

# Overview of HST observations of Jupiter's ultraviolet aurora during Juno orbits 3 to 7.

AGU2017-P24A-06



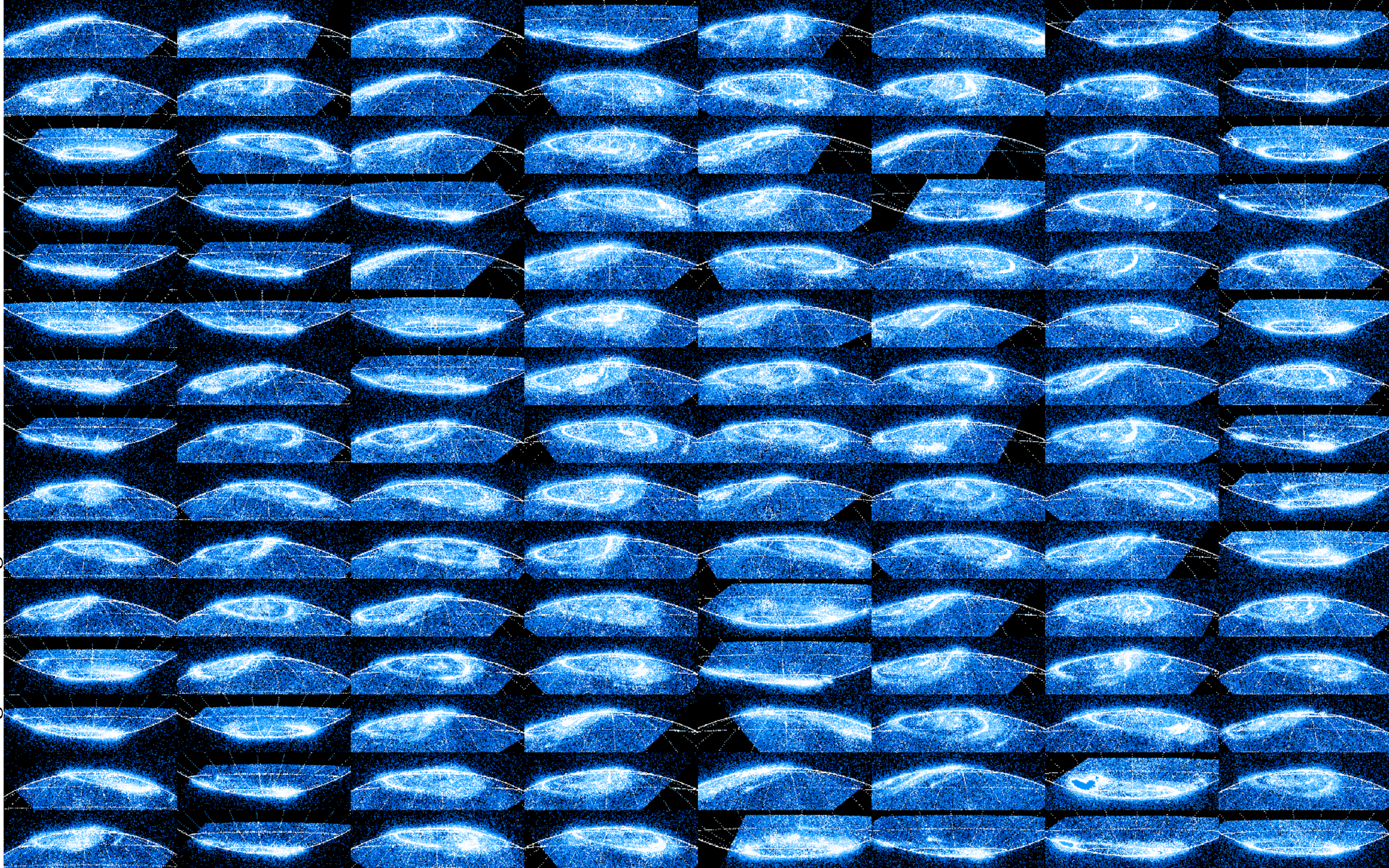
Denis GRODENT, Bertrand BONFOND, Zhonghua YAO, G. Randall GLADSTONE, Jean-Claude GERARD, Aikaterini RADIOTI, John T. CLARKE, Jonathan D. NICHOLS, Emma J. BUNCE, Lorenz ROTH, Joachim SAUR, Tomoki KIMURA, Glenn S. ORTON, Sarah V. BADMAN, Barry MAUK, John E. P. CONNERNEY, David J. McCOMAS, William S. KURTH, Alberto ADRIANI, Candice HANSEN, Philip W. VALEK, Benjamin PALMAERTS, Maité DUMONT, Scott J. BOLTON, Steven M. LEVIN, Fran BAGENAL

([d.grodent@uliege.be](mailto:d.grodent@uliege.be))

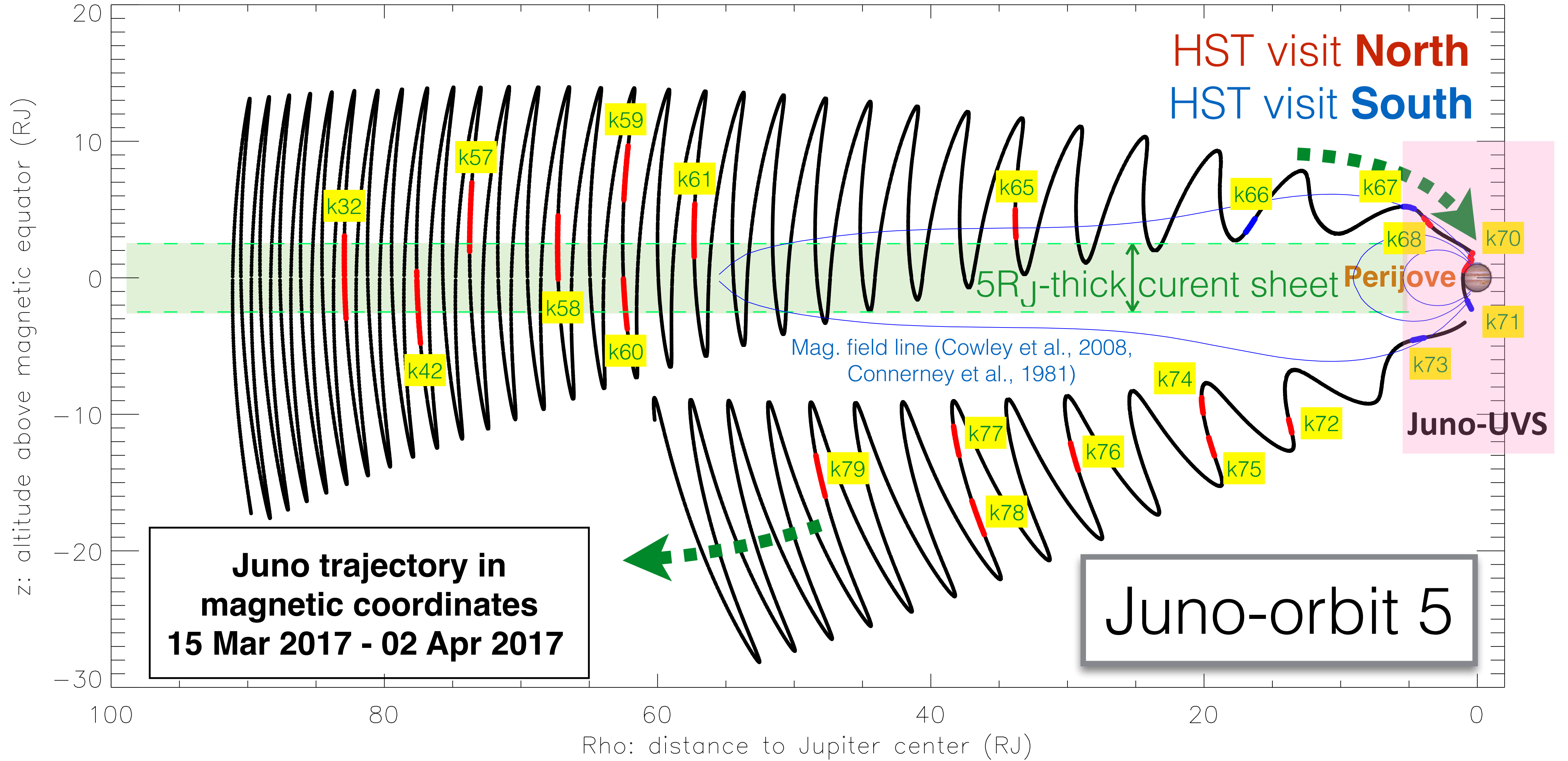
**Grodent et al., submitted to *JGR - Space Physics***

~70% = North

AGU 2017 d.grodent@uliege.be



124 HST visits - 8 months





Interfacultaire / Laboratoires / Welcome LPAP / Research / Giant Planets / HST Campaign

### HST Campaign

#### HST-Juno synergistic approach of Jupiter's magnetosphere and UV auroras

HST GO-14634. Principal Investigator/Credit: Denis GRODENT (NASA/ESA/Université de Liège).  
Phase 2 program (full description of the observing program) - PDF file  
Investigators (list of HST 14634 co Investigators) Text list  
Current program status (regularly updated observation times) - Table

This HST campaign started on the third orbit of Juno around Jupiter referred to as PJ03

#### Movie Previews

Preliminary analysis of the HST events lists obtained with the STIS spectro-imager

- Perijove on 12/11/2016 - PJ03
- Perijove on 02/02/2017 - PJ04
- Perijove on 03/27/2017 - PJ05
- Perijove on 05/19/2017 - PJ06
- Perijove on 07/11/2017 - PJ07
- HST solar avoidance from 03/23/2017 to 12/26/2017
- Perijove on 02/07/2018 - PJ11 (lunar avoidance on 02/07/2018)

- > Giant Planets
  - > HST Campaign
  - > JUNO Mission
  - > CASSINI Mission
- > Earth magnetosphere
- > Venus and Mars
- > Earth atmosphere and climate
- > All Publications (slow)

# Preview movies available on:

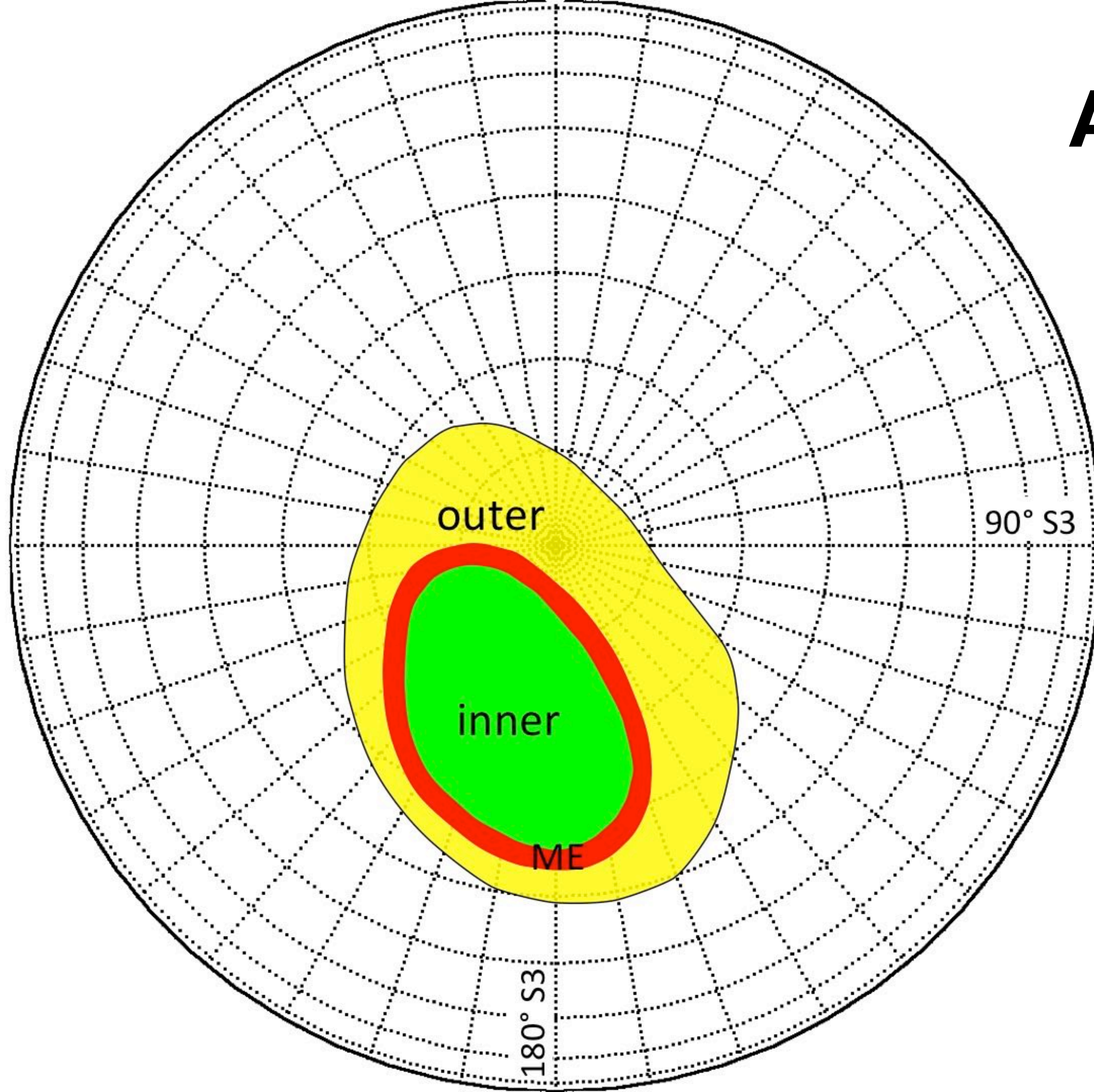
# www.lpap.uliege.be

# Or:

# Youtube Channel: Denis Grodent

The screenshot shows a YouTube channel page for Denis Grodent, who has 6 subscribers. The channel features a banner image of Jupiter's aurora in blue. Below the banner, there are buttons for 'CUSTOMIZE CHANNEL' and 'CREATOR STUDIO'. The 'Uploads' section is active, showing a row of five video thumbnails. Each thumbnail shows a different view of Jupiter's magnetosphere or aurora. The first video is titled 'Movie of Jupiter's magnetosphere' and has 10 views. The other four videos are titled 'HST movie of Jupiter's ultraviolet aurora captured in...' and have 20, 72, 11, and 10 views respectively. All videos were uploaded 2 months ago.

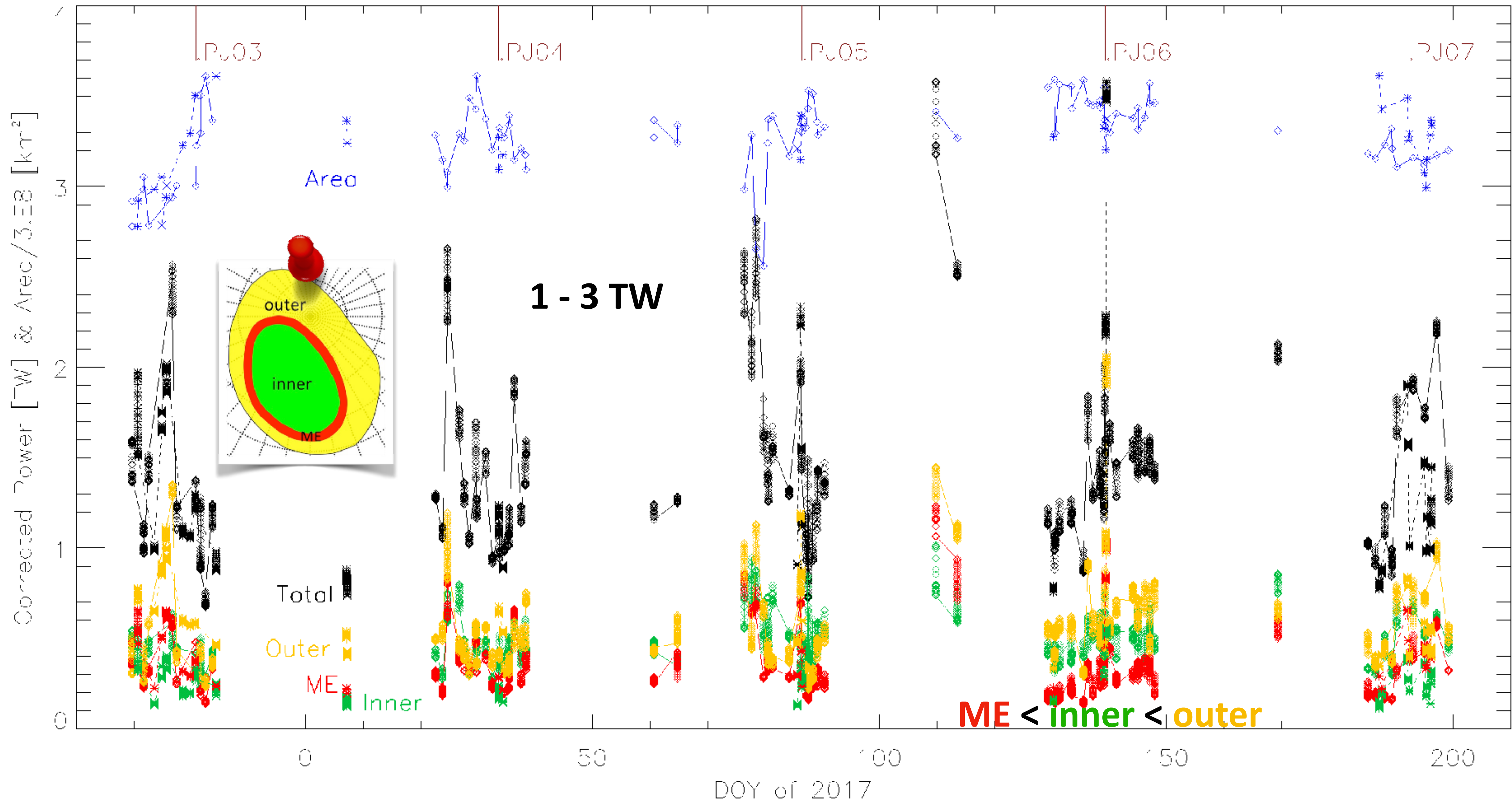
# Auroral subregions

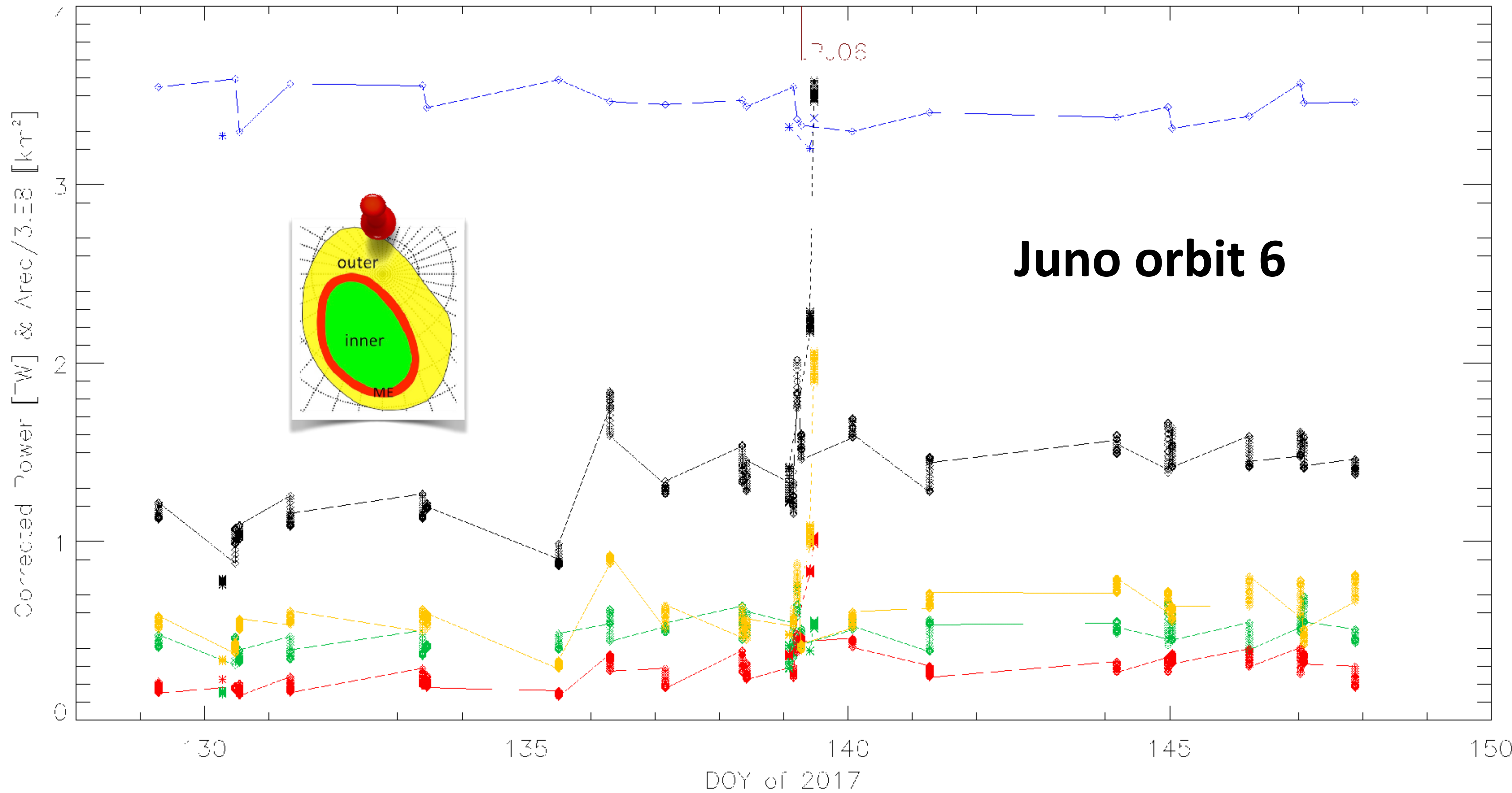


**ME** = Main Emission

**inner** aurora = distant magnetosphere ( $> 30 R_J$ )

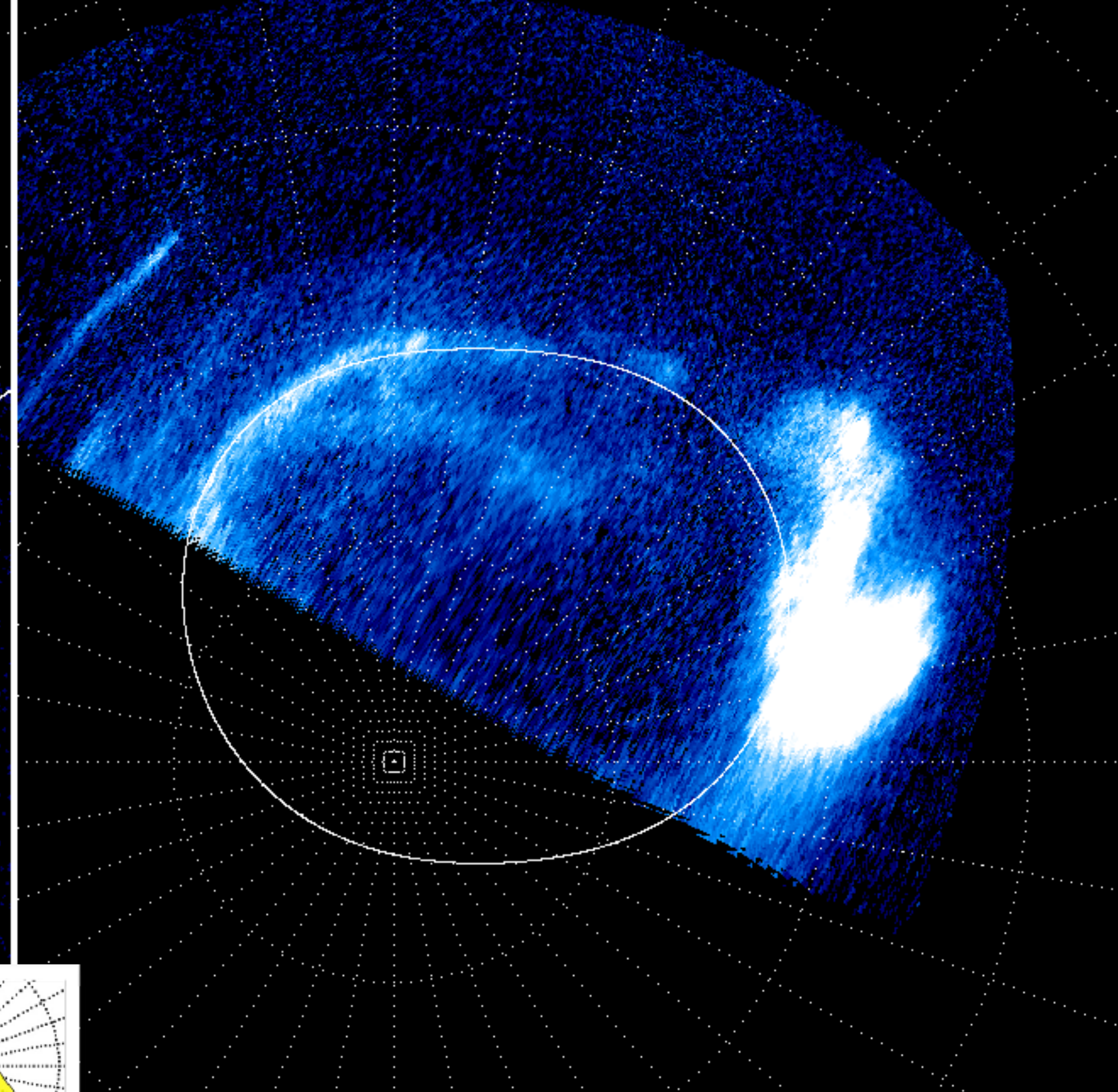
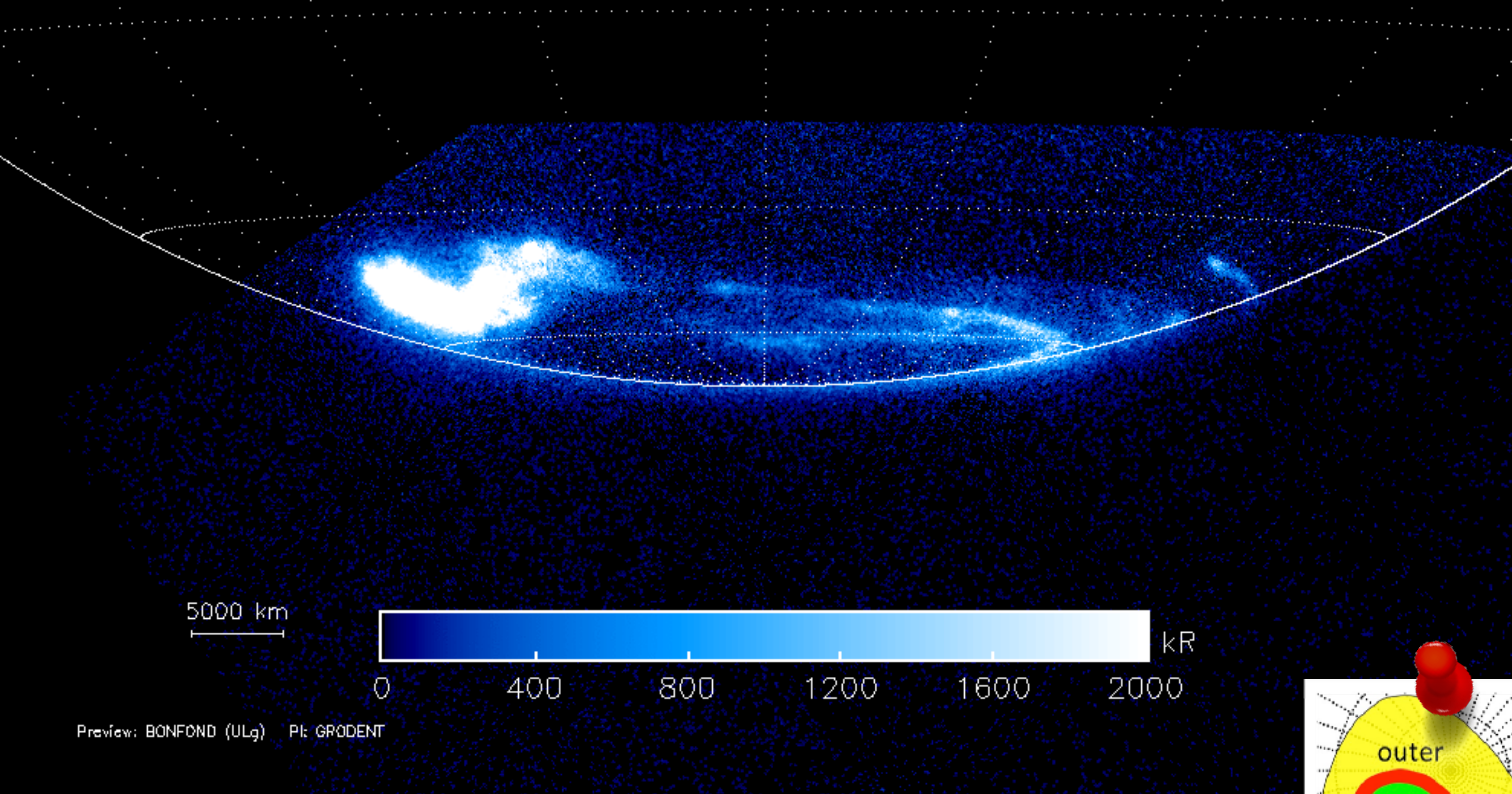
**outer** aurora = close magnetosphere ( $< 30 R_J$ )



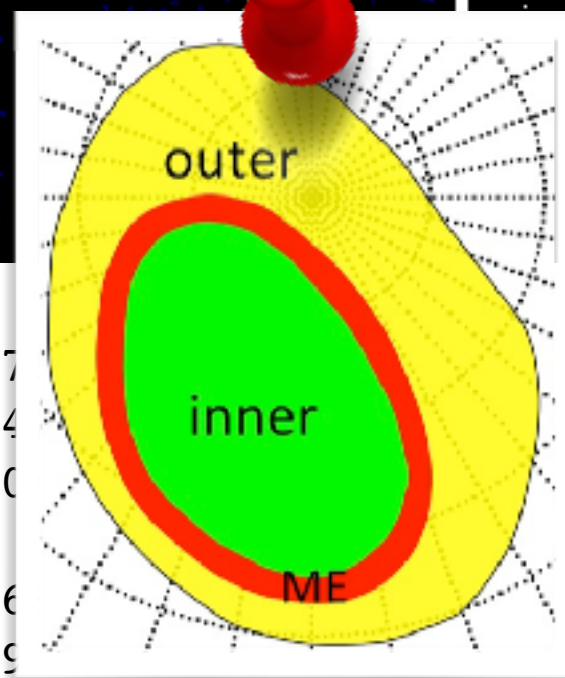


od8k0ay5q  
 05/19/2017 11:28:19  
 Max: Brightness: 10.2MR

DOY: 139  
 CML: 30.2028  
 Total Power: 3452GW



Preview: BONFOND (ULg) PI: GRODENT



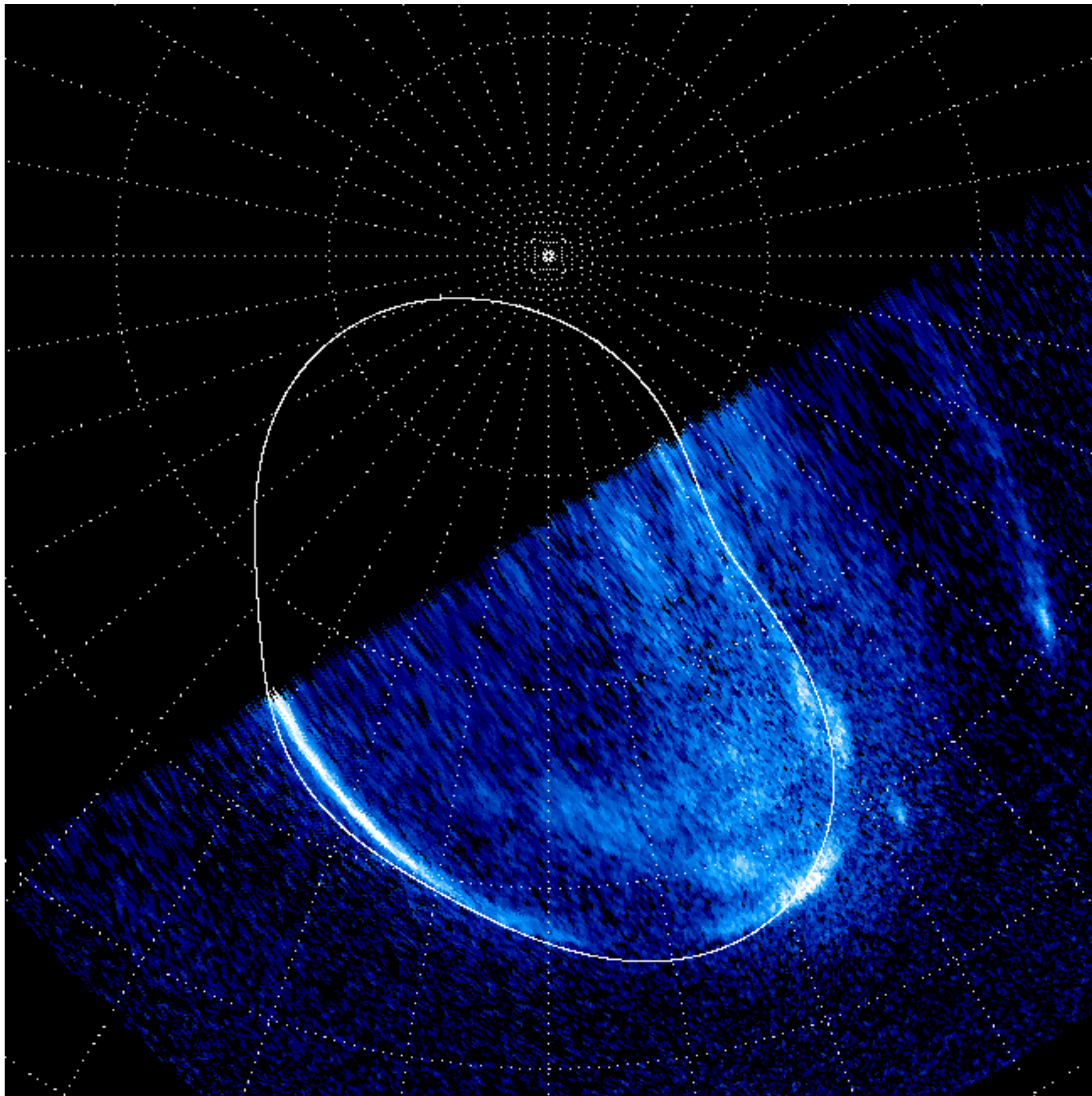
k90	od8k90tpq	05/18/2017	08:27:19	138.352	05/18/2017	07:48:23	N	130.134	122.7	0.539631	0.329127	0.553874	1.42263	1.04222
k91	od8k91txq	05/18/2017	10:02:40	138.419	05/18/2017	09:23:44	N	187.777	180.4	0.538965	0.276437	0.534007	1.34941	1.03169
k94	od8k94x3q	05/19/2017	05:06:55	139.213	05/19/2017	04:27:56	N	159.529	152.0	0.660341	0.425209	0.771012	1.85656	1.01034
<b>PJ06</b>	<b>139.278</b>													
k95	od8k95xgq	05/19/2017	06:42:17	139.279	05/19/2017	06:03:17	N	217.182	209.6	0.540696	0.530304	0.469224	1.54022	1.00040
k97	od8k97xzq	05/19/2017	09:52:59	139.412	05/19/2017	09:13:59	S	332.469	324.9	0.382705	0.820703	1.02319	2.22660	0.592668
<b>k0a</b>	<b>od8k0ay5q</b>	<b>05/19/2017</b>	<b>11:28:19</b>	<b>139.478</b>	<b>05/19/2017</b>	<b>10:49:18</b>	<b>S</b>	<b>30.1020</b>	<b>22.5798</b>	<b>0.531149</b>	<b>1.01147</b>	<b>1.97238</b>	<b>3.51500</b>	<b>0.570539</b>

Power TW

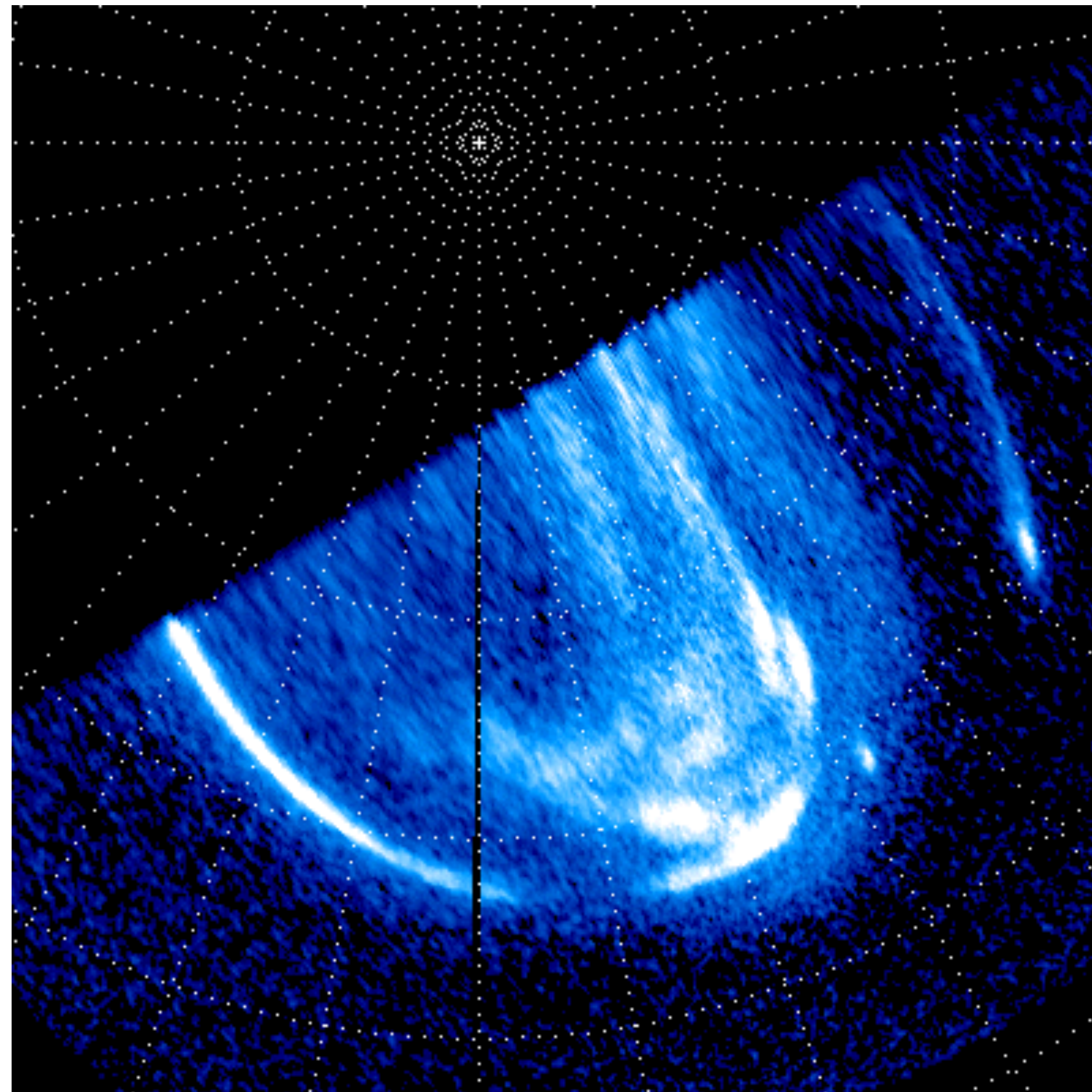


# All North Juno orbits 3 to 7 80 movies

*How do we deal with this  
complex morphology?*

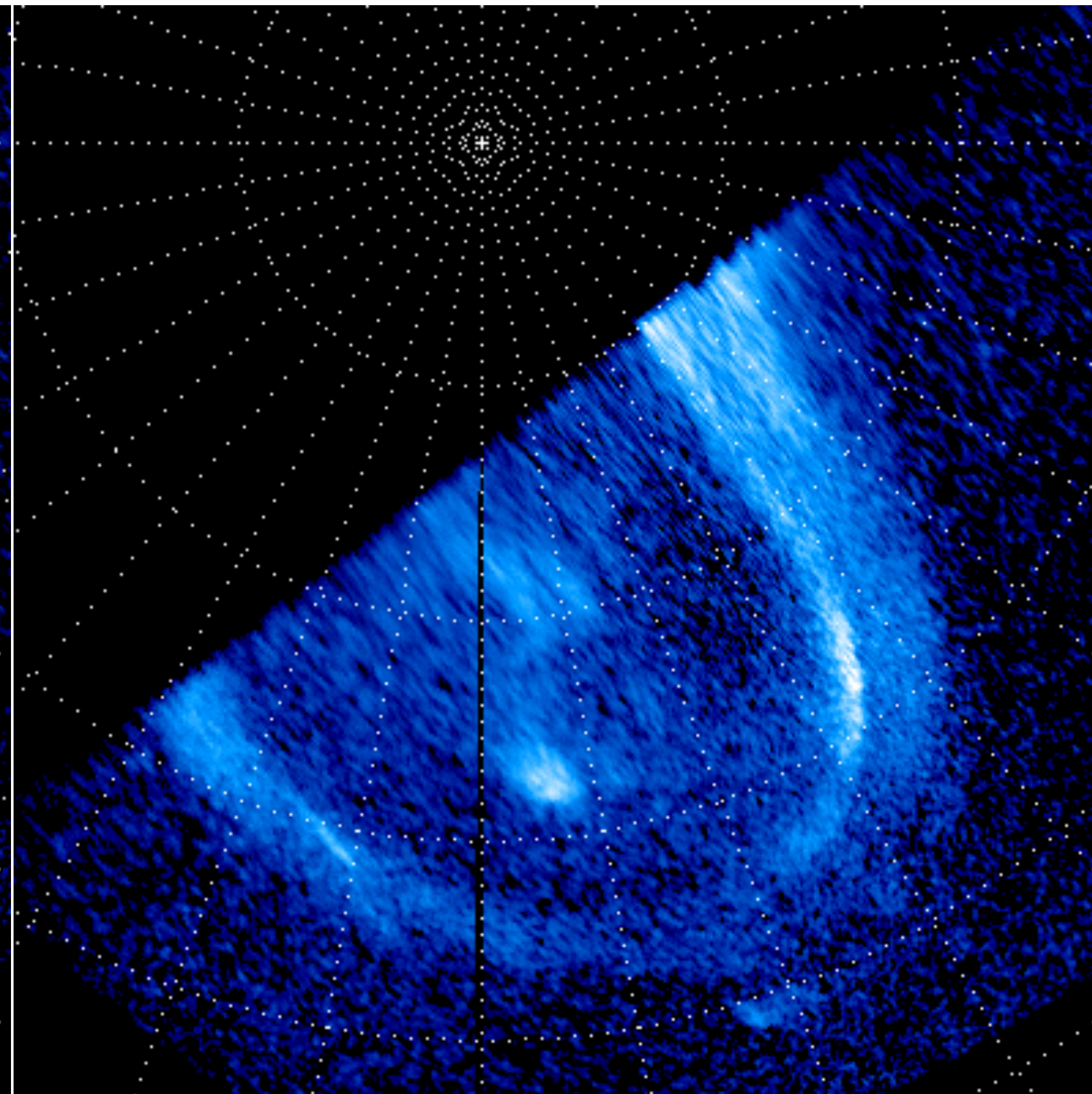


## « C » family



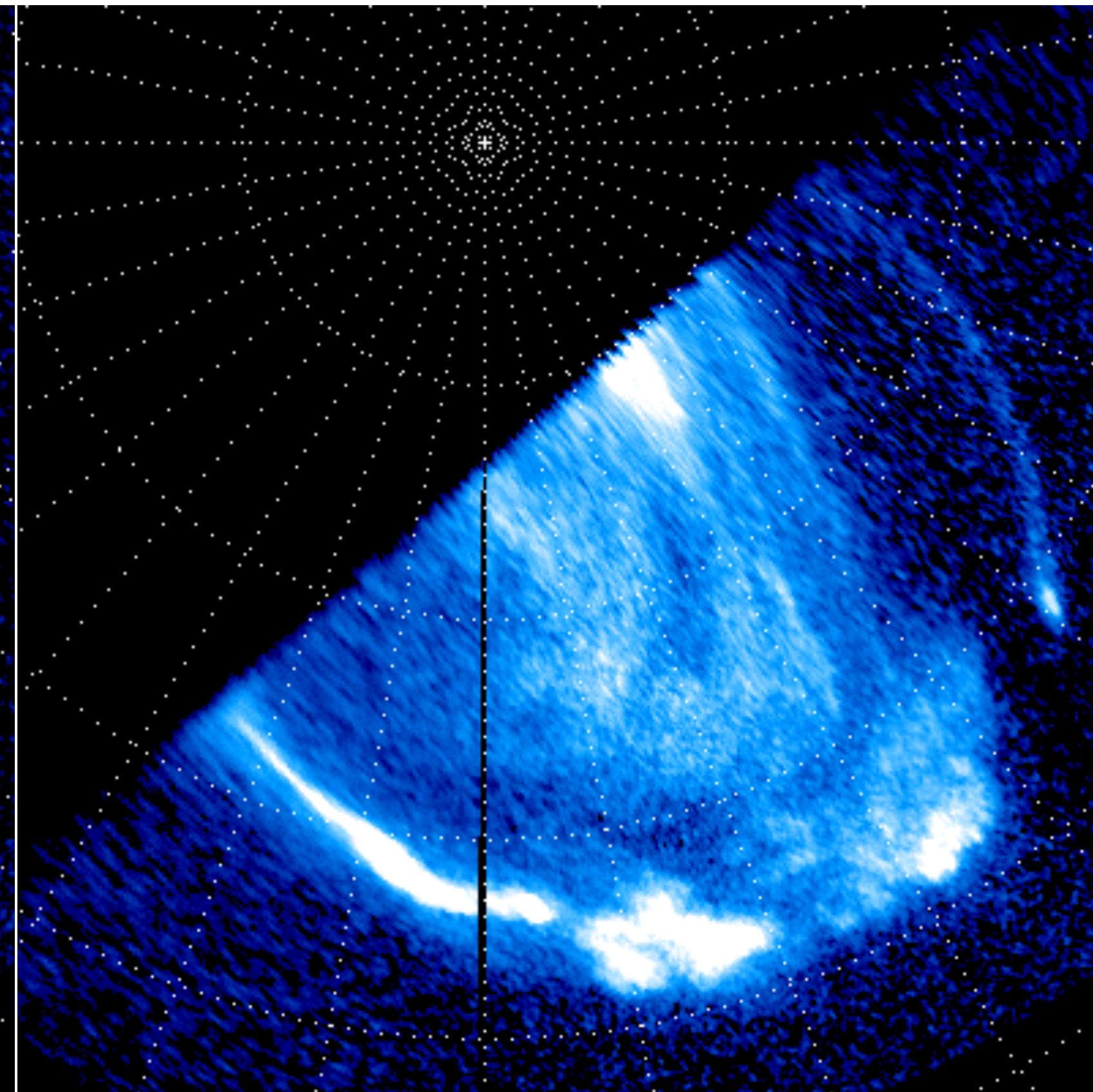
Enhanced IM activity  
compression region

## « A » family



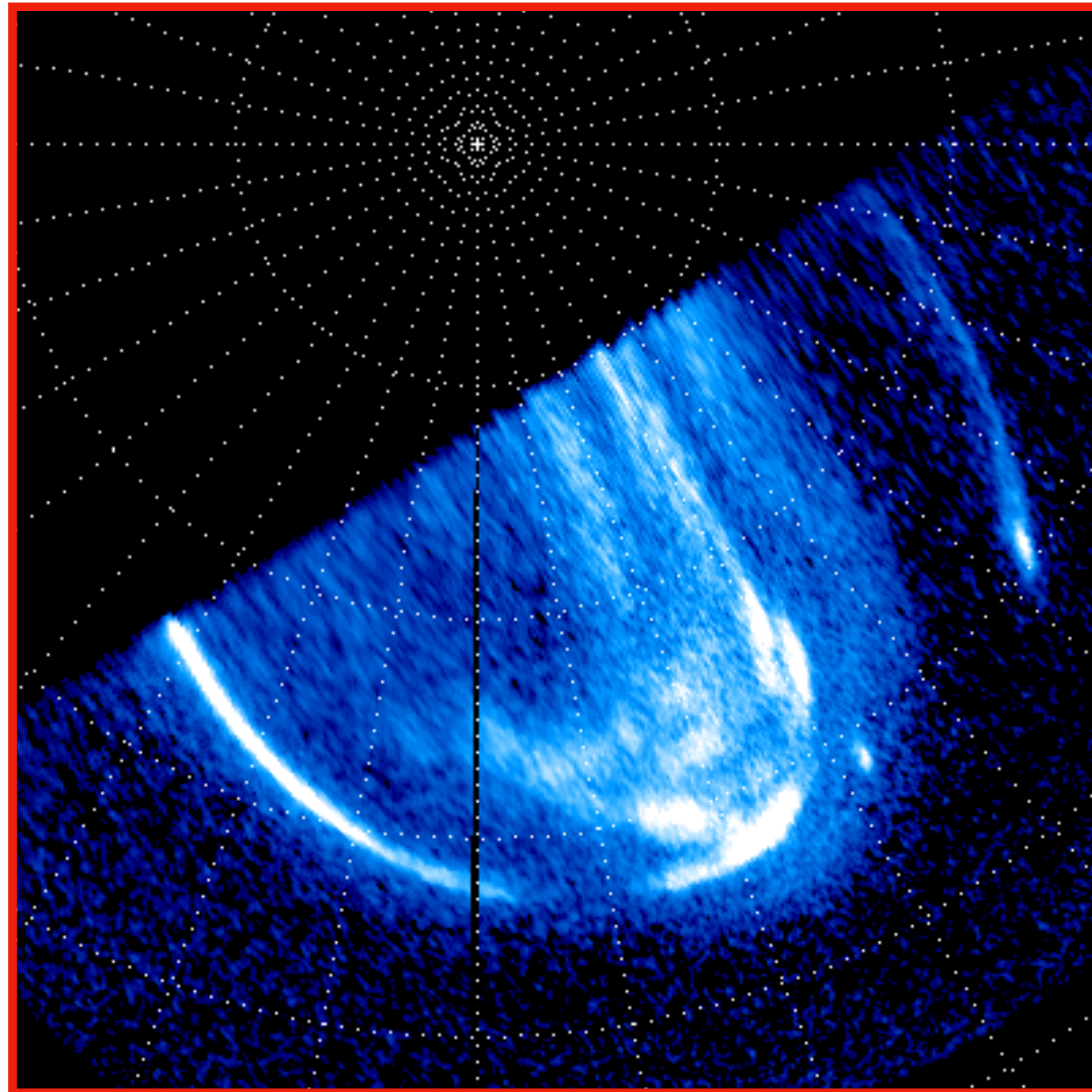
Reduced IM activity  
low SW pressure

## « D » family



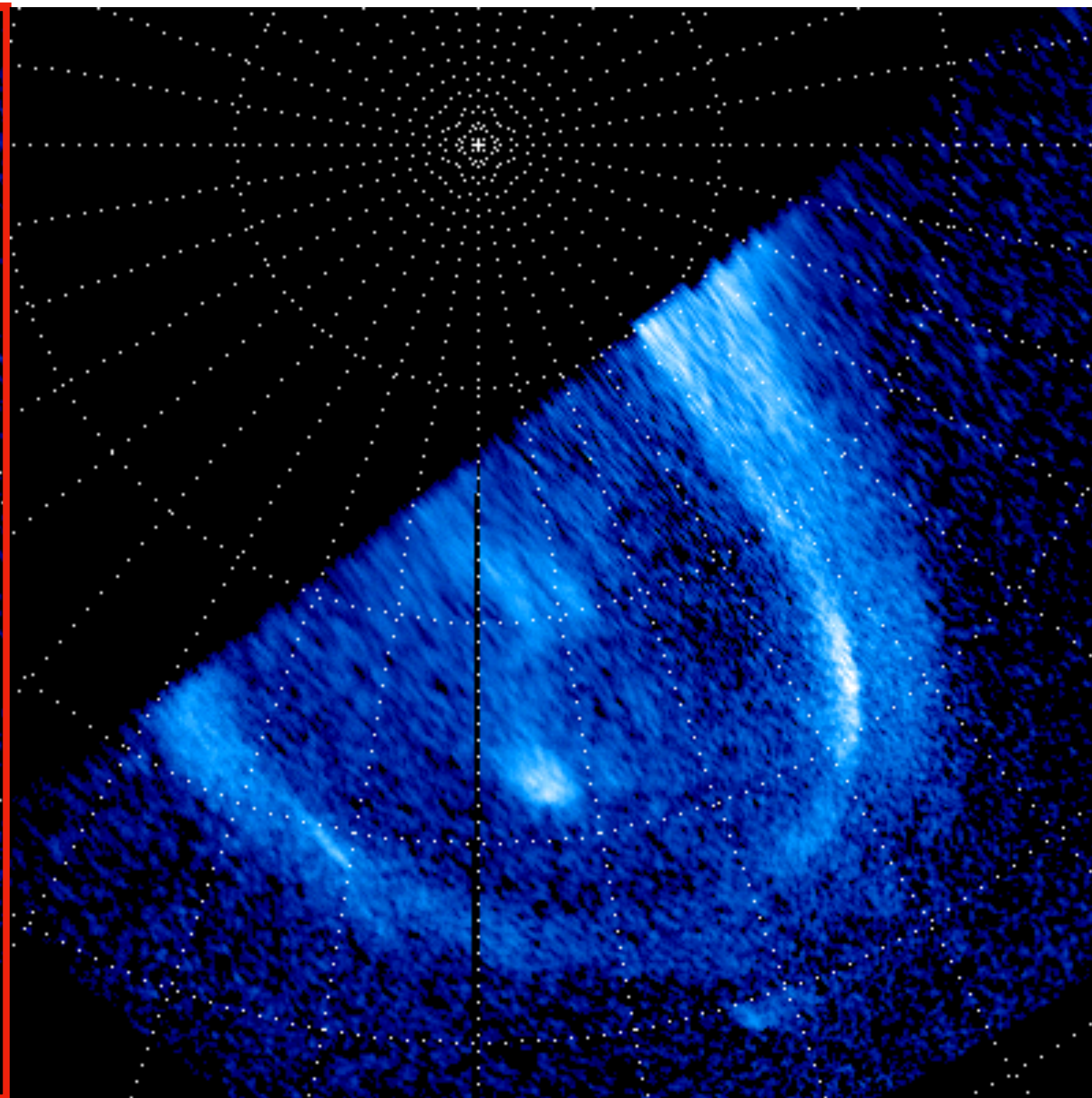
Strong plasma injections

**« C » family**



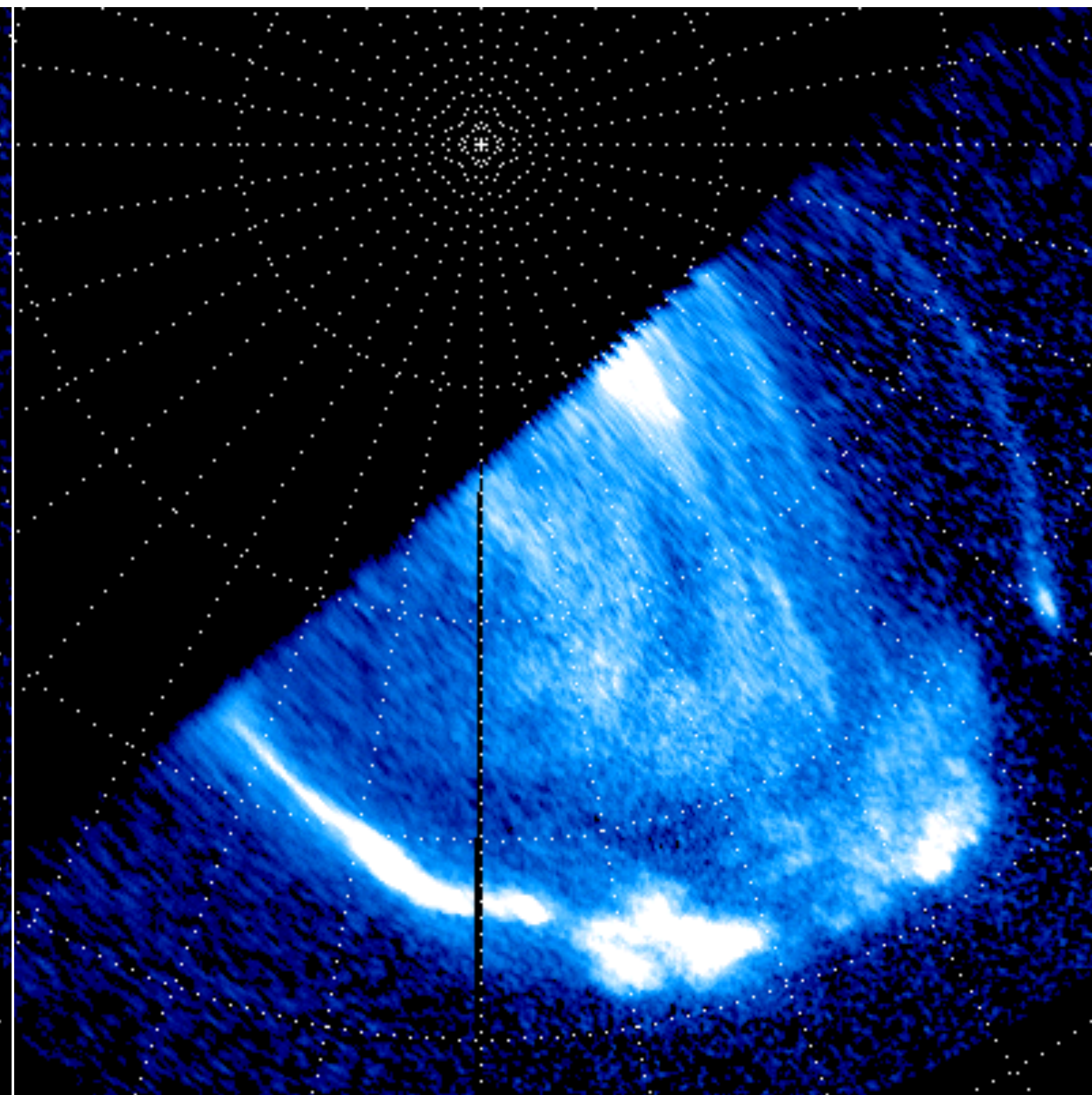
**Enhanced IM activity  
compression region**

**« A » family**



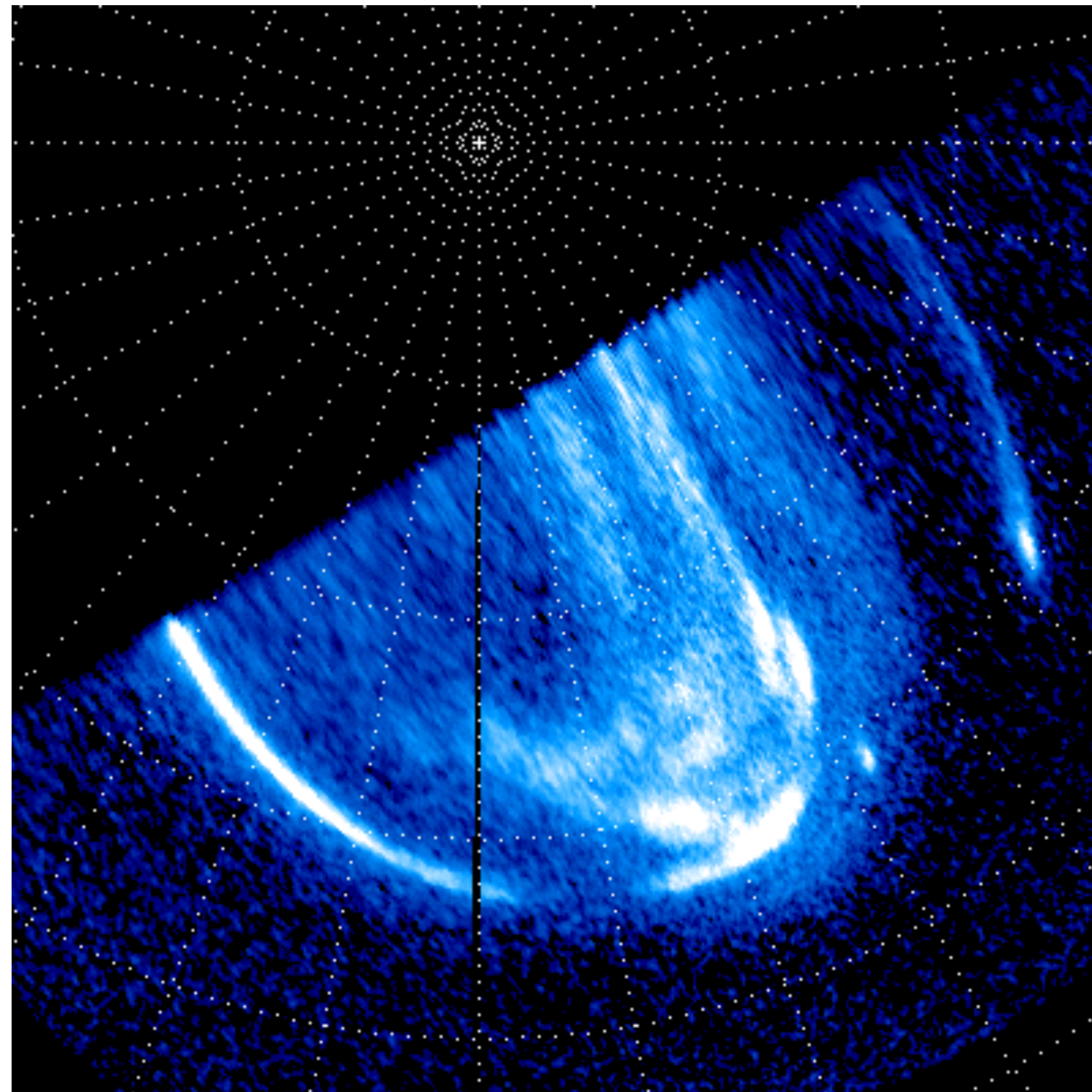
**Reduced IM activity  
low SW pressure**

**« D » family**



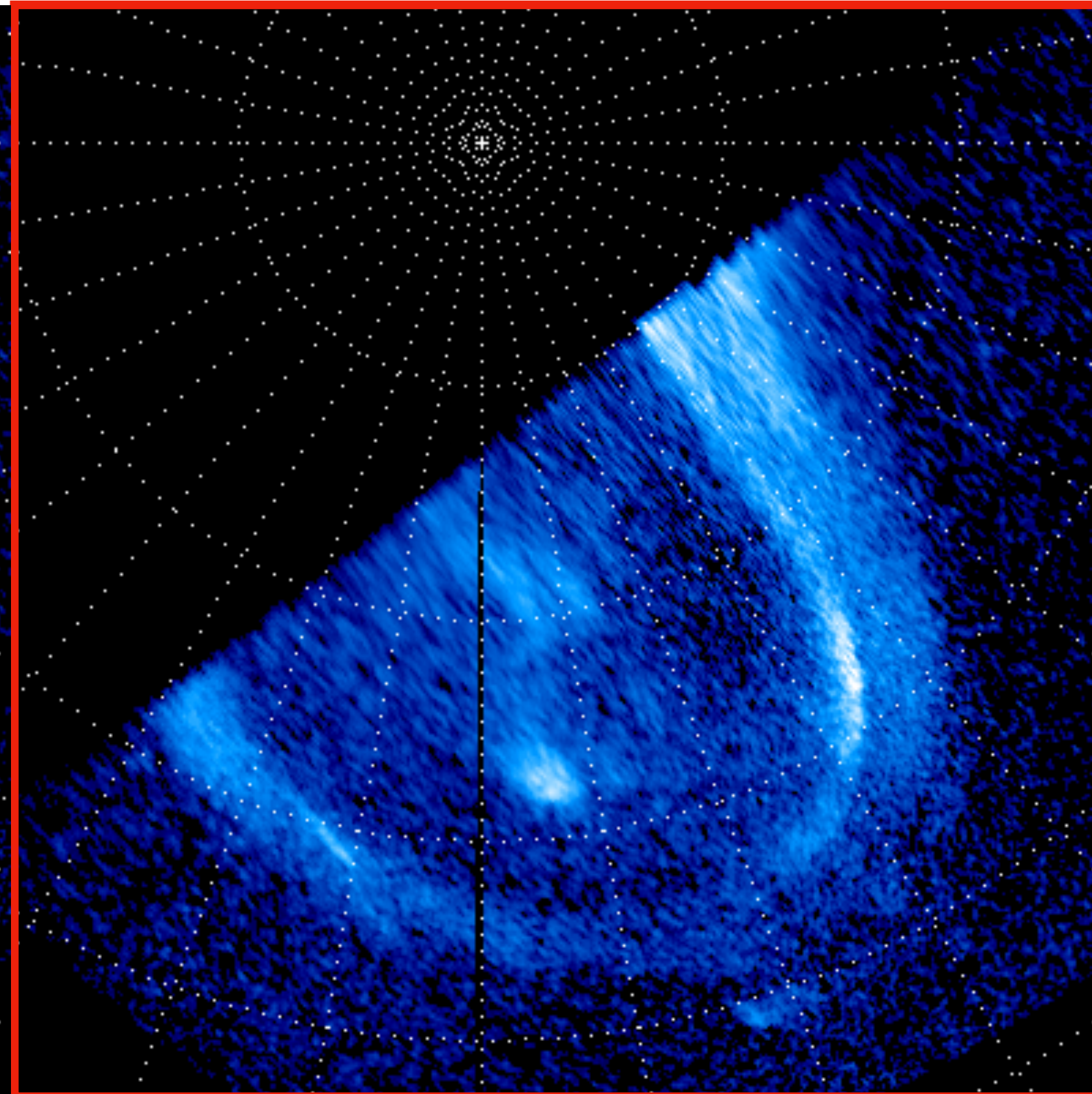
**Strong plasma injections**

« C » family



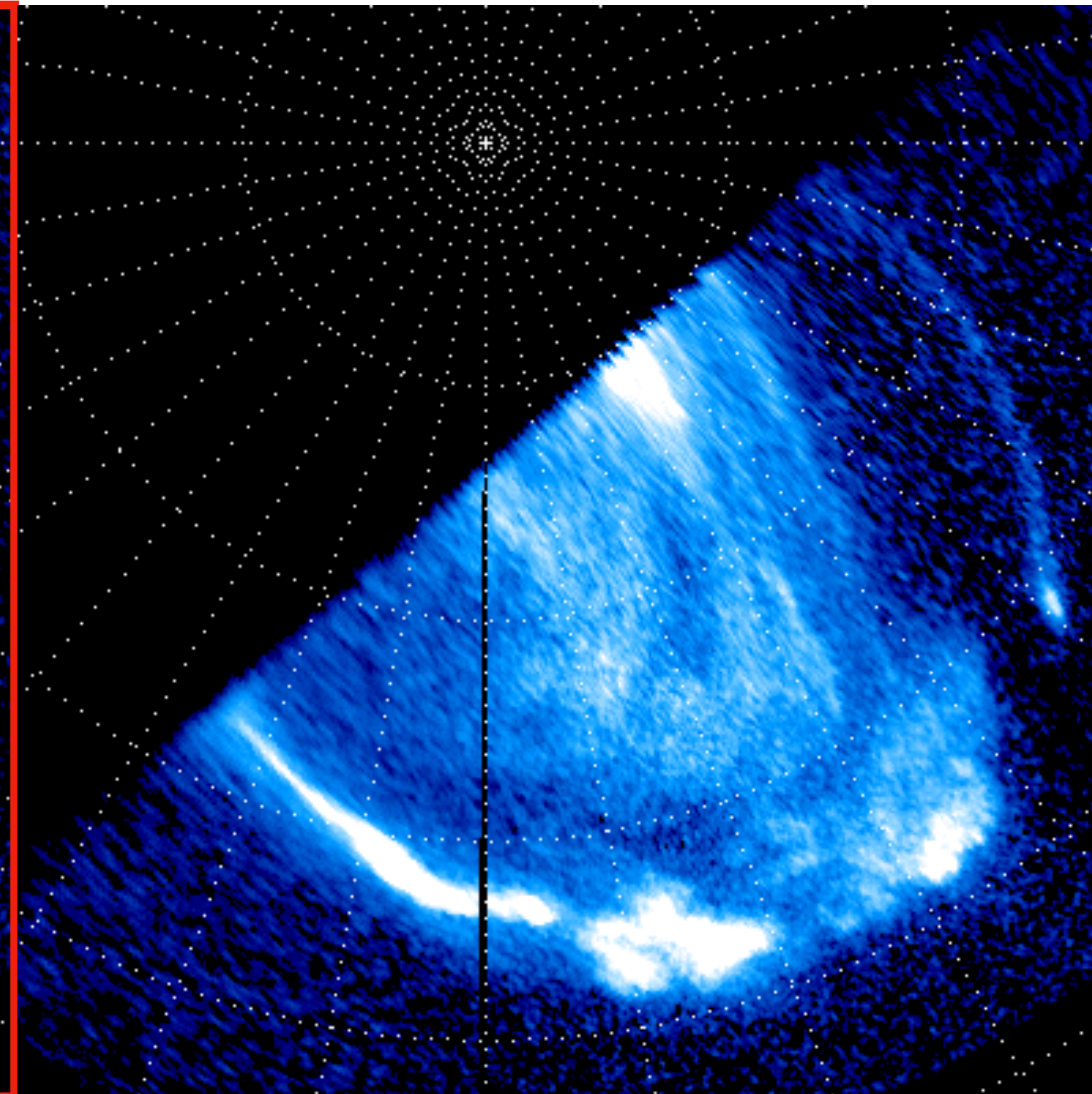
Enhanced IM activity  
compression region

« A » family



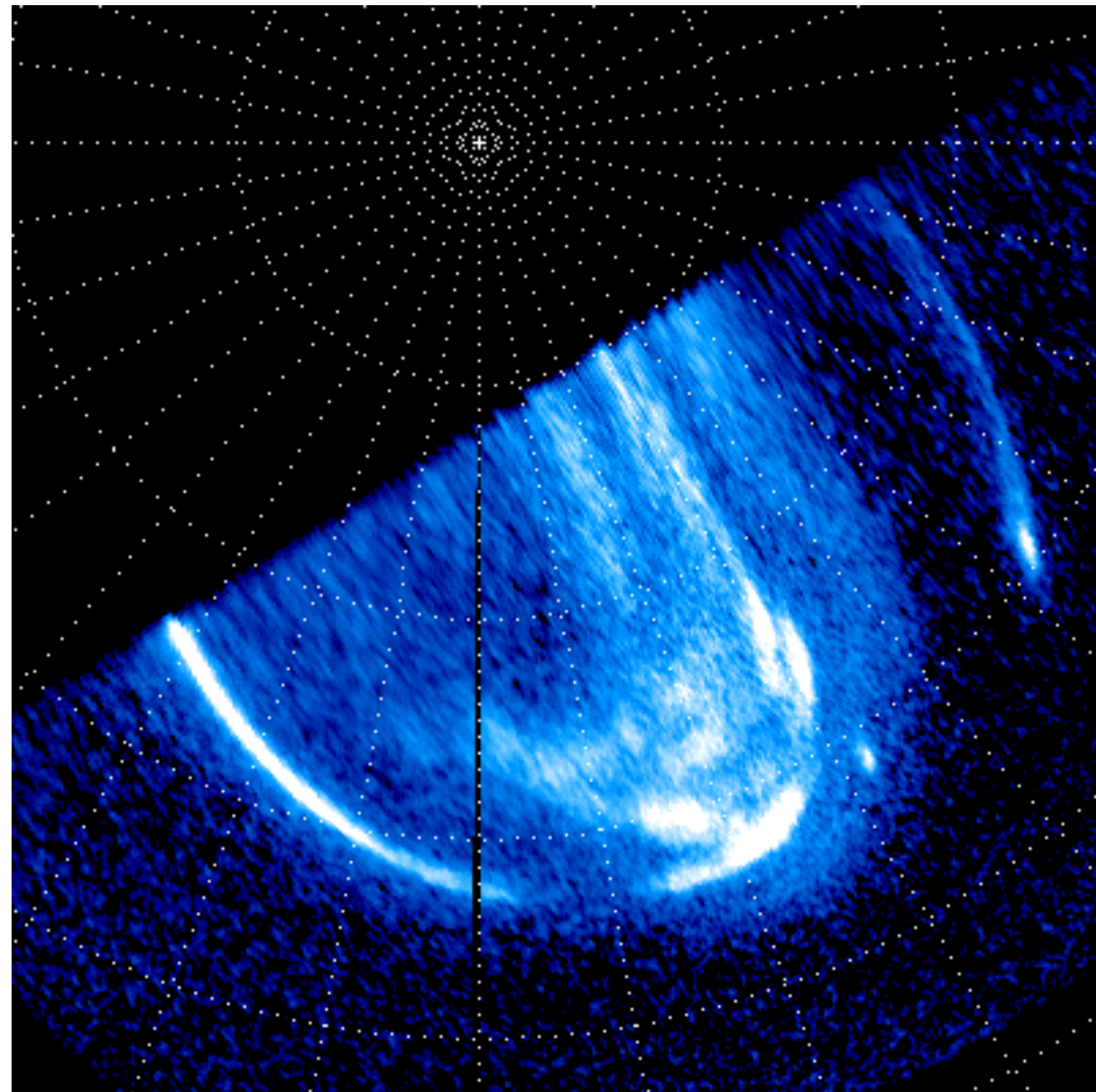
Reduced IM activity  
low SW pressure

« D » family



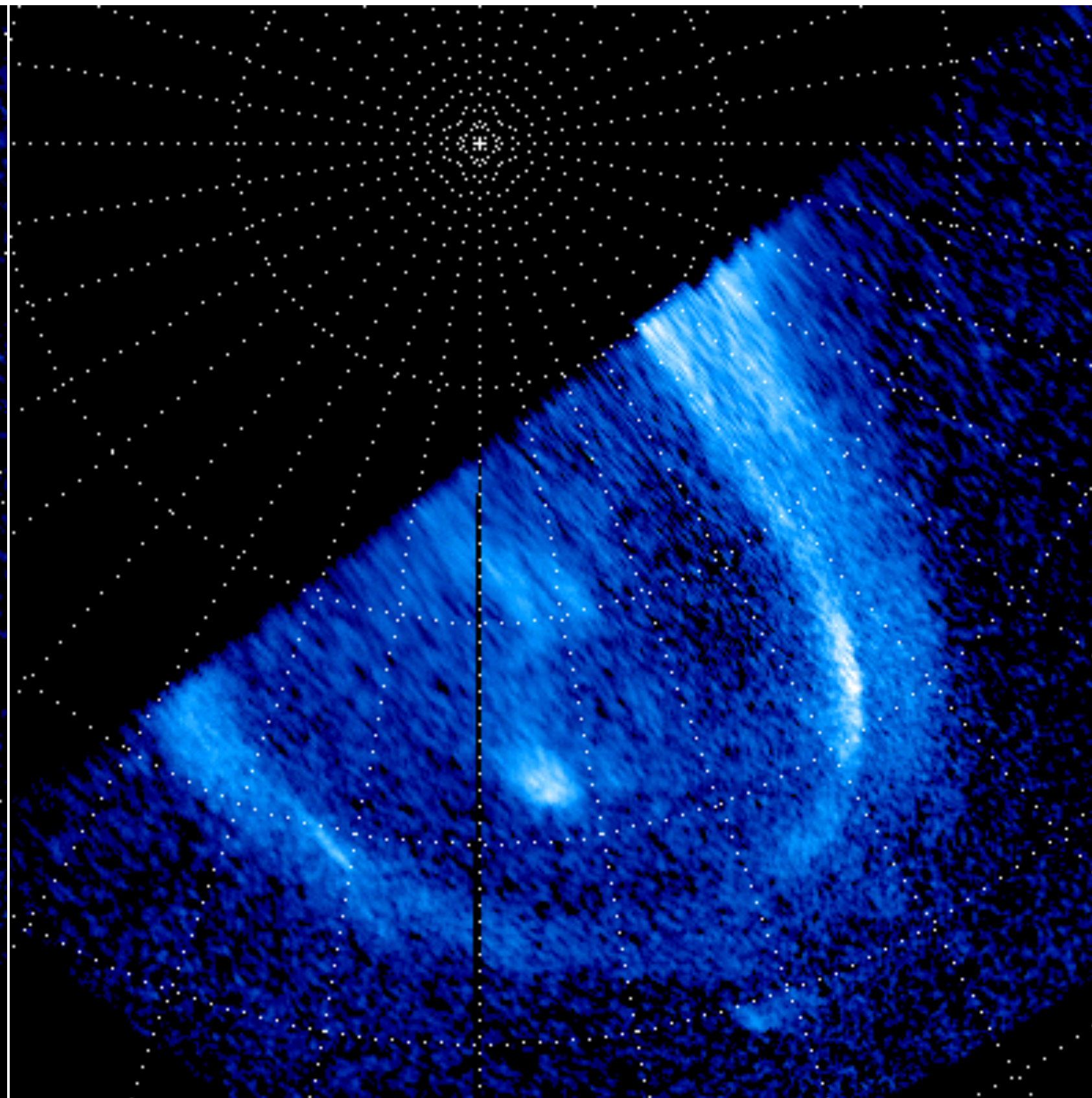
Strong plasma injections

« C » family



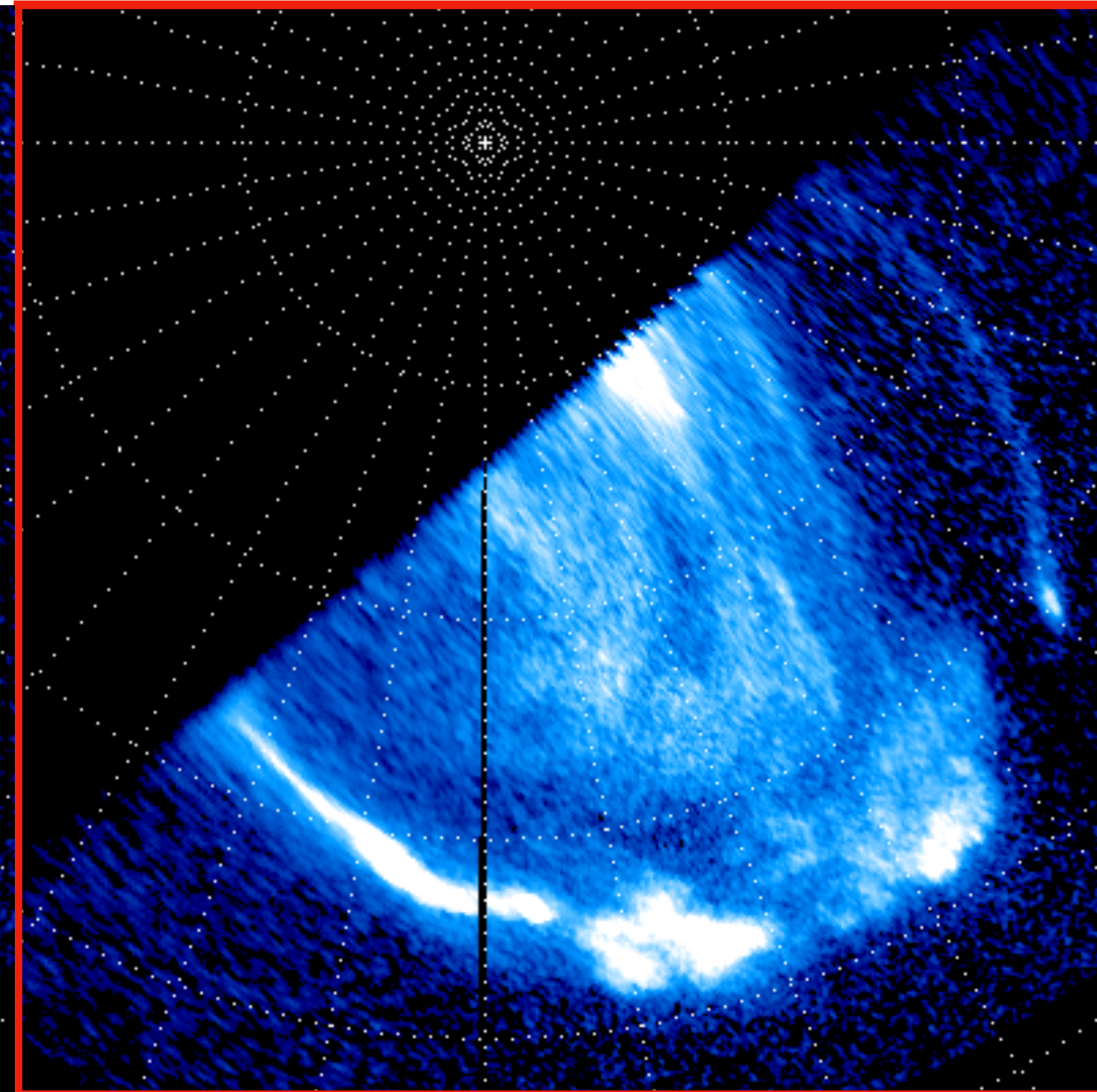
Enhanced IM activity  
compression region

« A » family



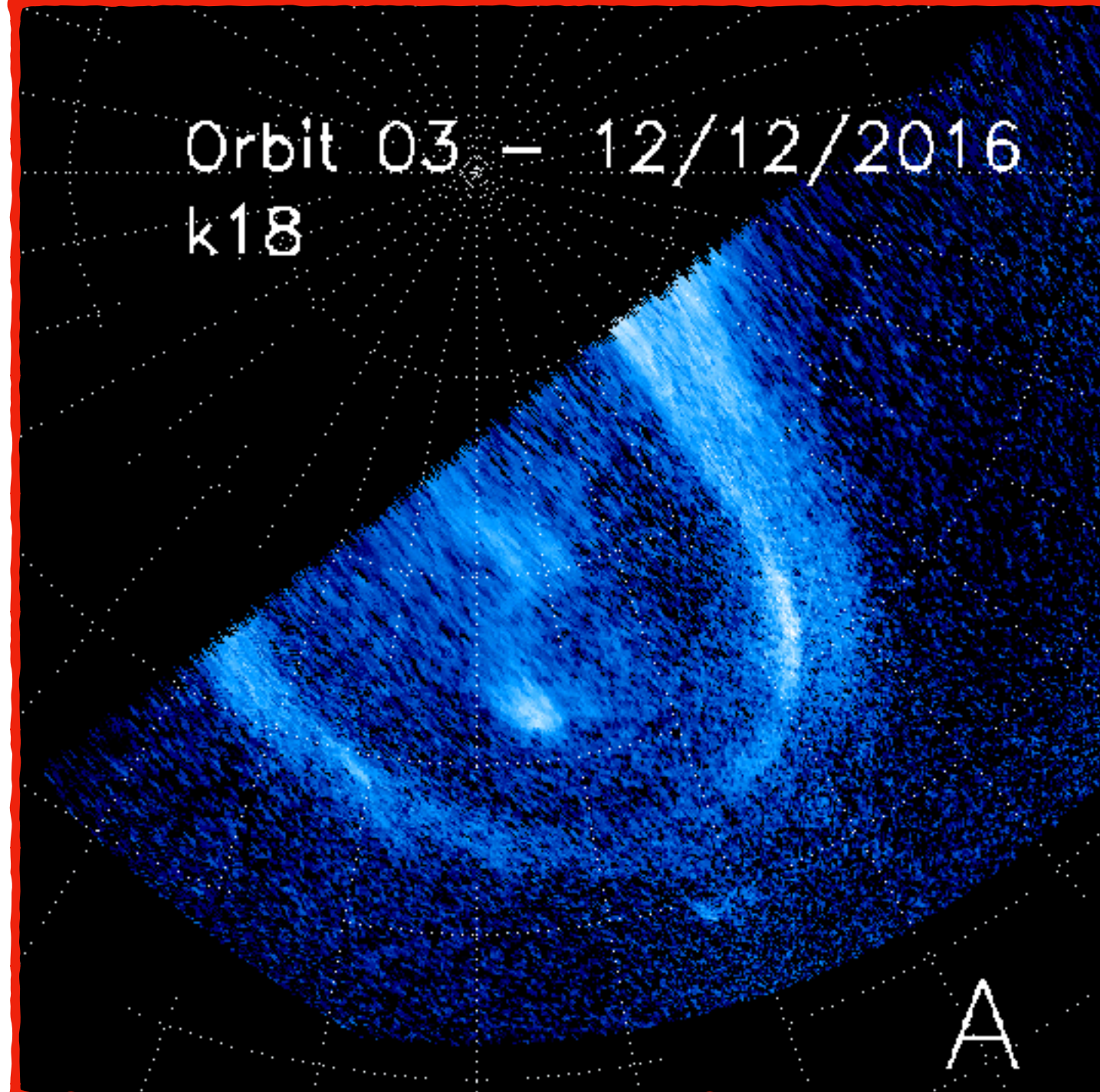
Reduced IM activity  
low SW pressure

« D » family



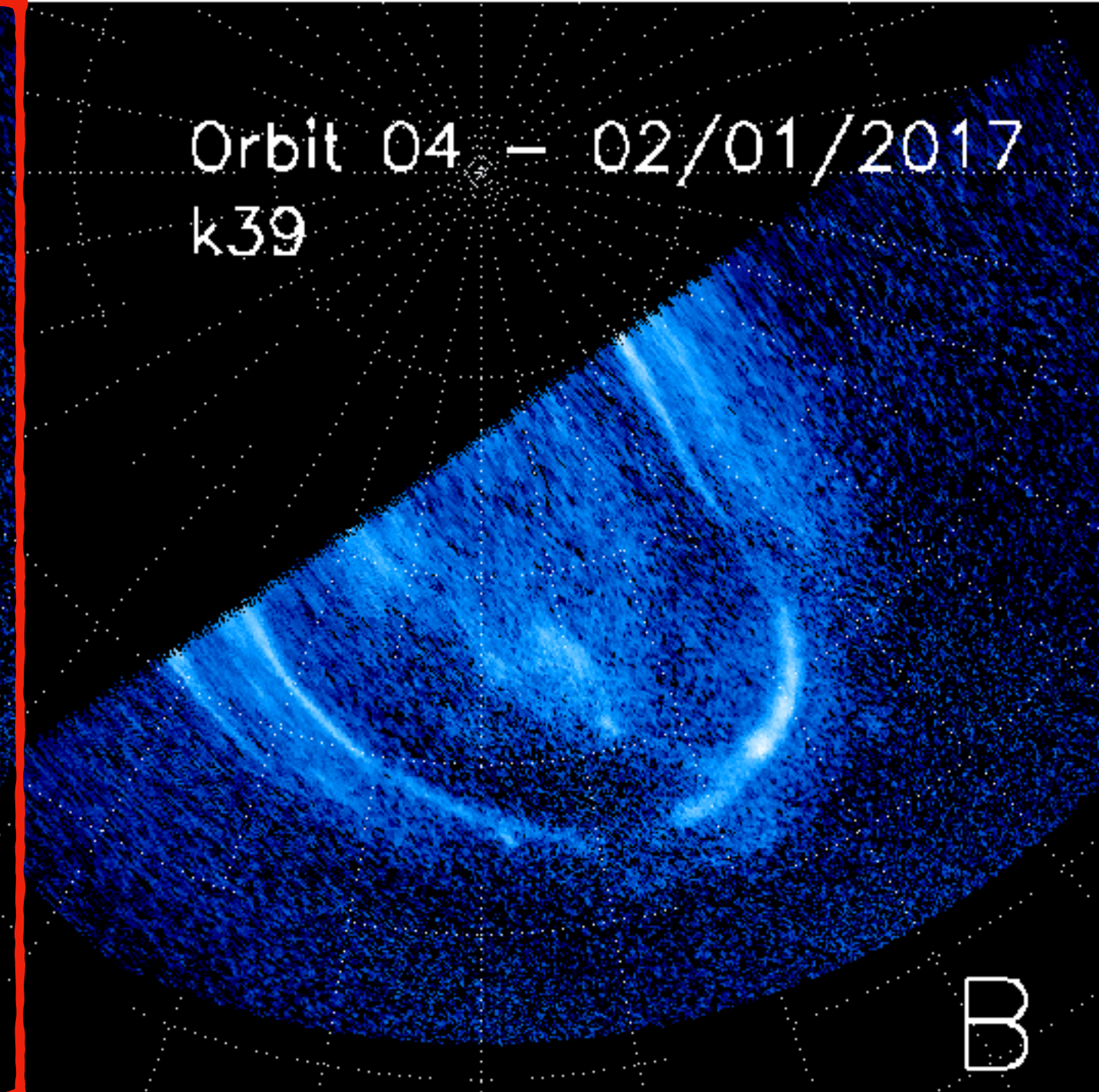
Strong plasma injections

Orbit 03 – 12/12/2016  
k18



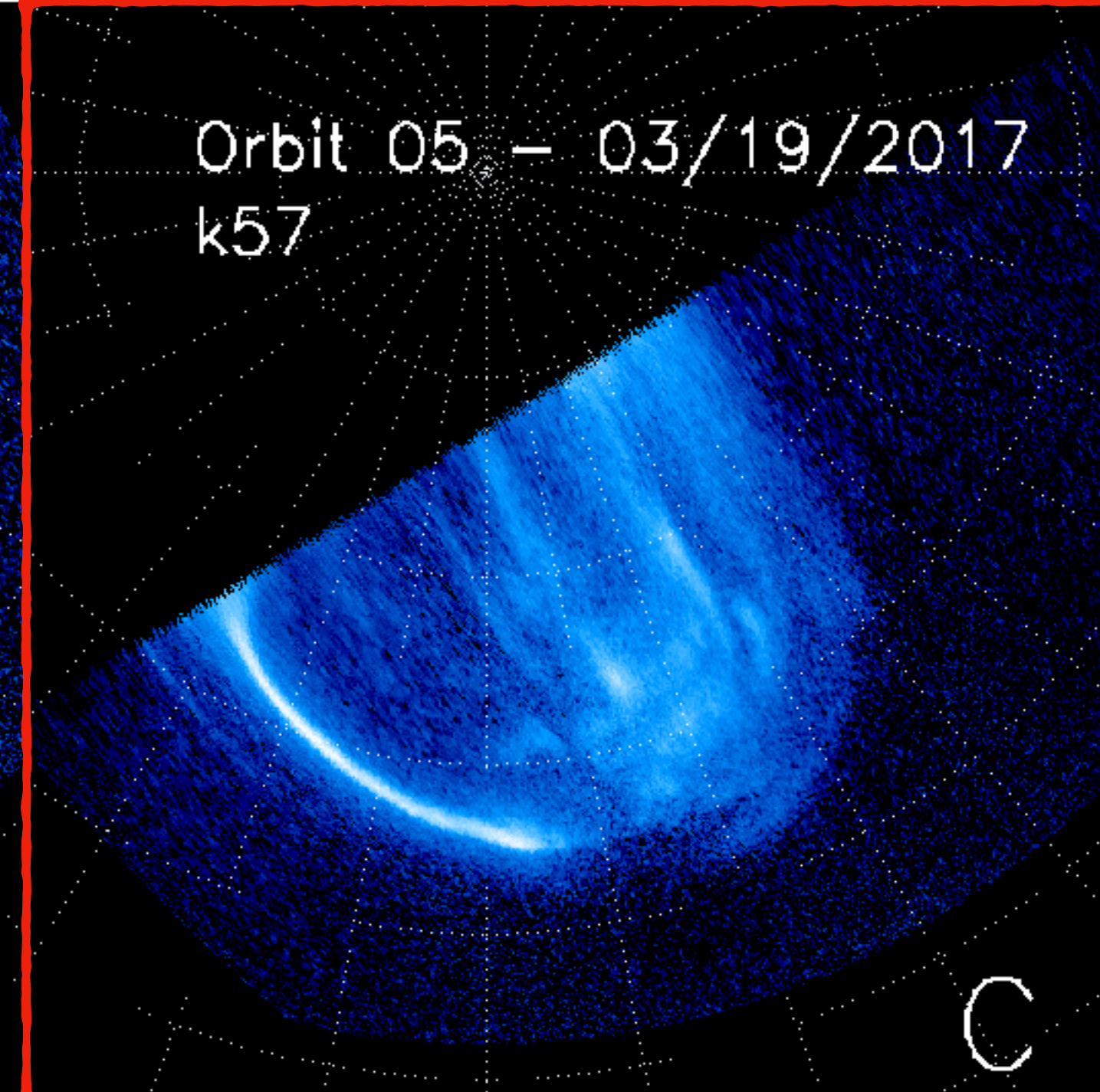
A

Orbit 04 – 02/01/2017  
k39



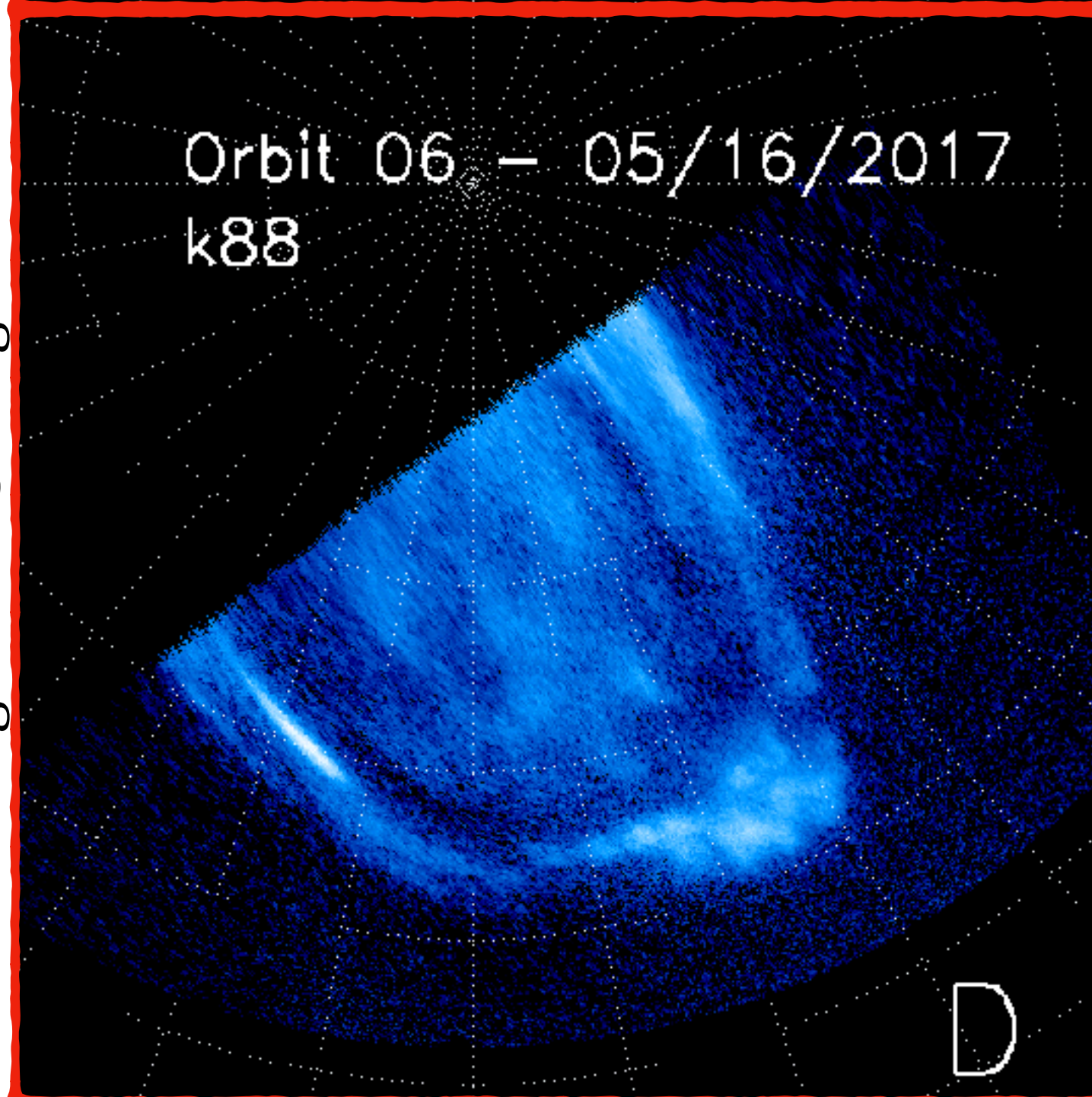
B

Orbit 05 – 03/19/2017  
k57



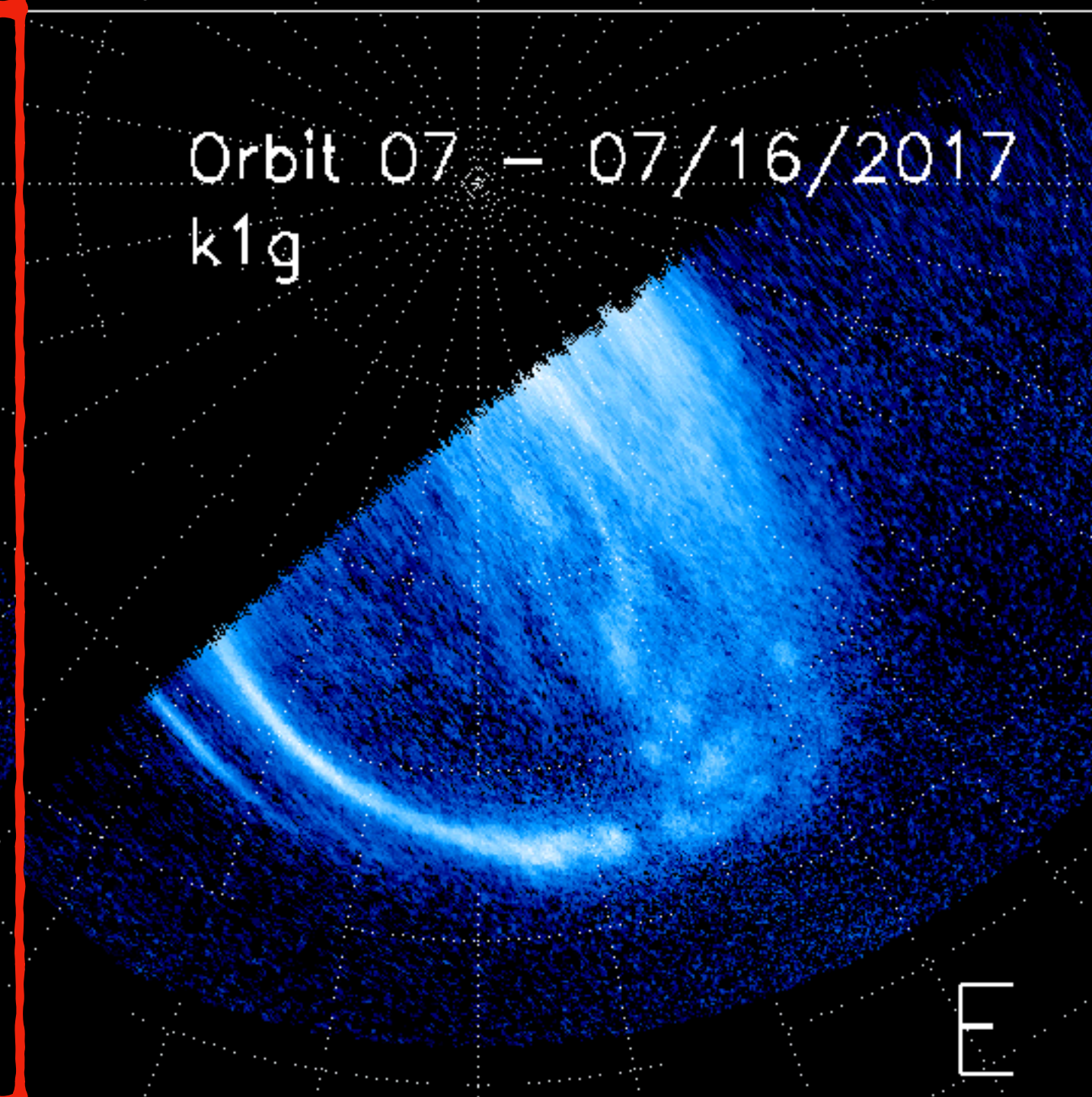
C

Orbit 06 – 05/16/2017  
k88



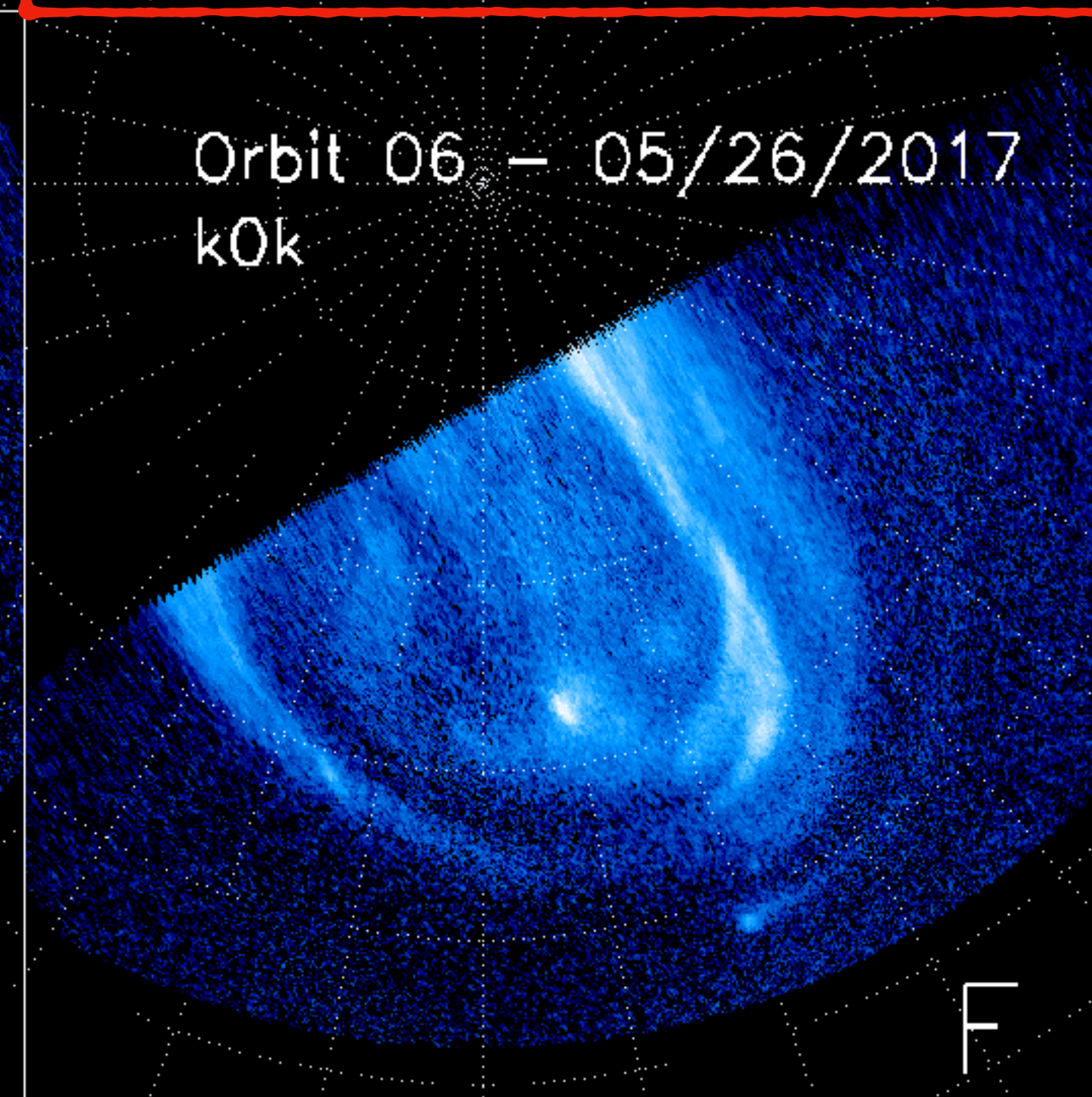
D

Orbit 07 – 07/16/2017  
k1g

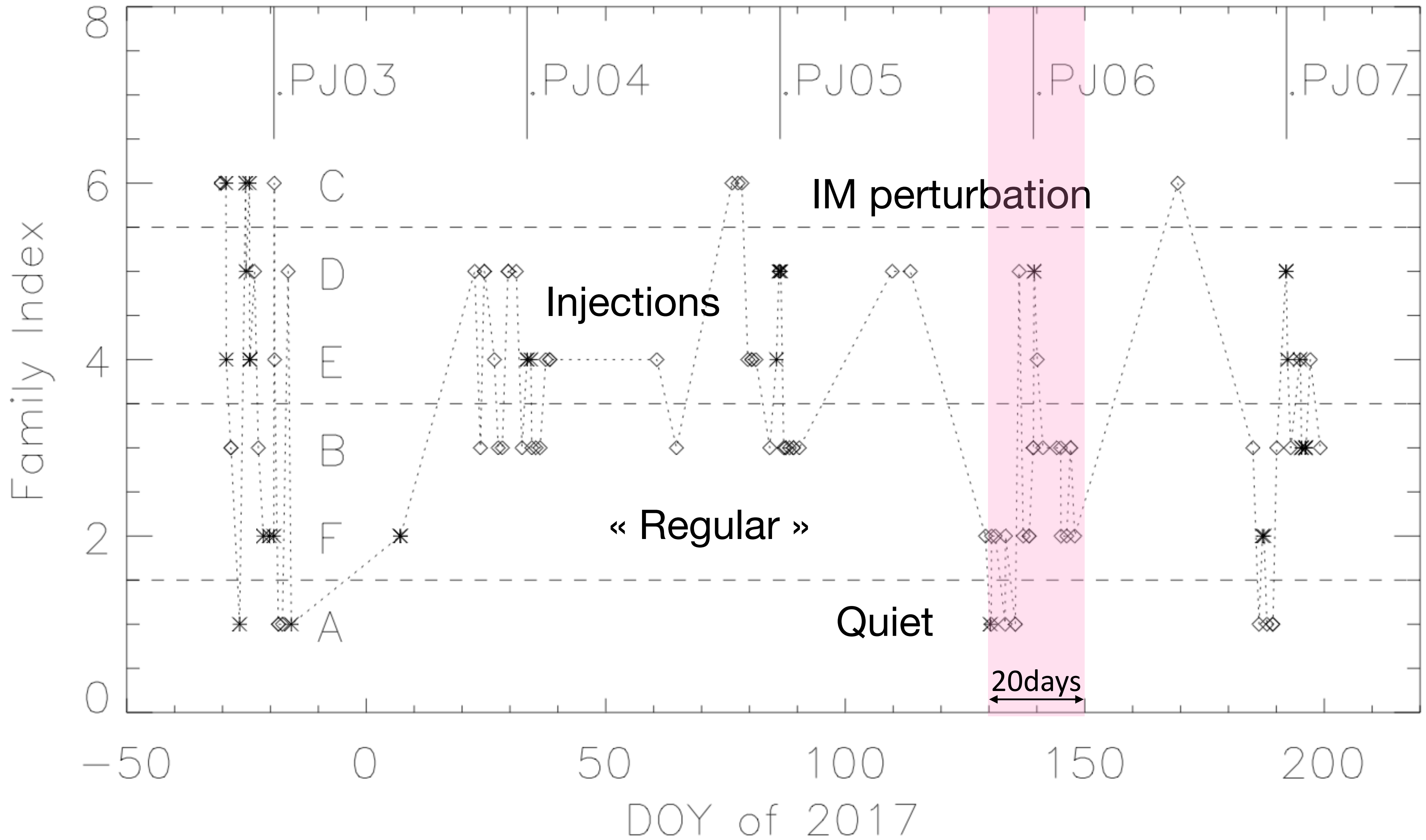


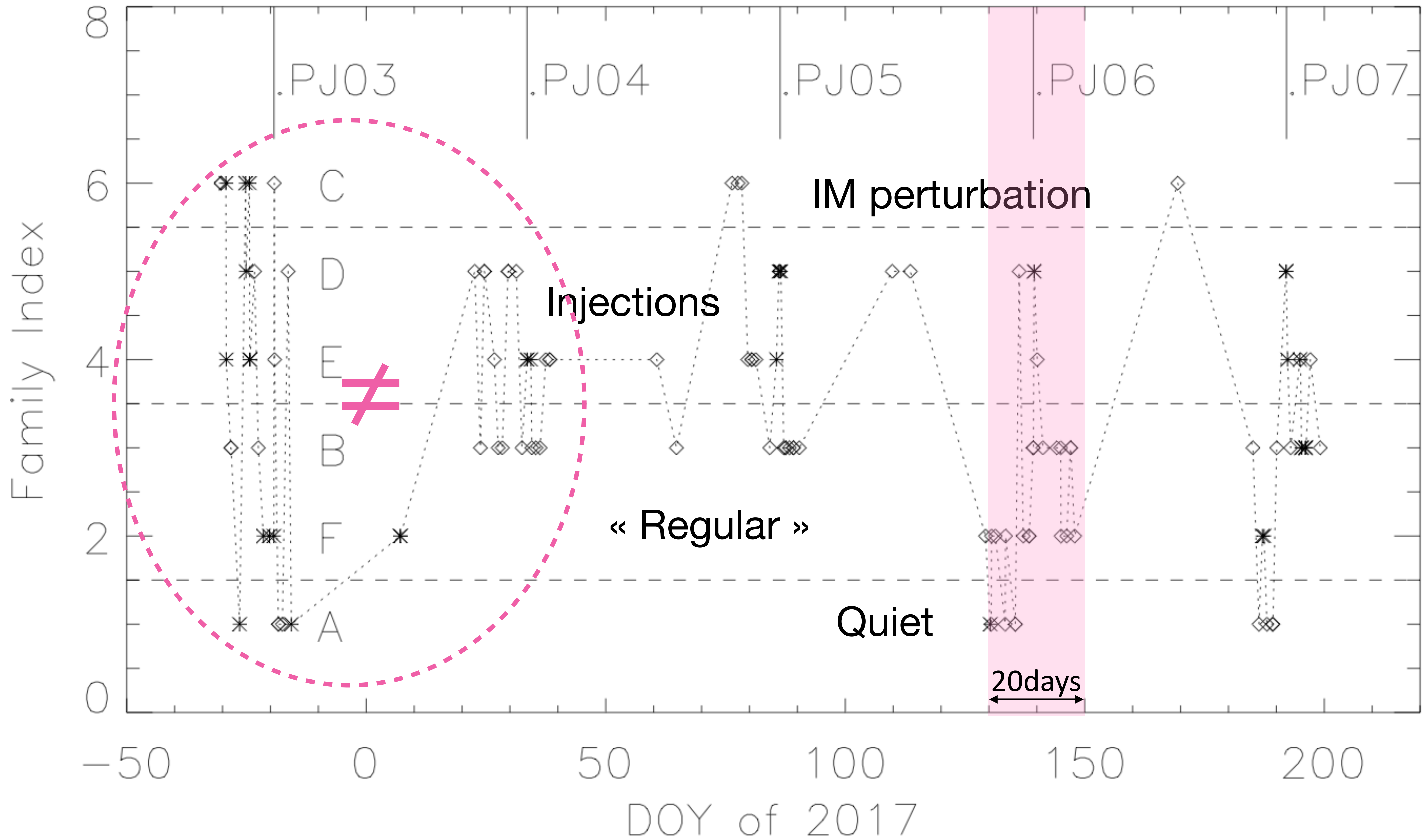
E

Orbit 06 – 05/26/2017  
k0k

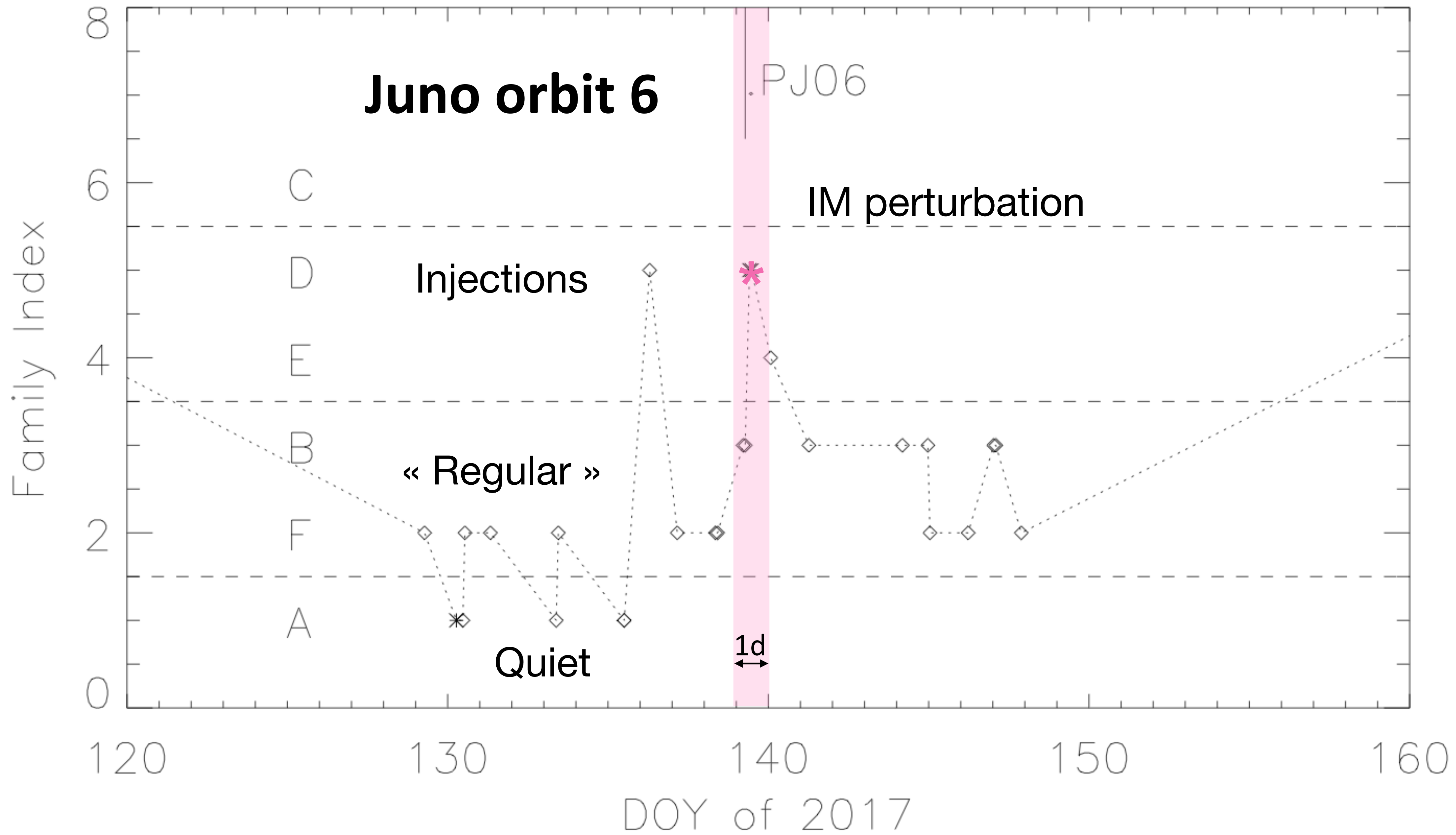


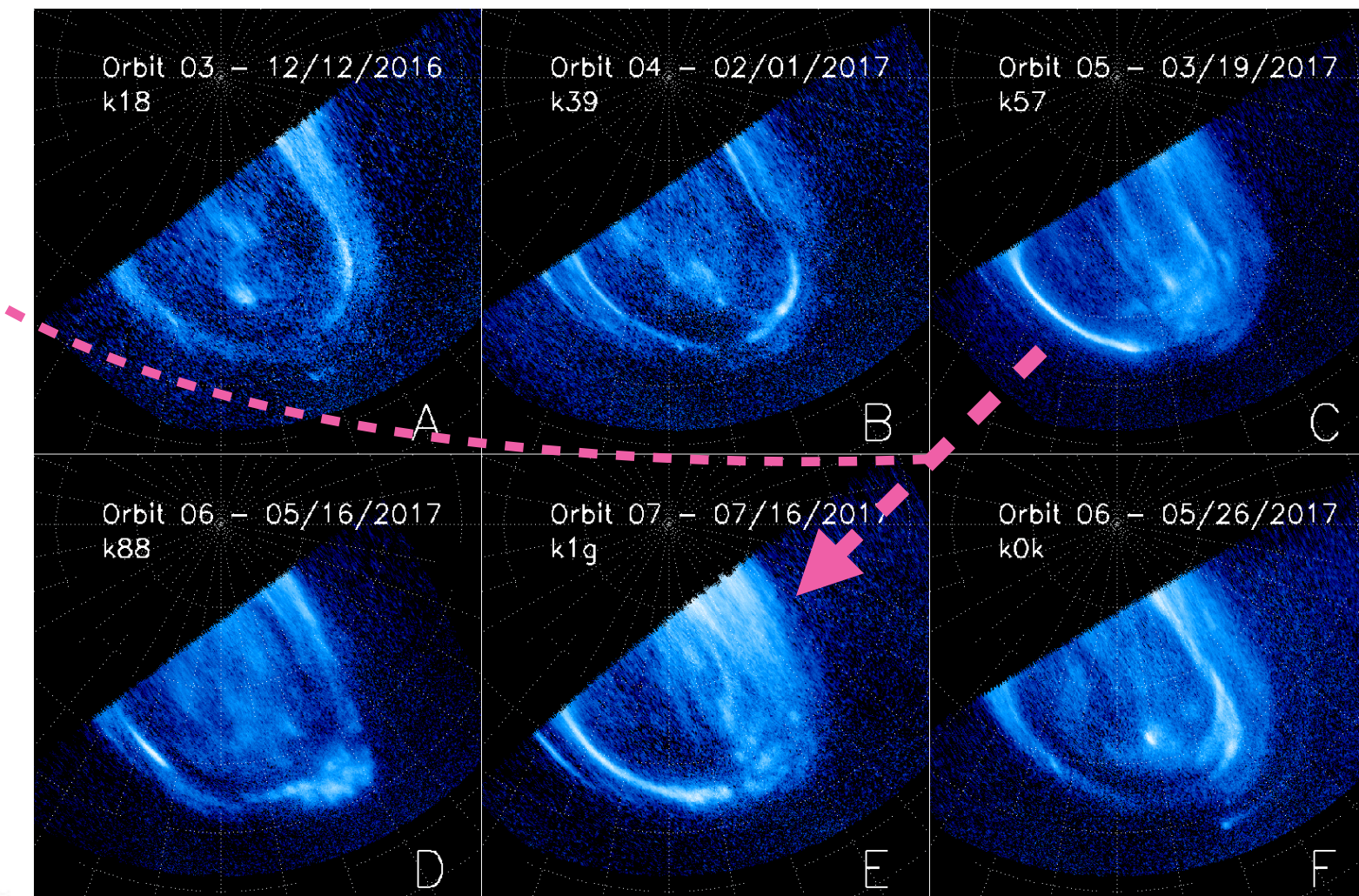
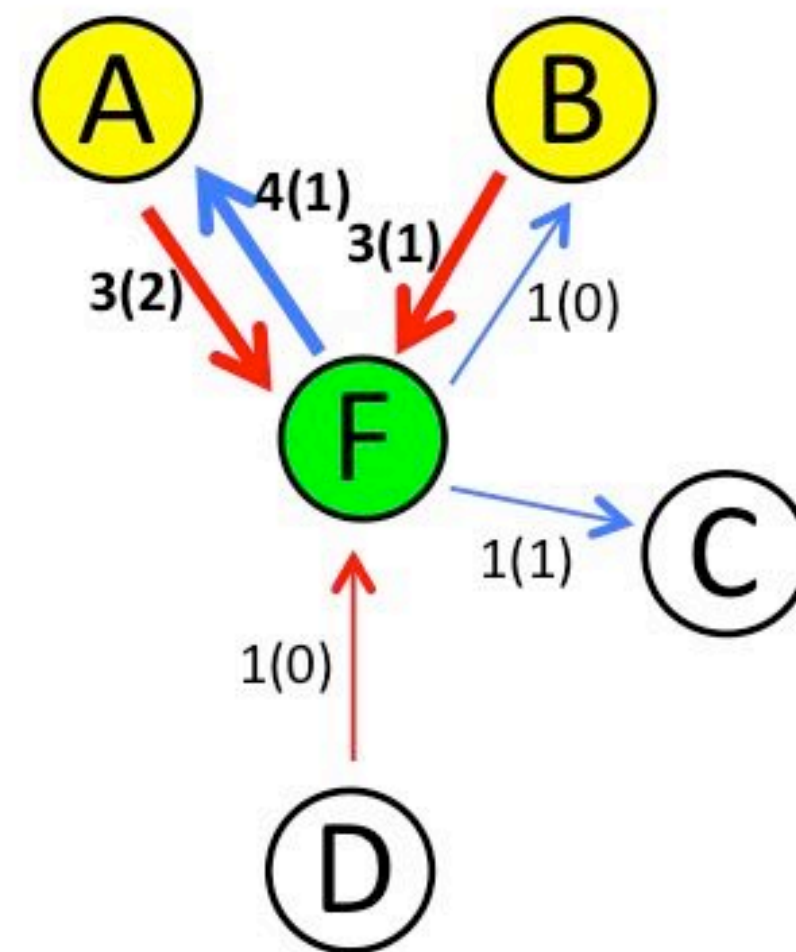
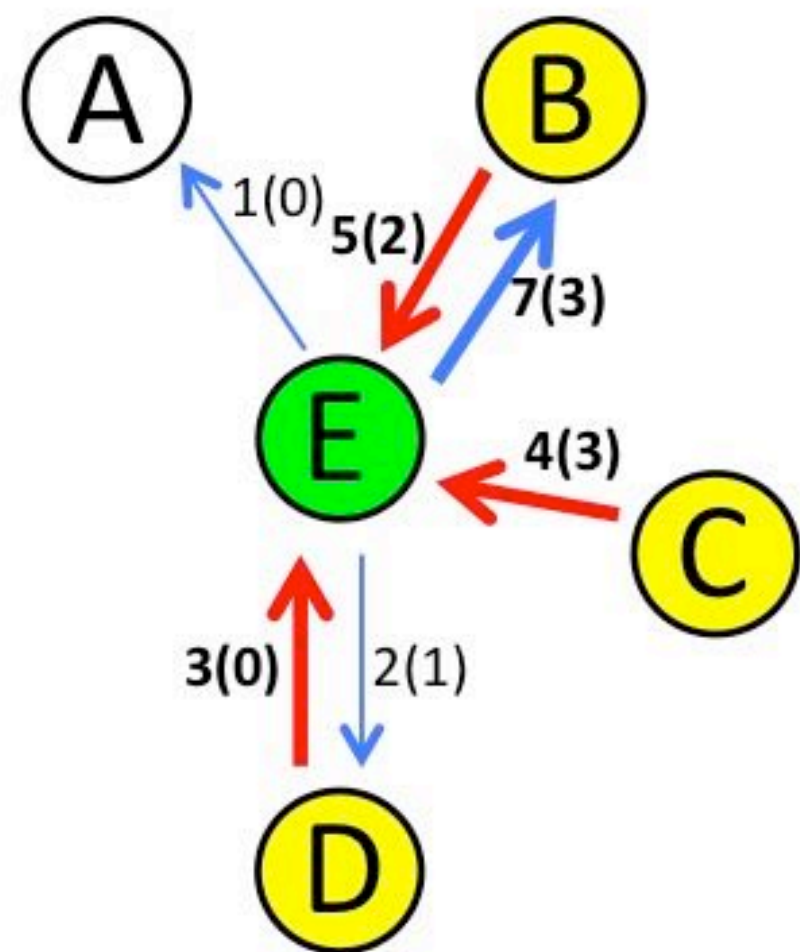
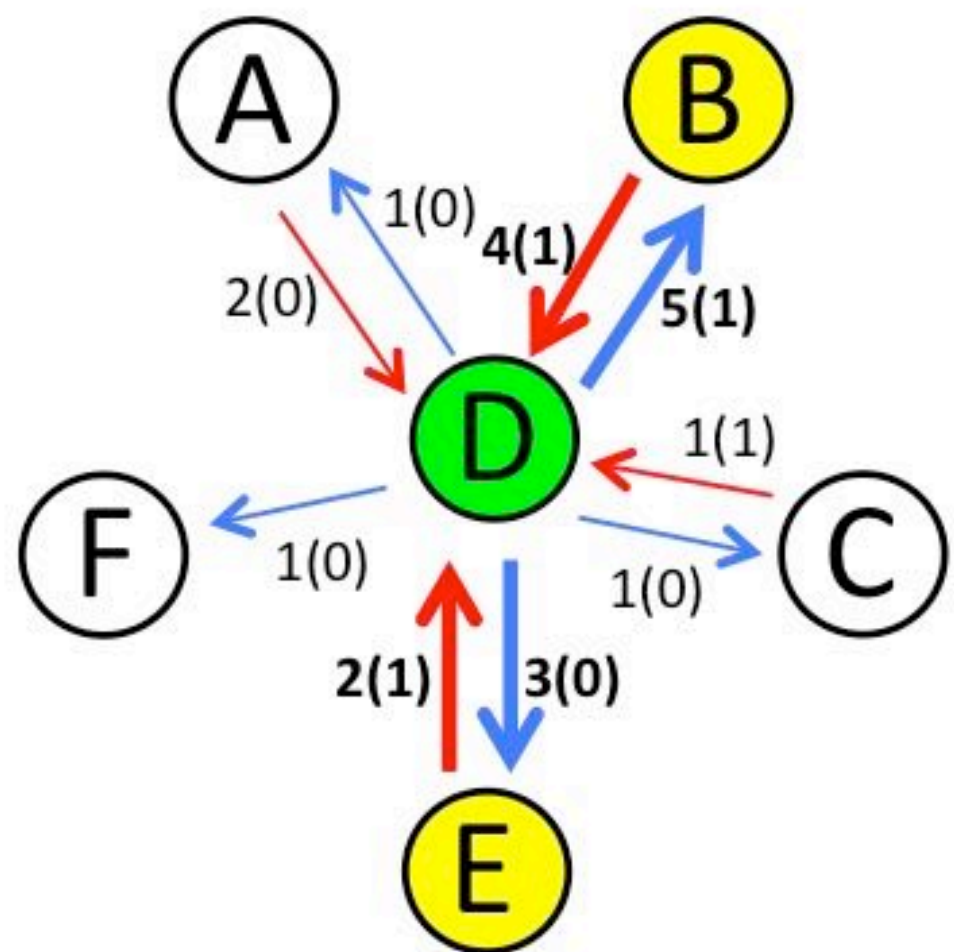
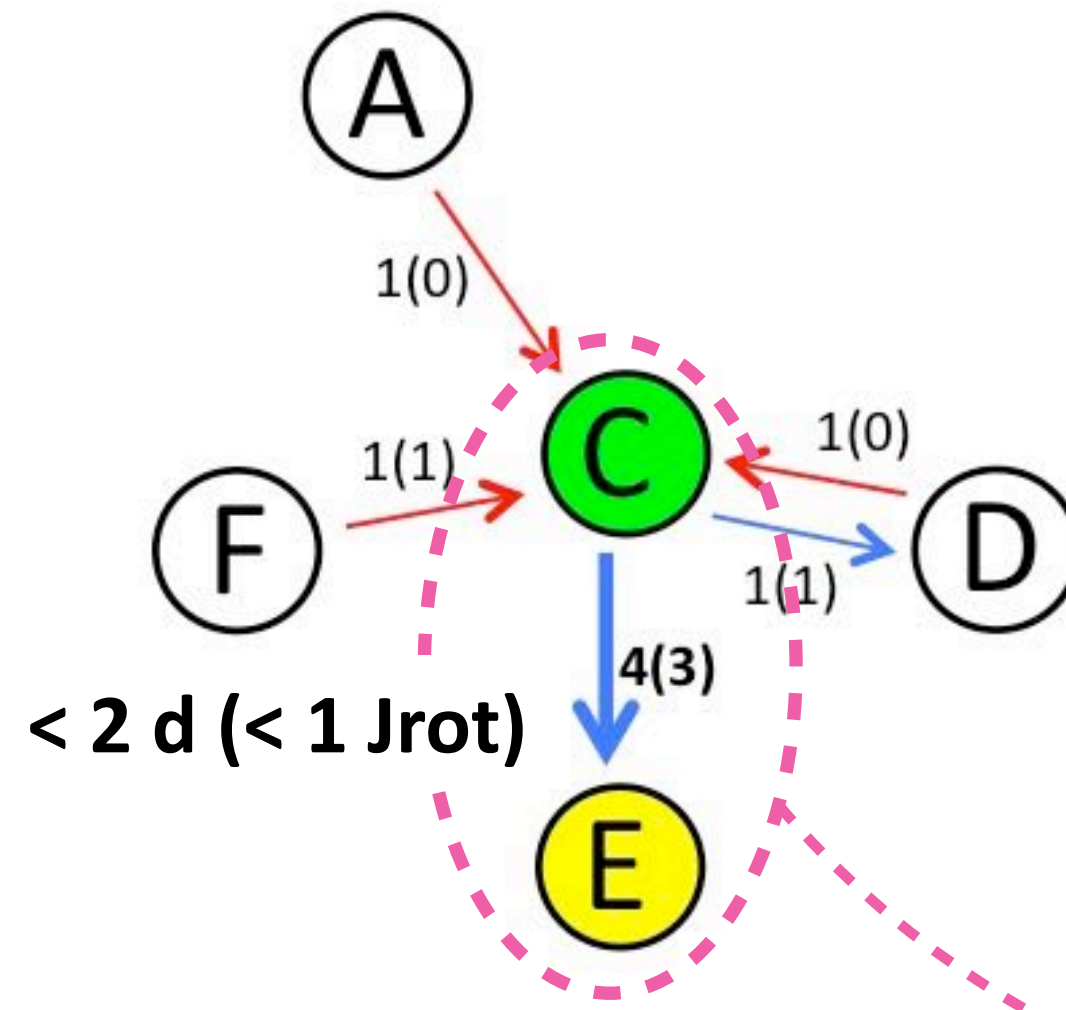
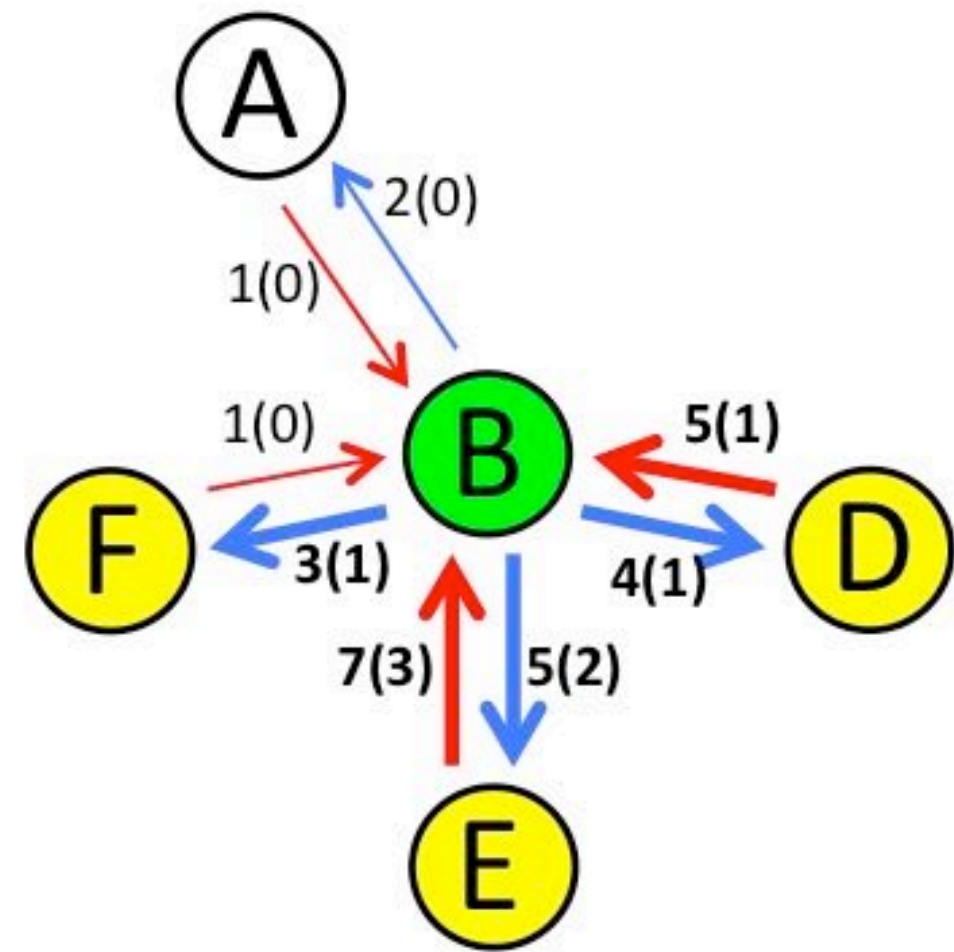
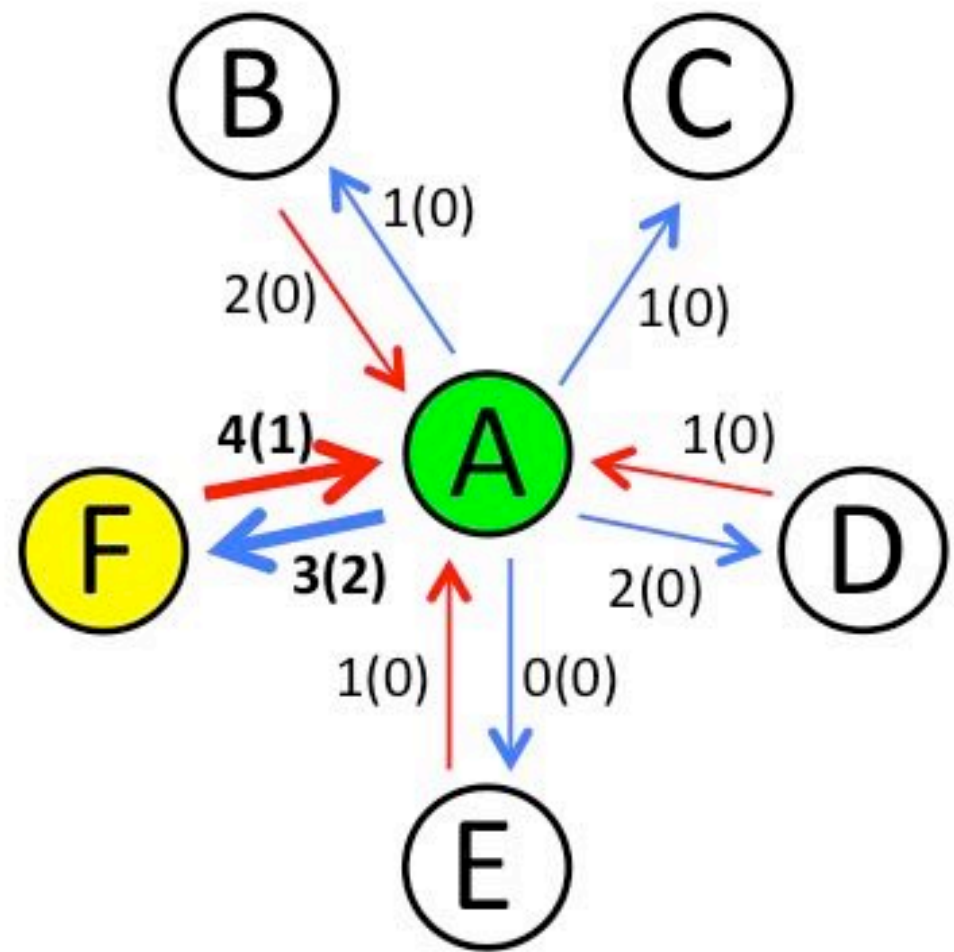
F











# Conclusions

**Jupiter's aurora** - is highly **variable** (power, morphology) (compare in situ)  
- is not limited to its main « oval »,  
**other components** are often stronger (outer)

## Possible to define auroral families

- Auroral **morphology evolved** differently around PJ3, 4, 5, 6 and PJ7
- Global **magnetosphere** was probably **different** during these periods
- One view of Jupiter's aurora is usually **representative** of less than **one Jovian rotation**
- Auroral family **transitions** are not equivalent (predictions)

**Grodent et al., submitted to JGR - Space Physics**

