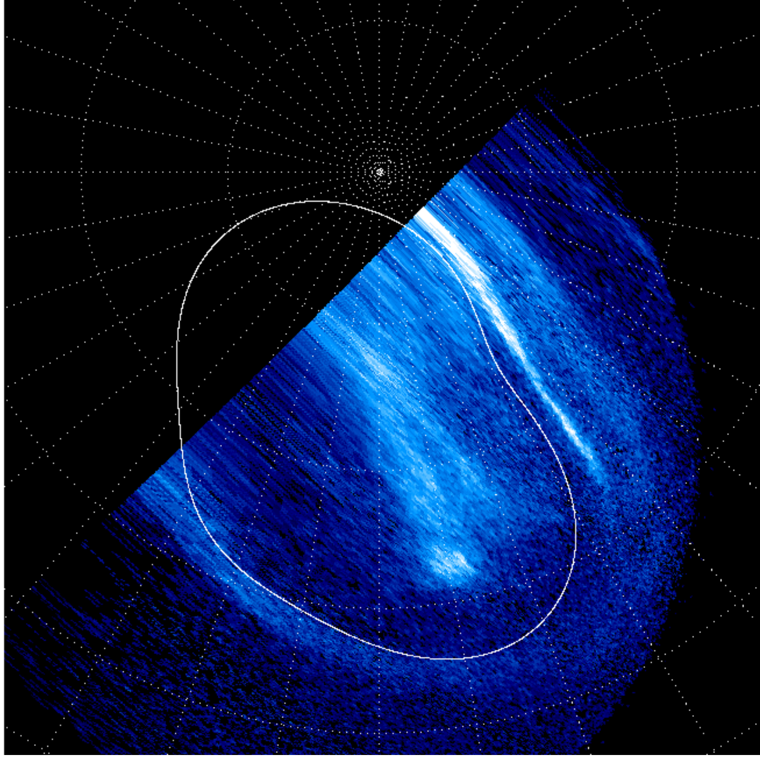


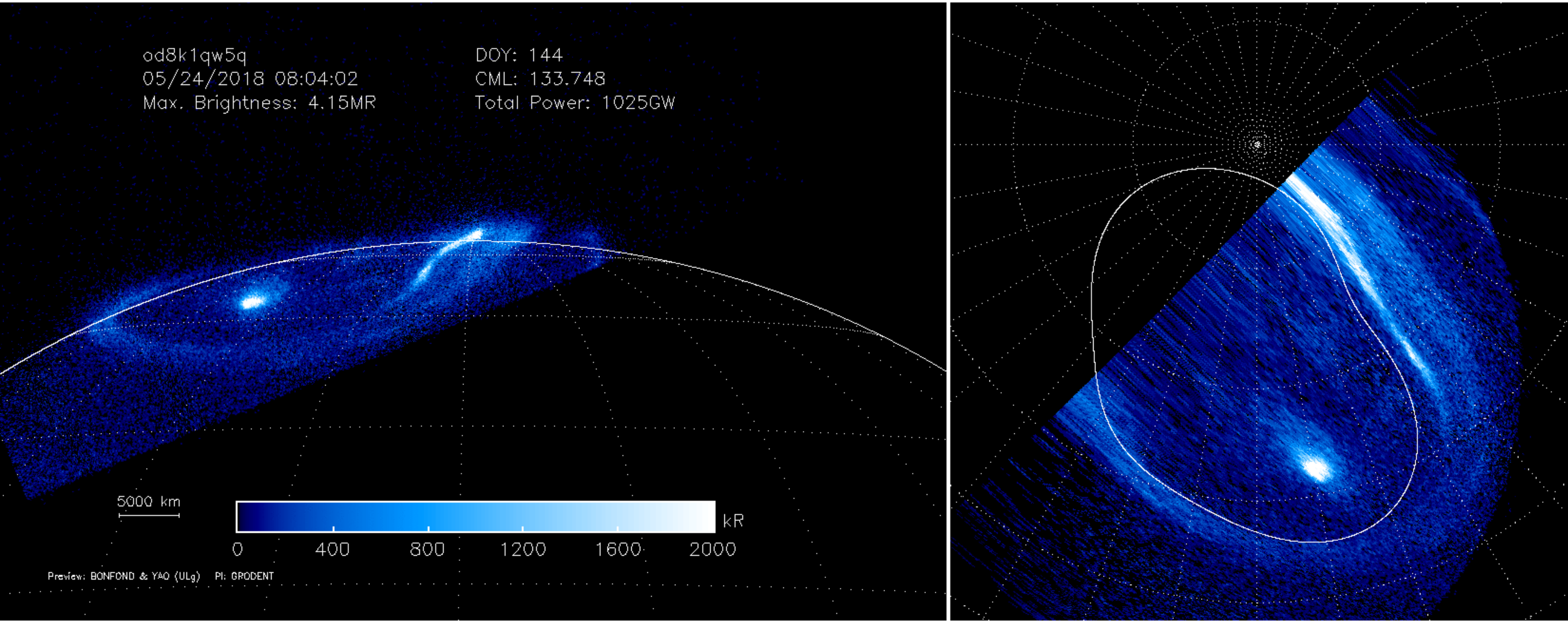

od8k1pstq
05/23/2018 12:59:56
Max. Brightness: 2.21MR
DOY: 143
CML: 162.017
Total Power: 1369GW
5000 km
kR
0
400
800
1200
1600
2000
Preview: BONFOND & YAO (ULg) PI: GRODENT

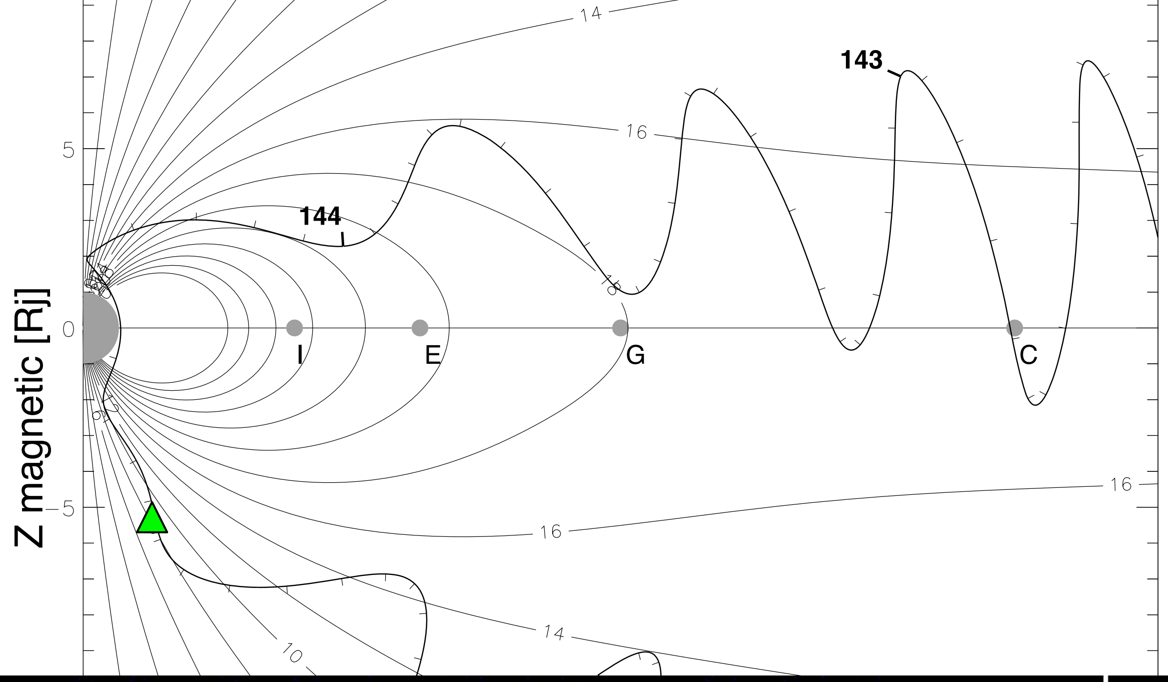


"QUIET" aurora

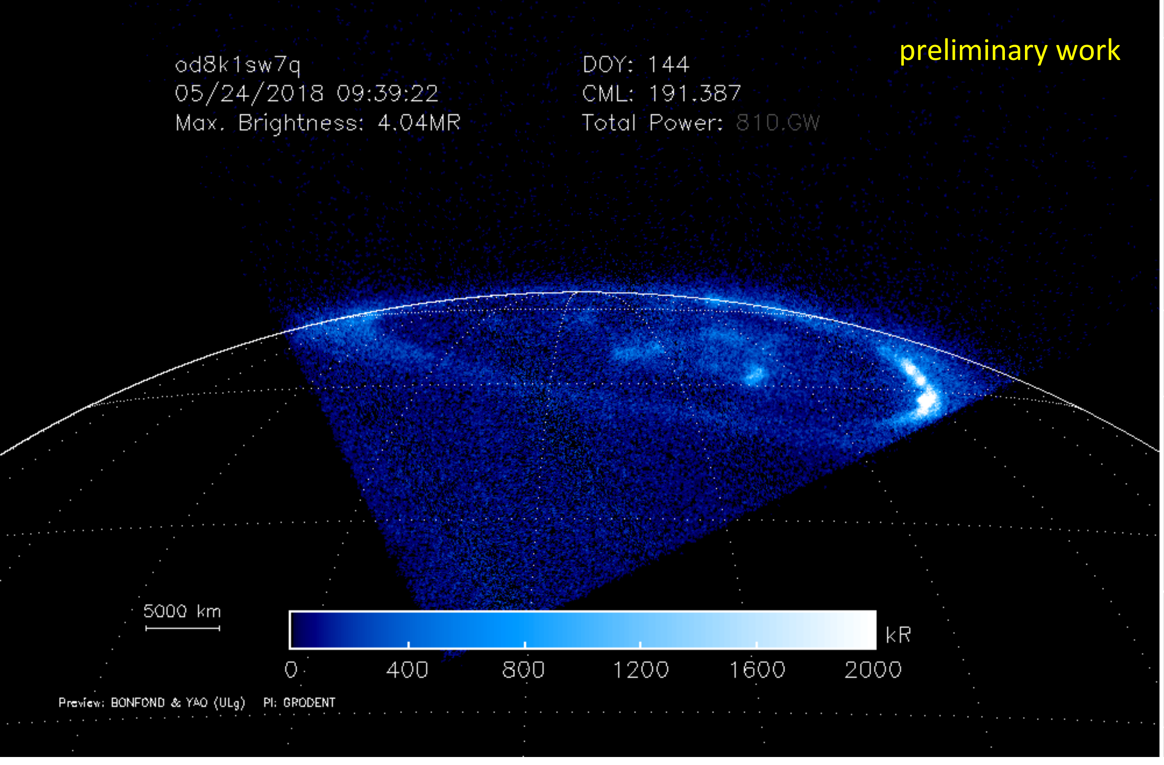


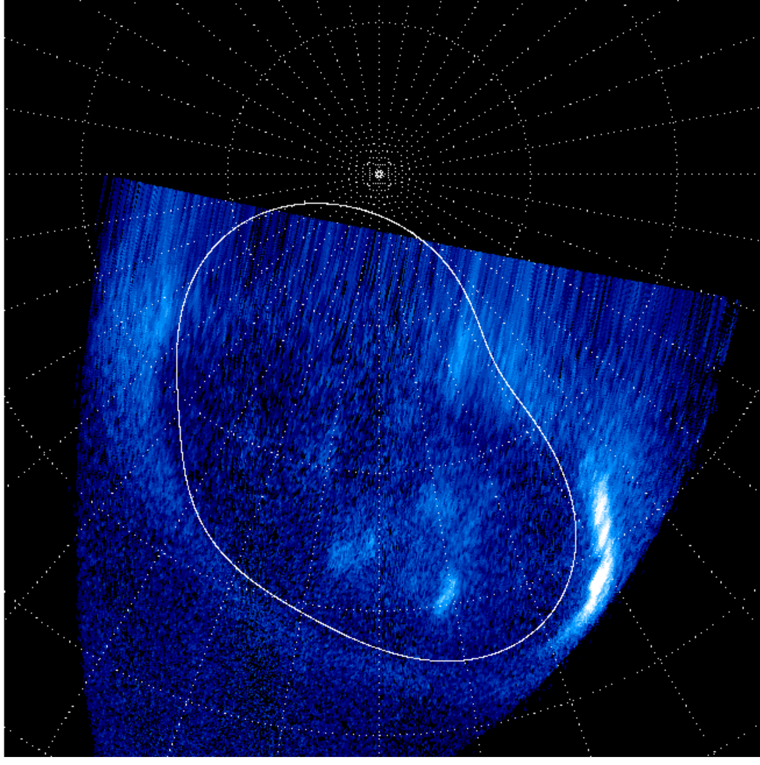


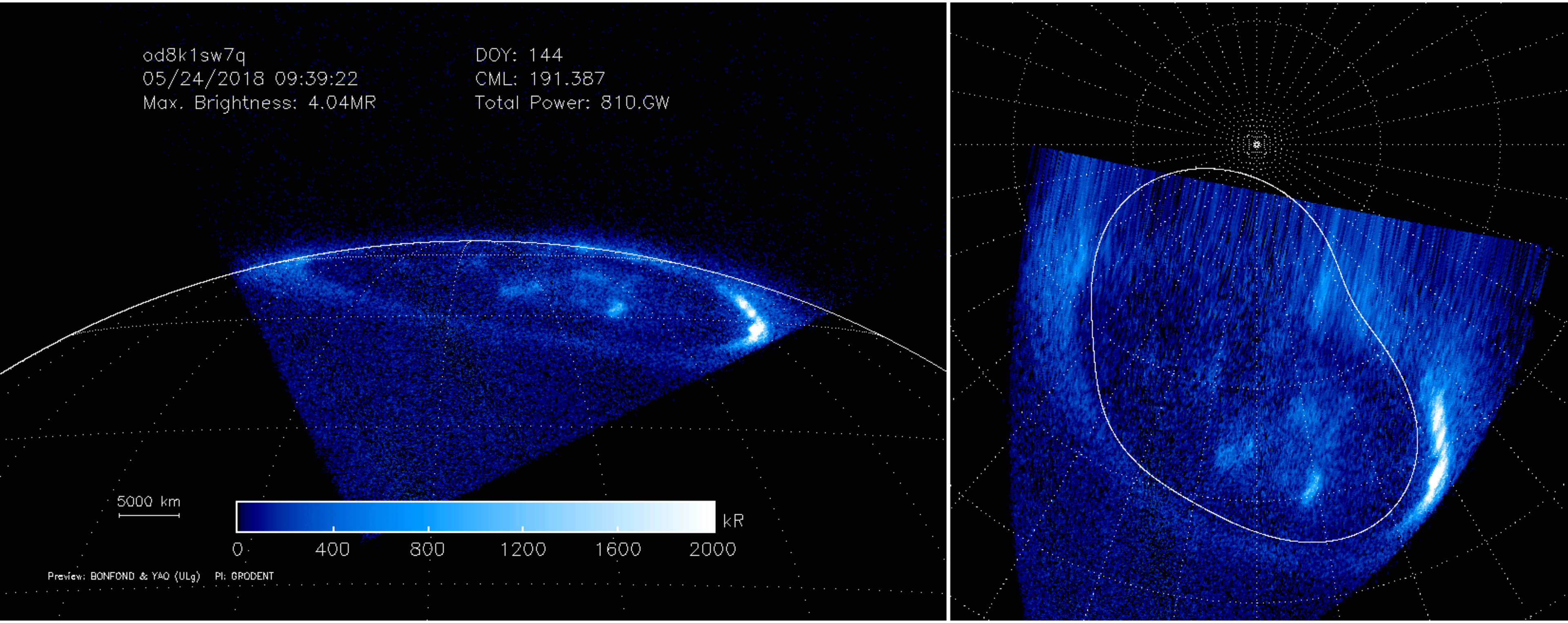

od8k1qw5q
05/24/2018 08:04:02
Max. Brightness: 4.15MR
DOY: 144
CML: 133.748
Total Power: 1025GW
5000 km
kR
0
400
800
1200
1600
2000
Preview: BONFOND & YAO (ULg) PI: GRODENT



"QUIET" aurora






od8k1sw7q
05/24/2018 09:39:22
Max. Brightness: 4.04MR
DOY: 144
CML: 191.387
Total Power: 810.GW
5000 km
kR
0
400
800
1200
1600
2000
Preview: BONFOND & YAO (ULg) PI: GRODENT

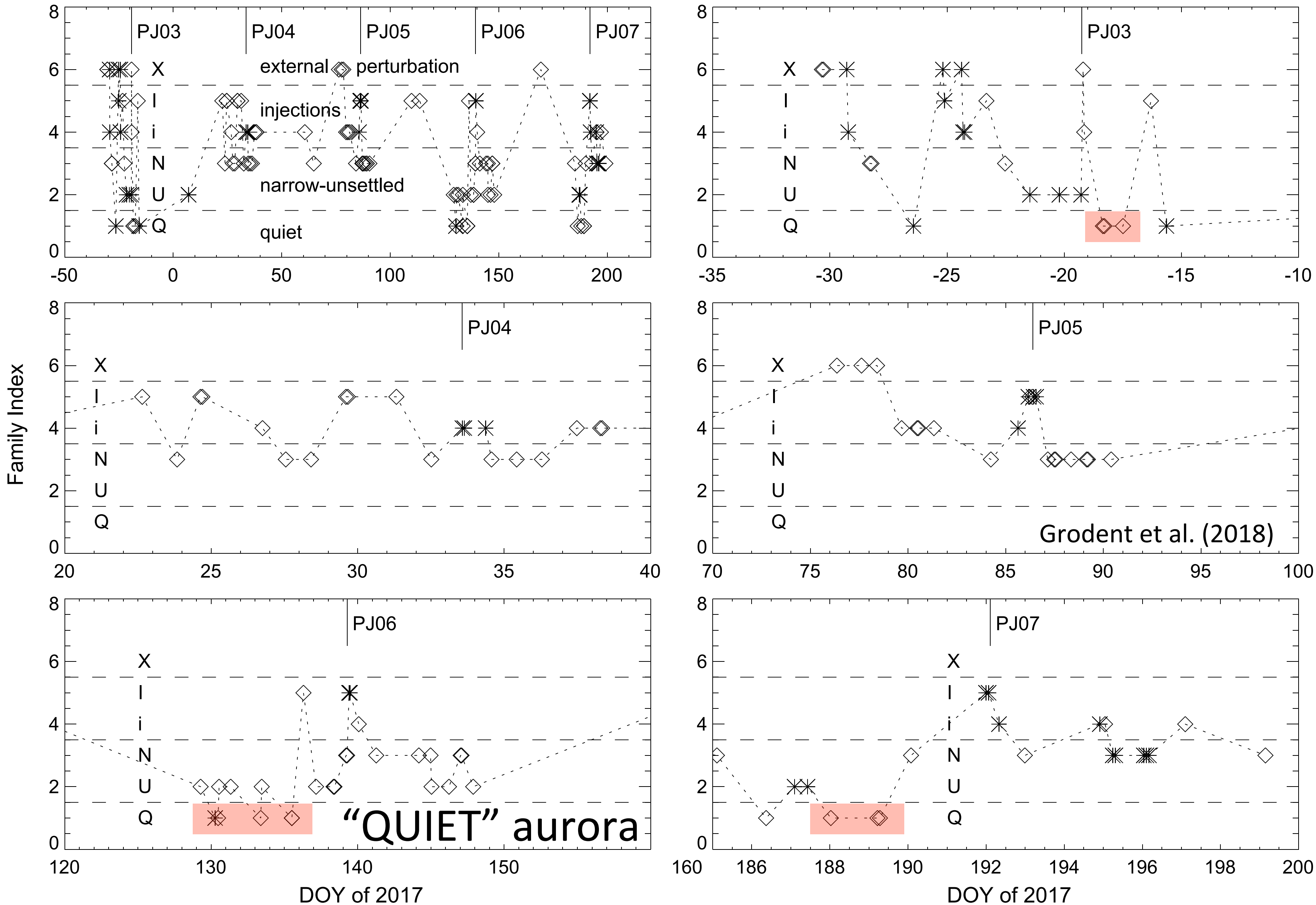
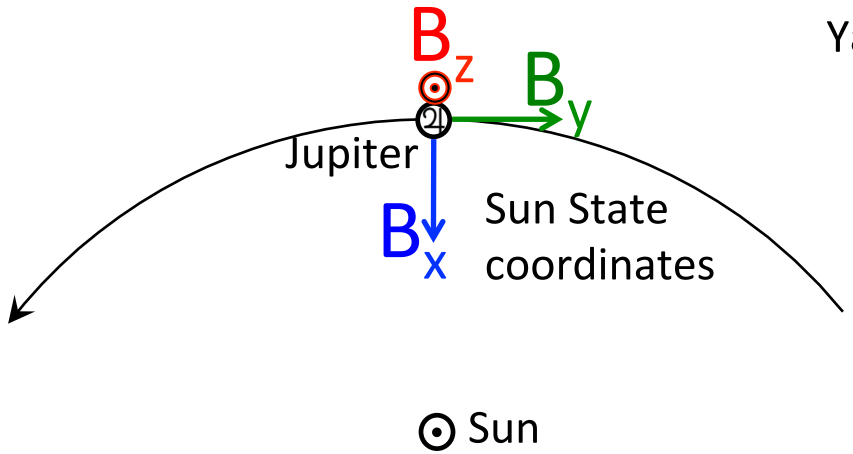


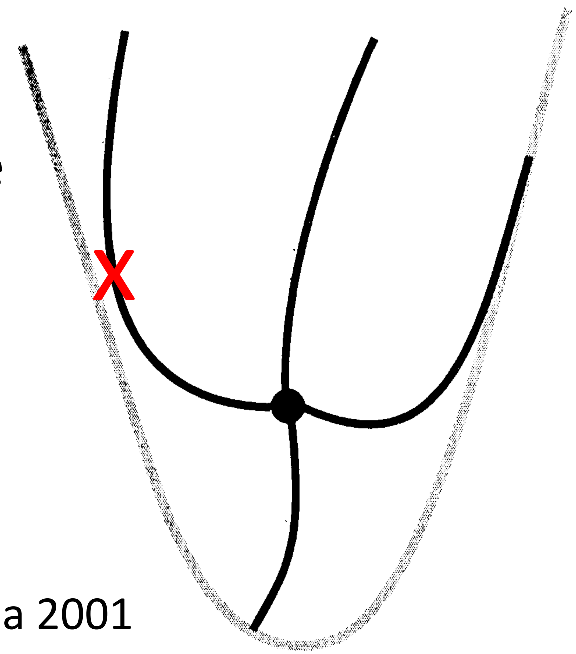
Figure 4. Graphical representation of the evolution of the auroral morphology over Juno orbits 3 to 7 (see also detailed parameters in Table 1). Like Figure

Yao et al., in preparation



Dawn side CS

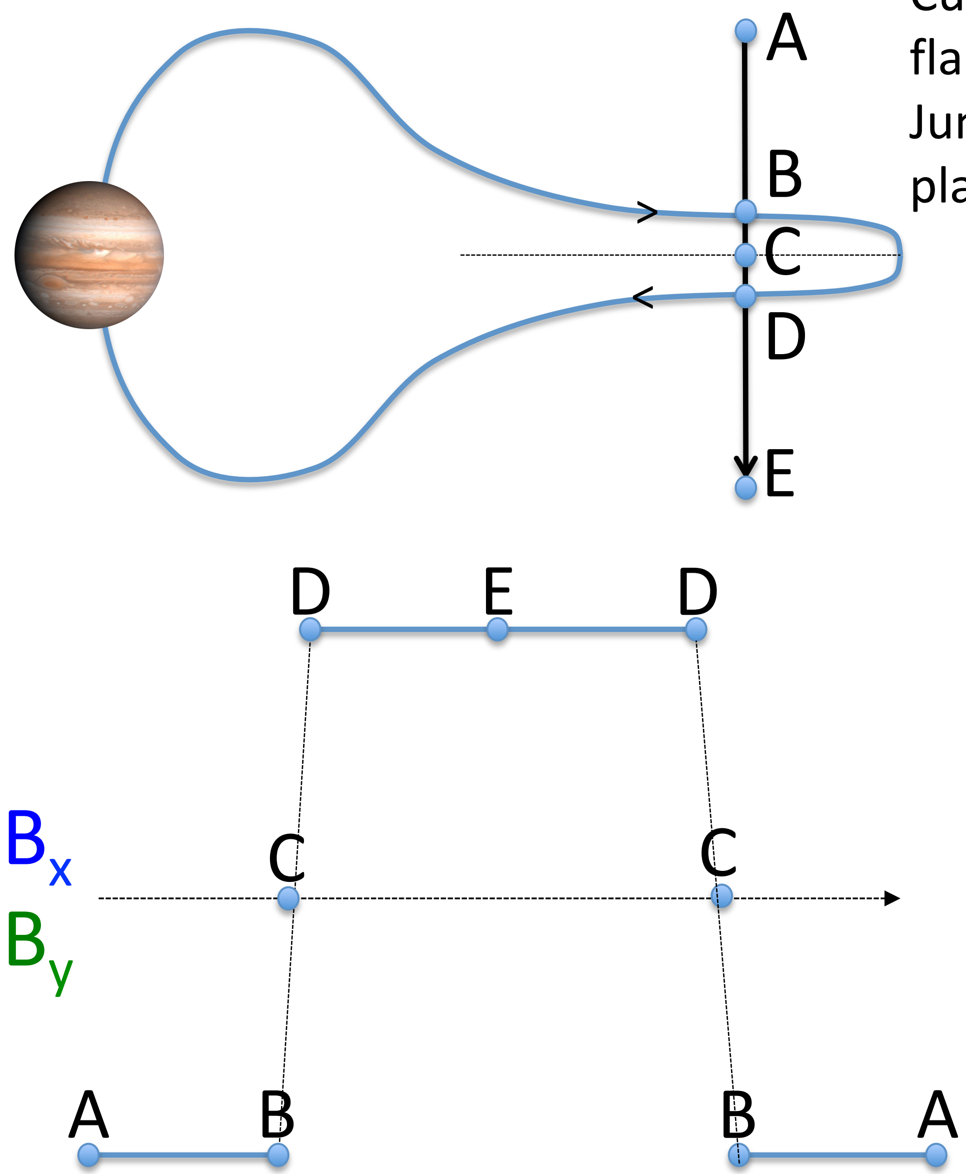
	above	below	inside
B_x	< 0	>0	$=0$
B_y	< 0	>0	$=0$
B_z	< 0	<0	$\simeq 0$

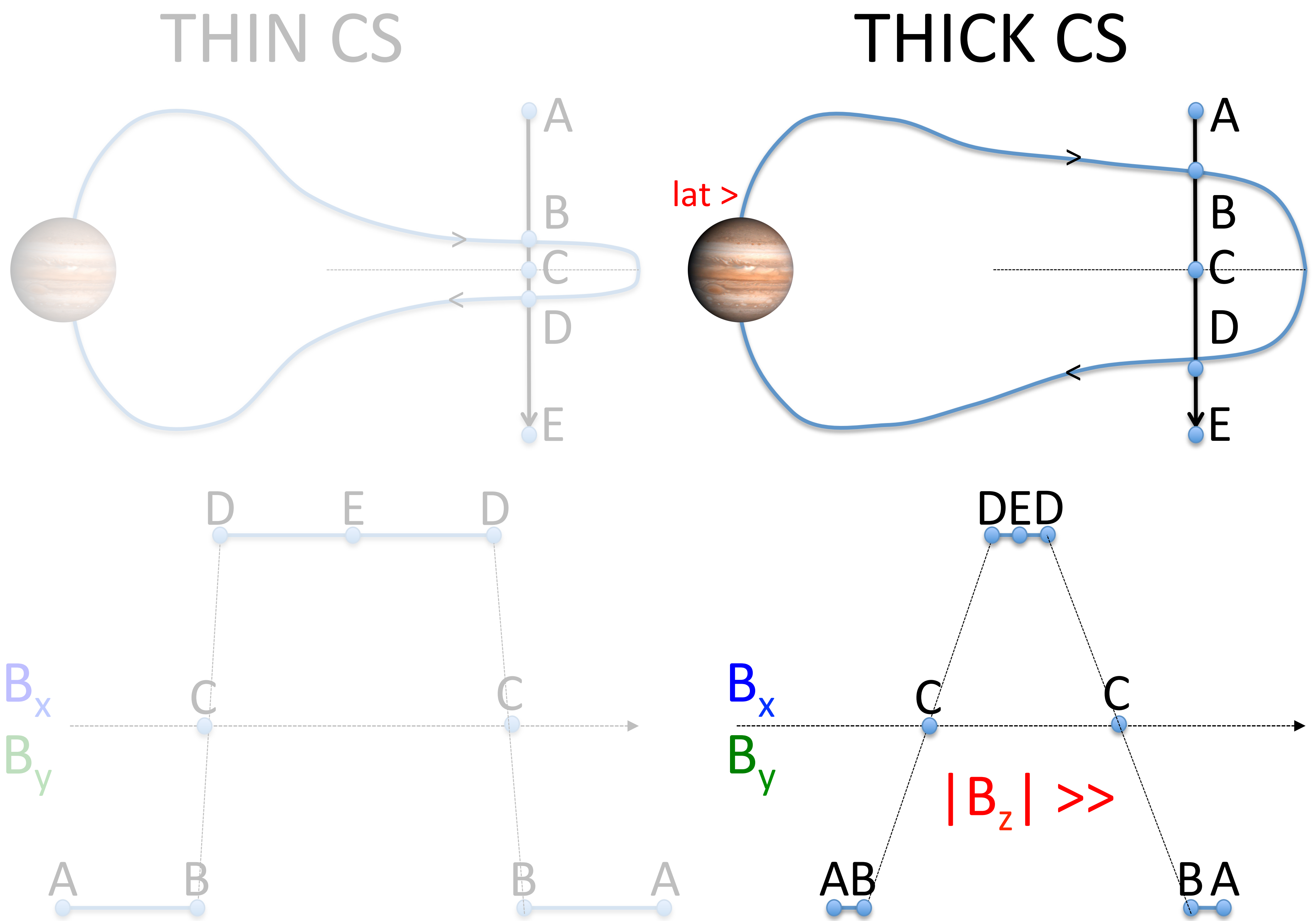


Khurana 2001

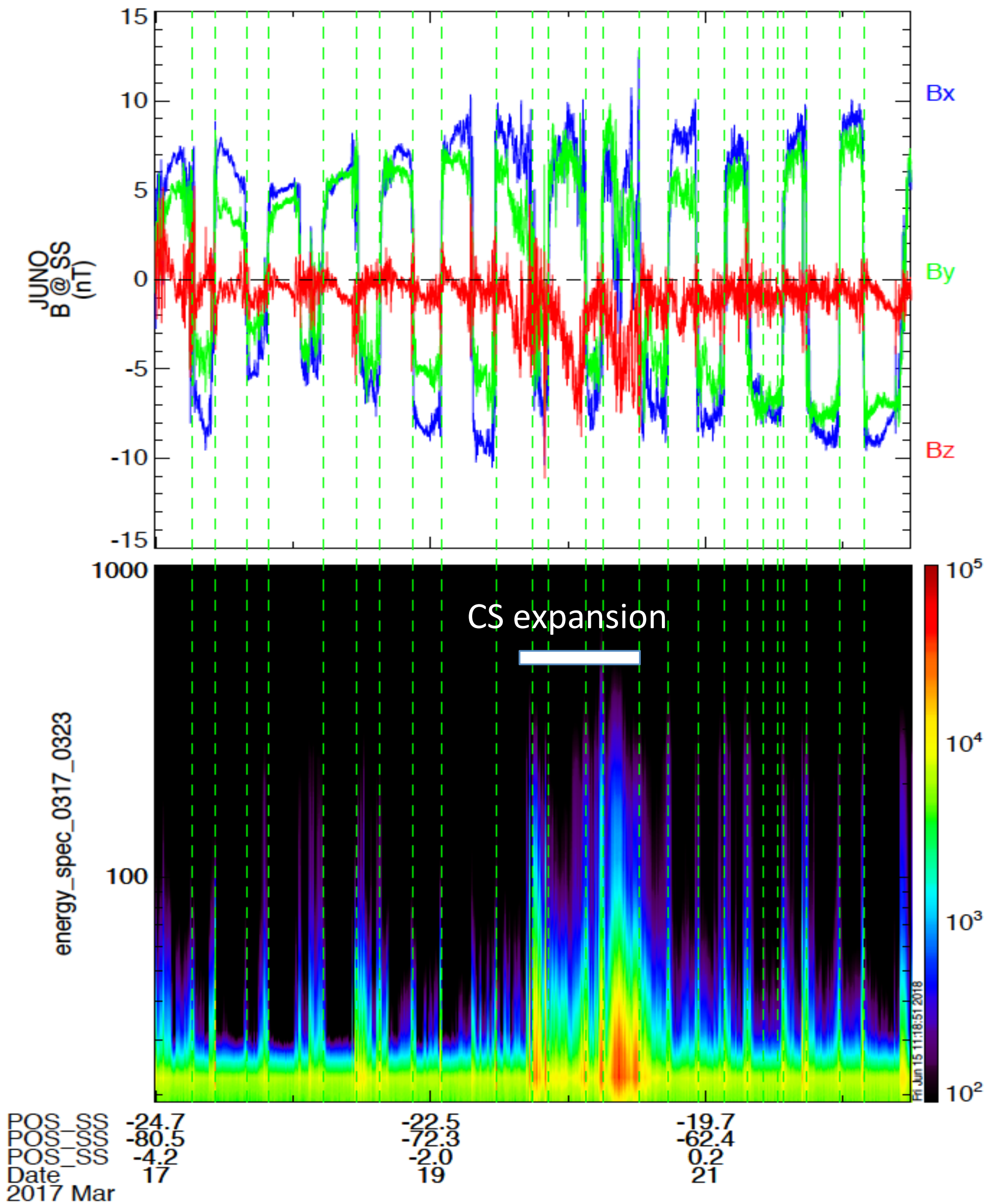
THIN CS

Current sheet flapping around Juno (in equatorial plane)





THIN CS
THICK CS
A
B
C
D
E
lat >
DED
D
E
D
C
C
Bx
By
|Bz| >>
A
B
B
A
AB
BA



Juno orbit 05

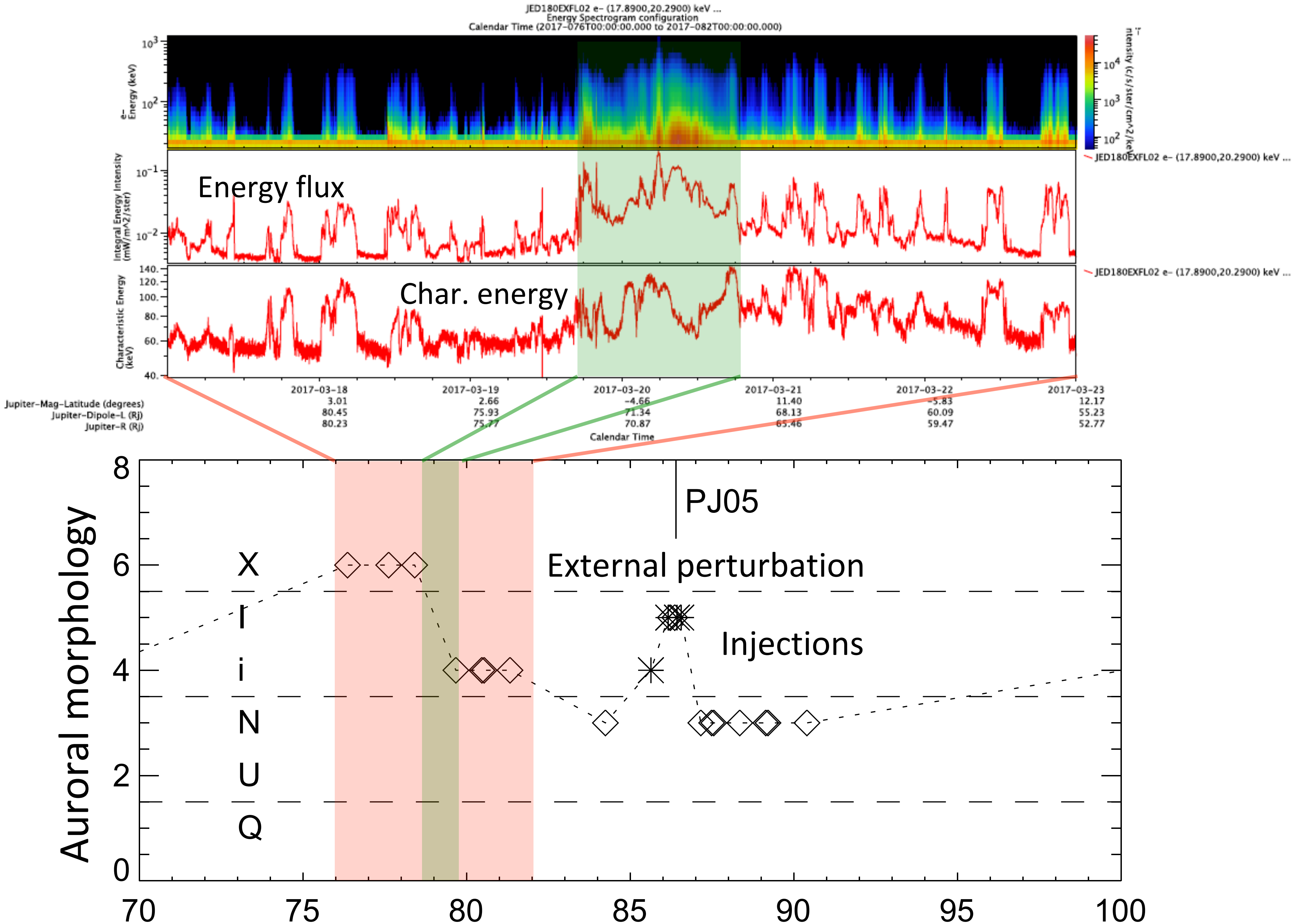
PJ05 on 27 March 2017

MAG data

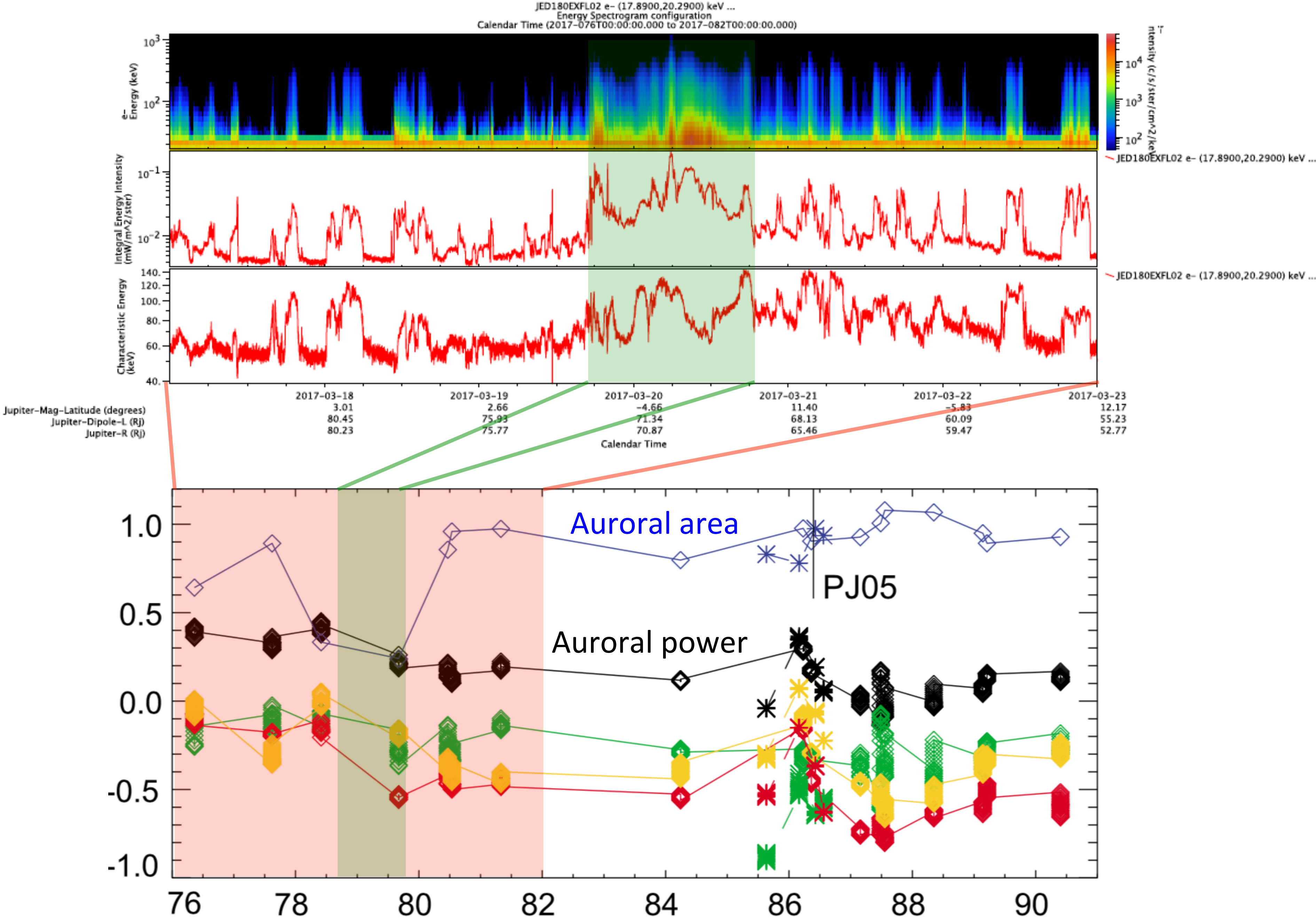
Connerney et al.

JEDI data

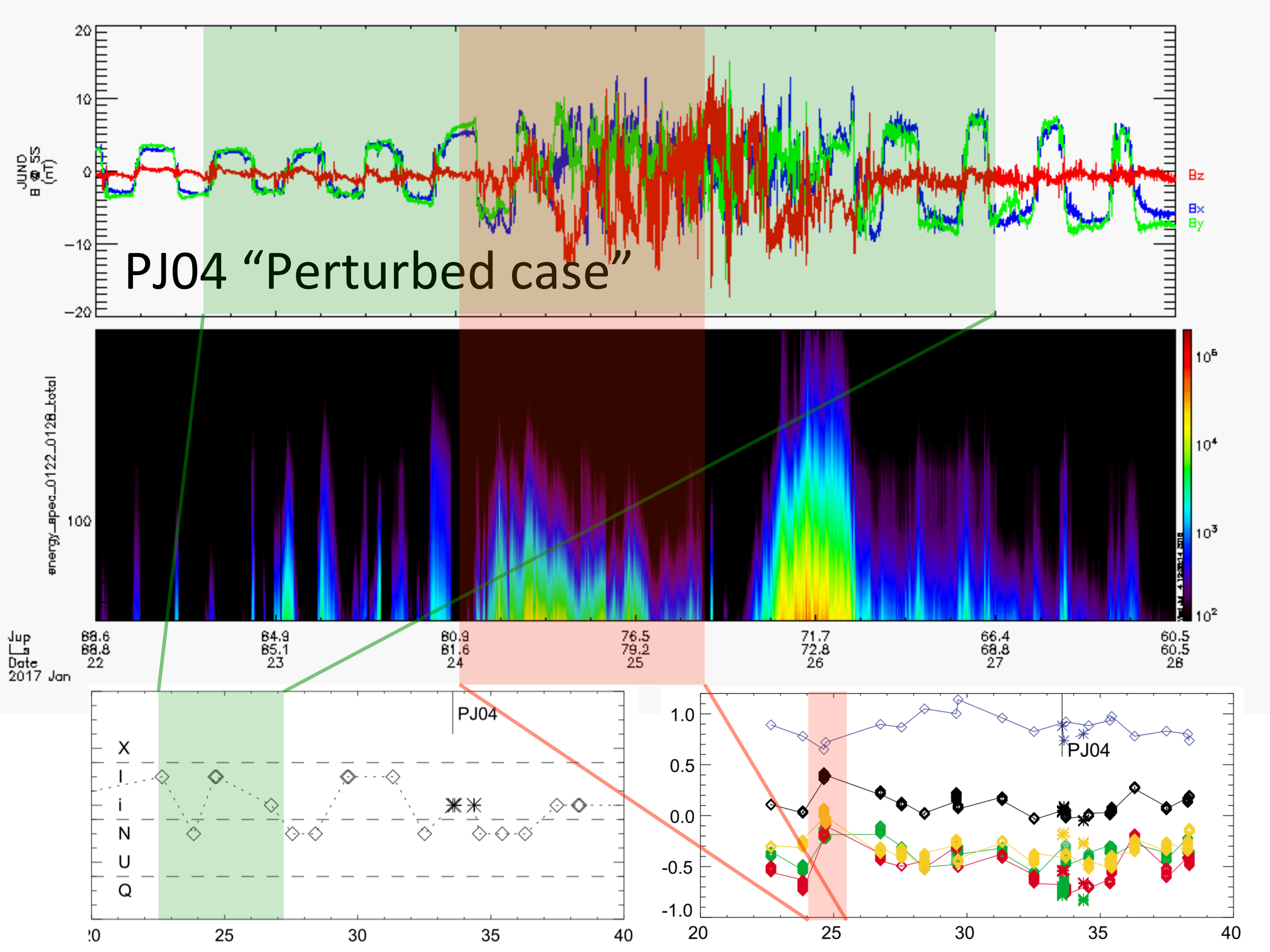
Mauk et al.



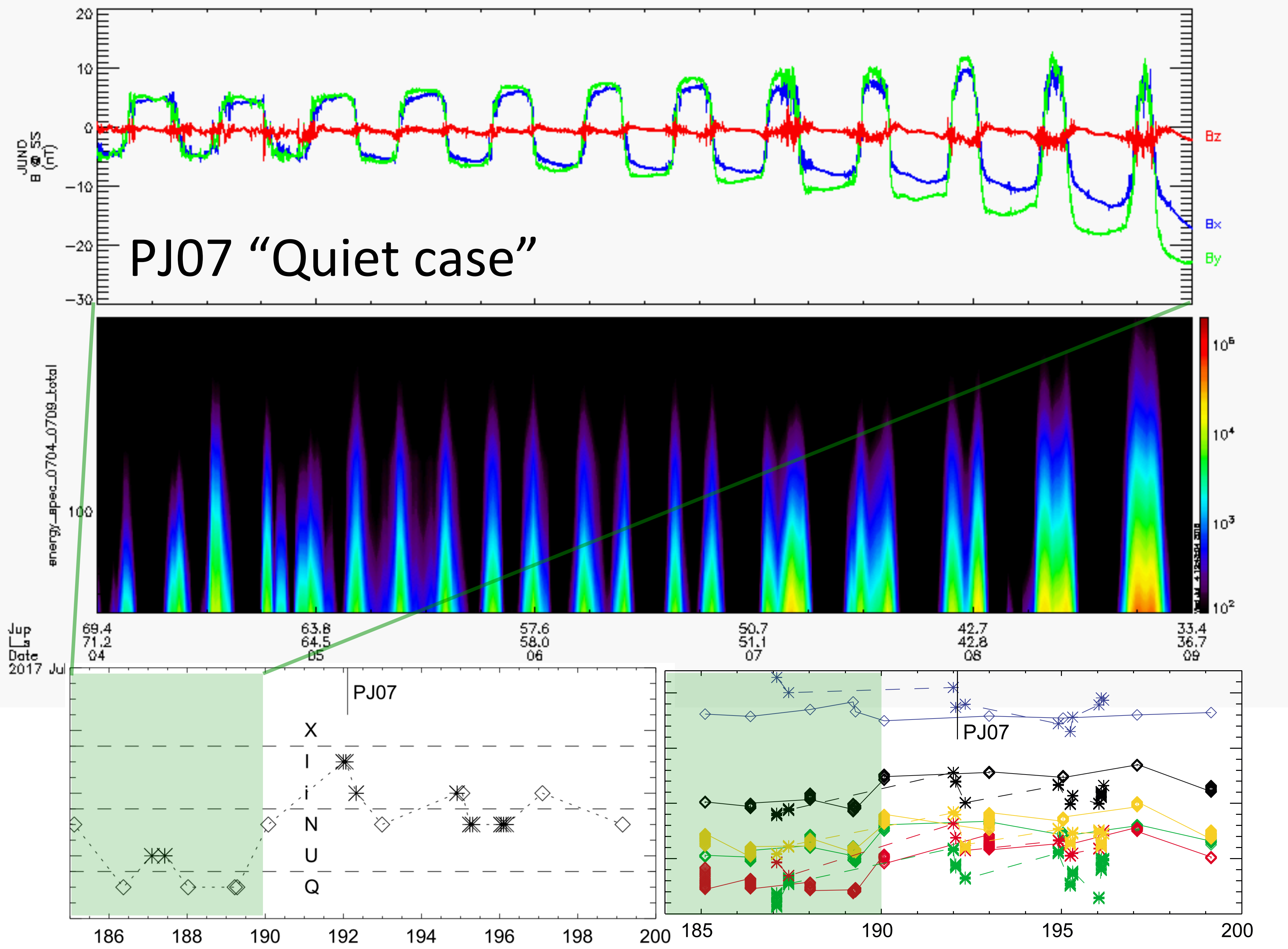
JED180EXFL02 e– (17.8900,20.2900) keV ...
Energy Spectrogram configuration
Calendar Time (2017–076T00:00:00.000 to 2017–082T00:00:00.000)
e– Energy (keV)
Energy flux
Integral Energy Intensity (mW/m^2/ster)
Char. energy
Characteristic Energy (keV)
2017–03–18
2017–03–19
2017–03–20
2017–03–21
2017–03–22
2017–03–23
Jupiter–Mag–Latitude (degrees)
Jupiter–Dipole–L (Rj)
Jupiter–R (Rj)
Calendar Time
PJ05
External perturbation
Injections
X
I
i
N
U
Q
Auroral morphology



JED180EXFL02 e- (17.8900,20.2900) keV ...
Energy Spectrogram configuration
Calendar Time (2017-076T00:00:00.000 to 2017-082T00:00:00.000)
e- Energy (keV)
Integral Energy Intensity (mW/m^2/ster)
Characteristic Energy (keV)
JED180EXFL02 e- (17.8900,20.2900) keV ...
JED180EXFL02 e- (17.8900,20.2900) keV ...
Jupiter-Mag-Latitude (degrees)
Jupiter-Dipole-L (Rj)
Jupiter-R (Rj)
2017-03-18 3.01 80.45 80.23
2017-03-19 2.66 75.93 75.77
2017-03-20 -4.66 71.34 70.87
2017-03-21 11.40 68.13 65.46
2017-03-22 -5.83 60.09 59.47
2017-03-23 12.17 55.23 52.77
Calendar Time
Auroral area
PJ05
Auroral power



PJ04 “Perturbed case”
JUNO B SS (nT)
20
10
0
−10
−20
Bz
Bx
By
energy_spec_0122_0128_total
100
10⁵
10⁴
10³
10²
Jup
Date
2017 Jan
68.6 68.8 22
64.9 65.1 23
80.9 81.6 24
76.5 79.2 25
71.7 72.8 26
66.4 68.8 27
60.5 60.5 28
PJ04
X
I
i
N
U
Q
20
25
30
35
40
1.0
0.5
0.0
-0.5
-1.0
PJ04
20
25
30
35
40



PJ07 "Quiet case"
JUNO B @ SS (nT)
Bz
Bx
By
energy_spec_0704_0709_total
100
Jup
L
Date
2017 Jul
69.4 71.2 04
63.8 64.5 05
57.6 58.0 06
50.7 51.1 07
42.7 42.8 08
33.4 36.7 09
PJ07
X
I
i
N
U
Q
186
188
190
192
194
196
198
200
185
195

"Conclusion" (work in progress)

1. Perturbations of B and of energetic ē [50-80R_J] are highly correlated with auroral **dynamics** $\Longrightarrow$ middle to outer magnetosphere dynamics is important in driving Jovian auroral emissions.

2. Apparent anti-correlation between JEDI signatures of CS expansion and HST auroral size and bulk morphology.

3. Potential connection between CS thickening (reconnection?) and auroral injections.

4. CS expansion and plasma energisation events observed by Juno and HST are global effects.