

# Largest Electron Differential Energy Flux Observed at Mars, 2004-2016

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# Motivation - Curiosity

What is the largest electron Differential Energy Flux (DEF) spectrum in the largest electron energy channels that the electron plasma instrument on the Mars Express spacecraft measured during its 10+ years of operation?

# Procedure

Examine each spectrum to record the largest single value of DEF and the largest average value of DEF in the following energy ranges:  
~150 – 500 eV, 500 – 1000 eV, 1 – 5 keV, and  
5 – 10 keV.

# Results

## Times Where the Spectra Occur

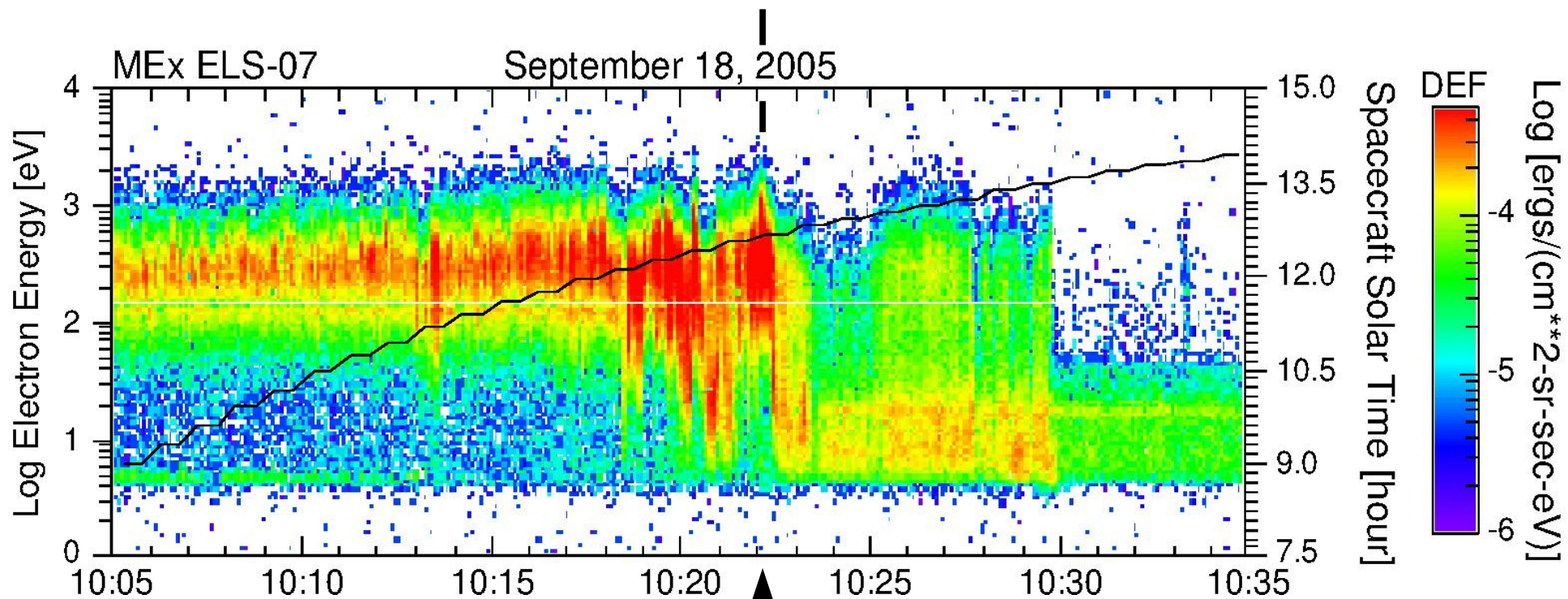
### Mars

Energy (keV)	0.1 - 0.5	0.5 - 1.0	1.0 - 5.0	5.0 - 10.0
Peak DEF	2005-261 10:22:06	2005-261 10:22:06	2005-261 10:22:06	Noise
Average DEF	2005-261 10:22:06	2005-261 10:22:06	2005-261 10:22:06	Noise

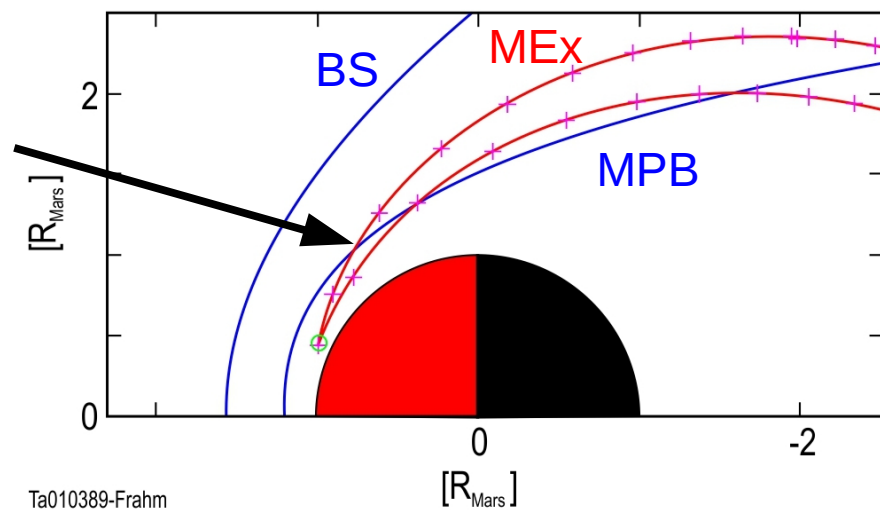
### Venus

Energy (keV)	0.1 – 0.5	0.5 – 1.0	1.0 – 5.0	5.0 – 10.0
Peak DEF	2011-309 07:00:22	2011-309 07:00:22	2011-309 07:00:22	Noise
Average DEF	2011-309 07:00:22	2011-309 07:00:22	2011-309 07:00:22	Noise

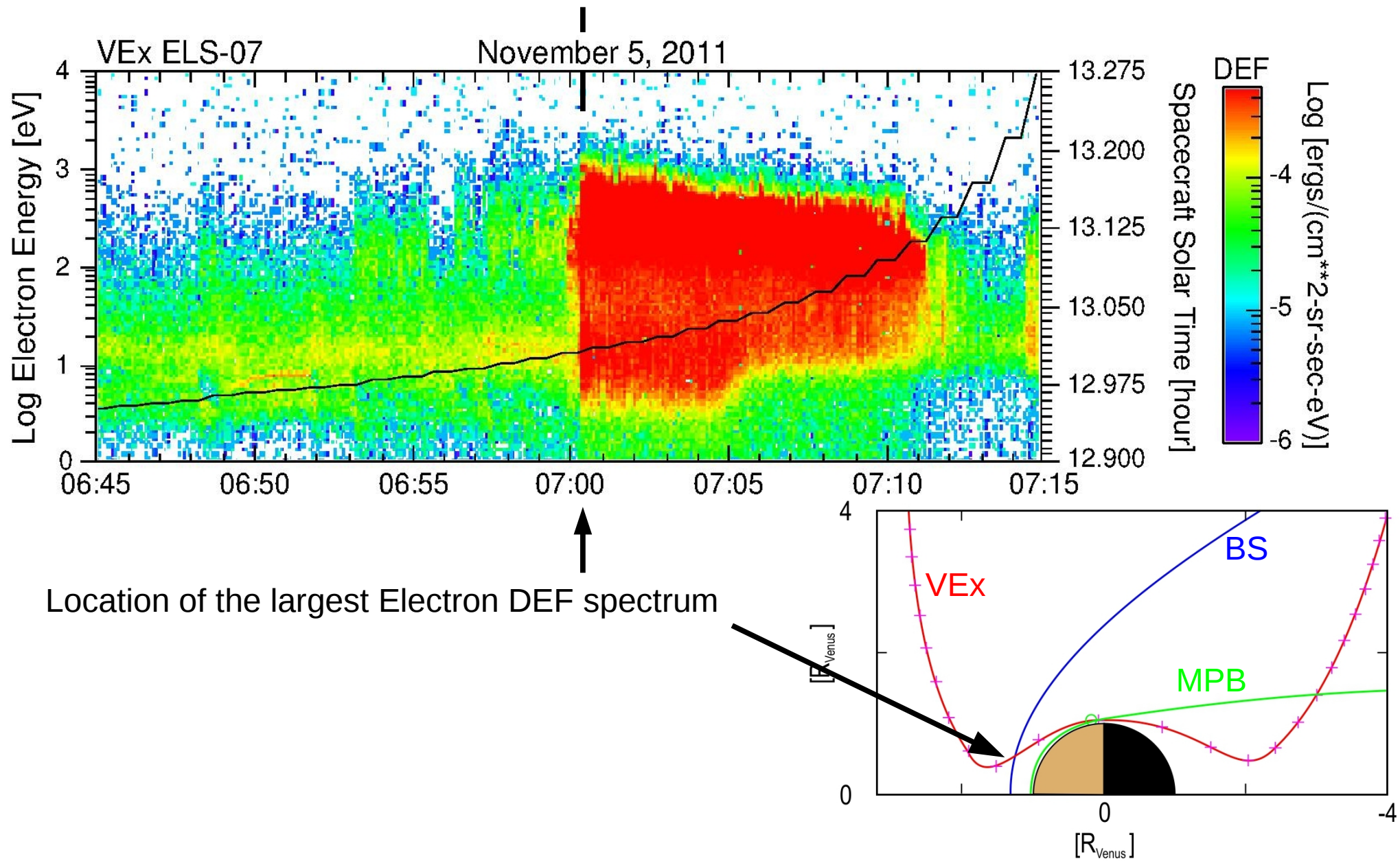
# Electron Data at Mars



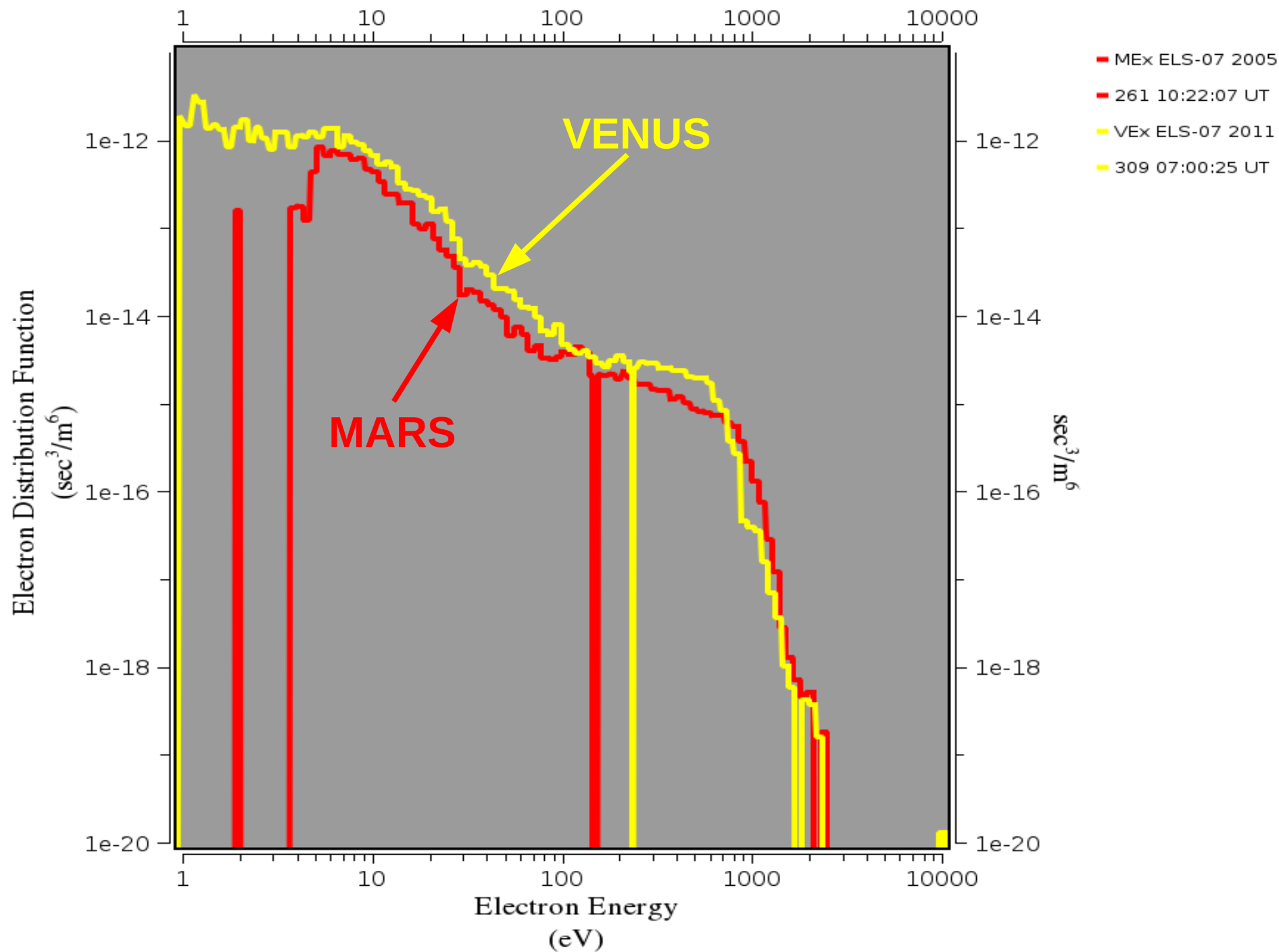
Location of the largest Electron DEF spectrum



# Electron Data at Venus

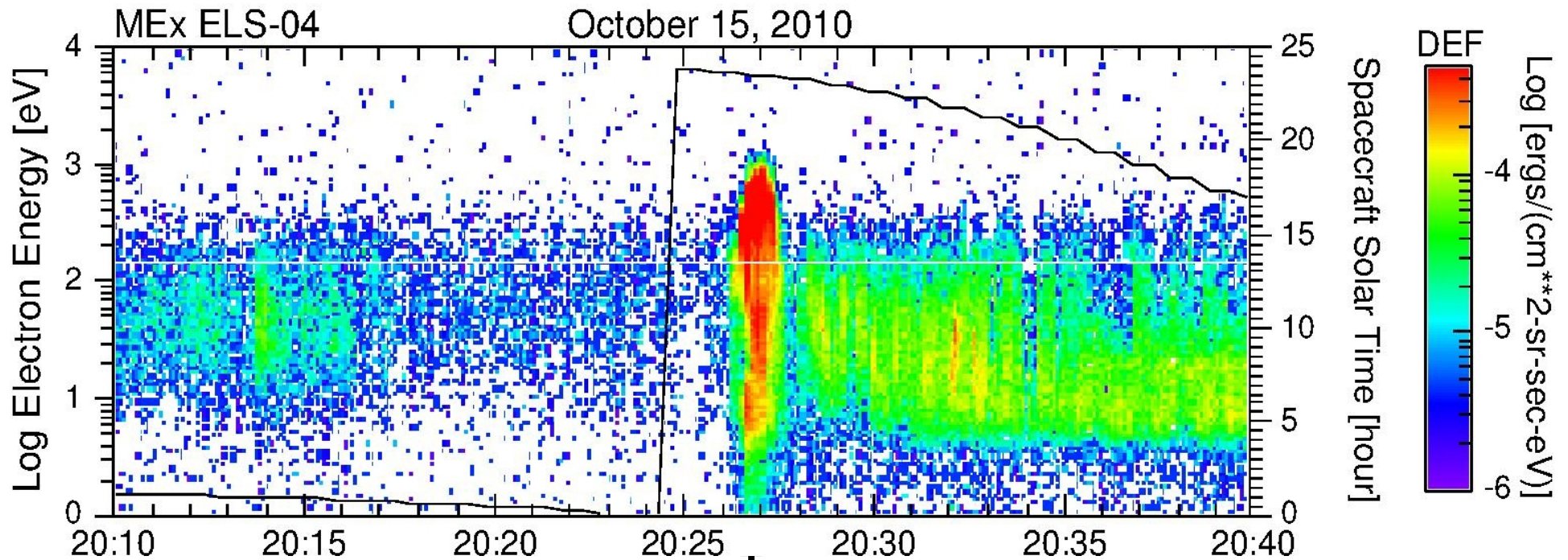


2005:261:10:22:07.338  
2011:309:07:00:25.899

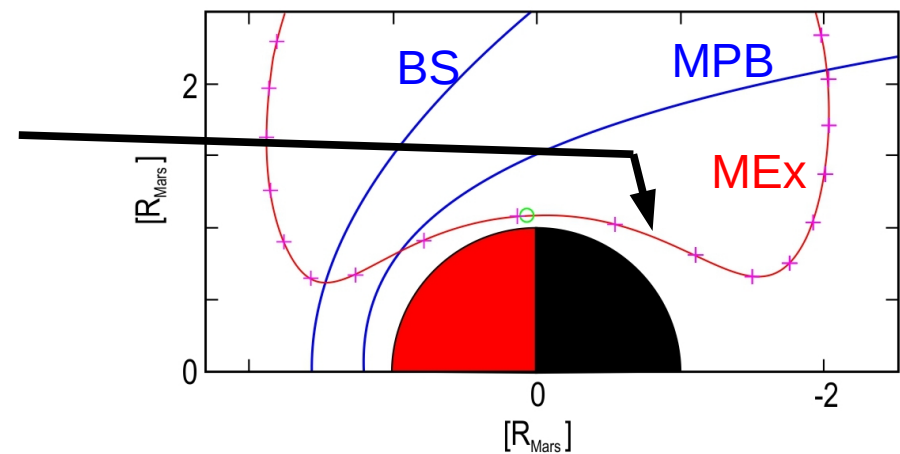




# Mars SPICAM “Aurora”



Location of SPICAM enhanced “Auroral” signature

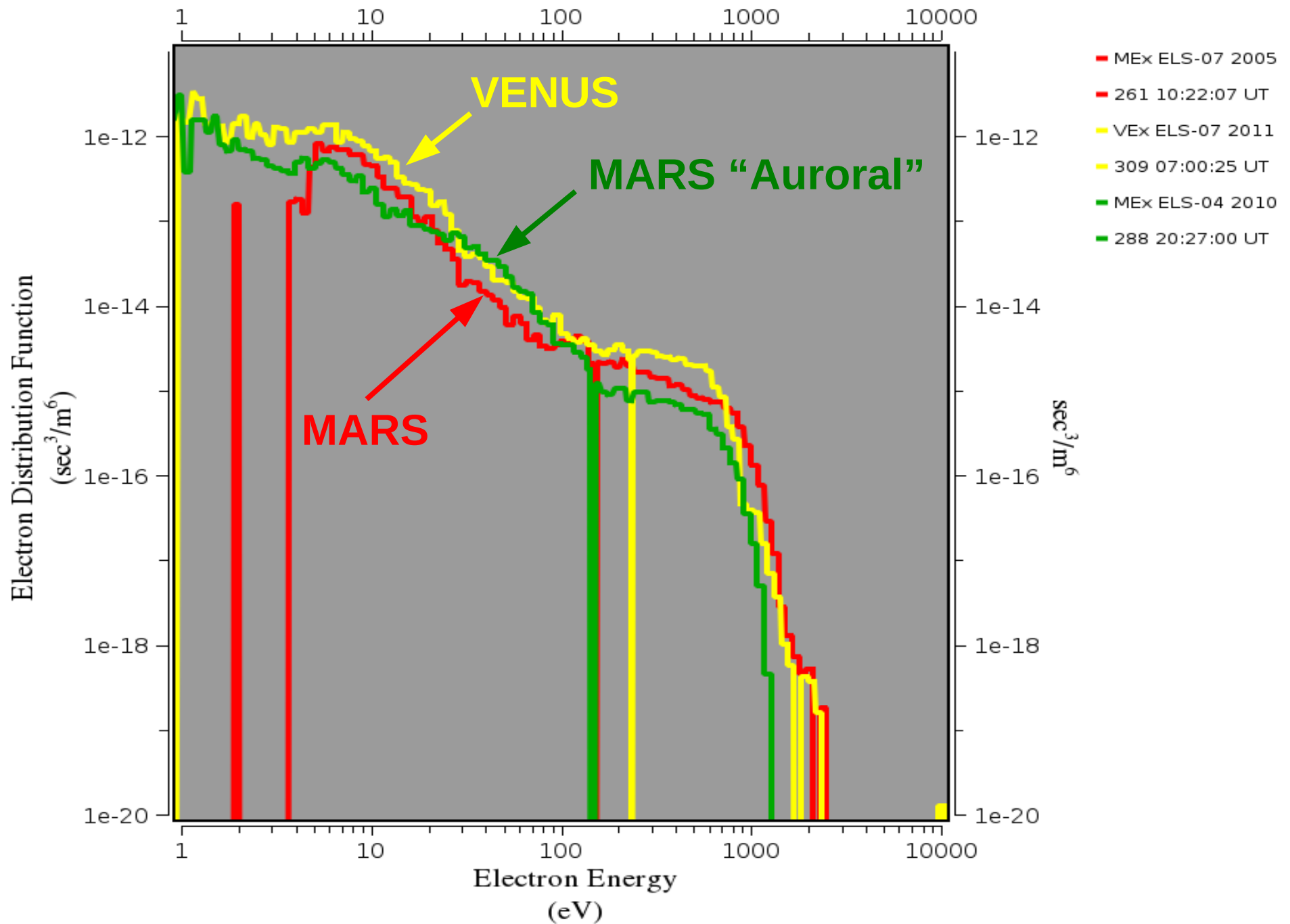




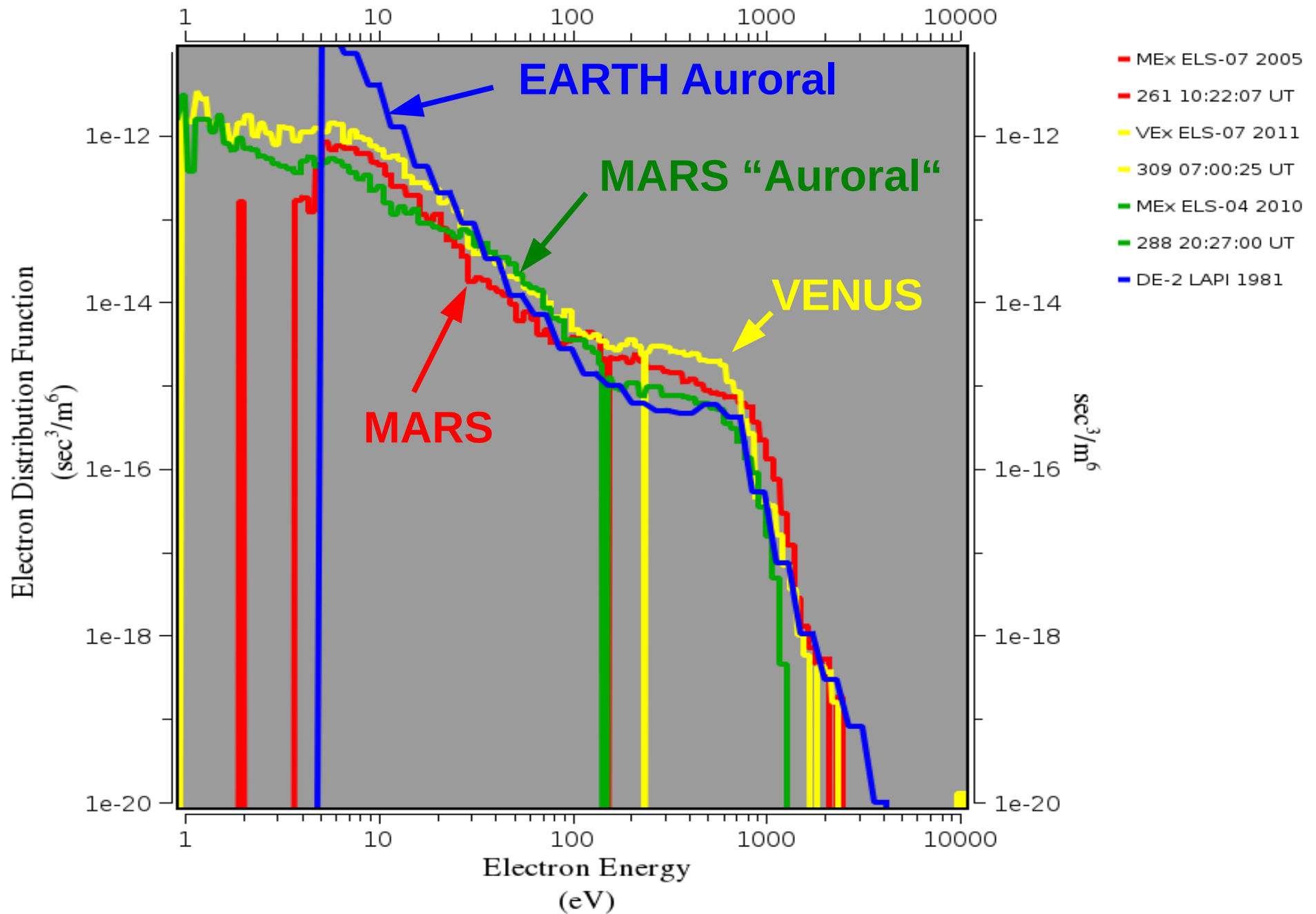
2005:261:10:22:07.338

2011:309:07:00:25.899

2010:288:20:27:00.863



2005:261:10:22:07.338  
 2011:309:07:00:25.899  
 2010:288:20:27:00.863  
 1981:296:04:46:31.655



# Conclusions

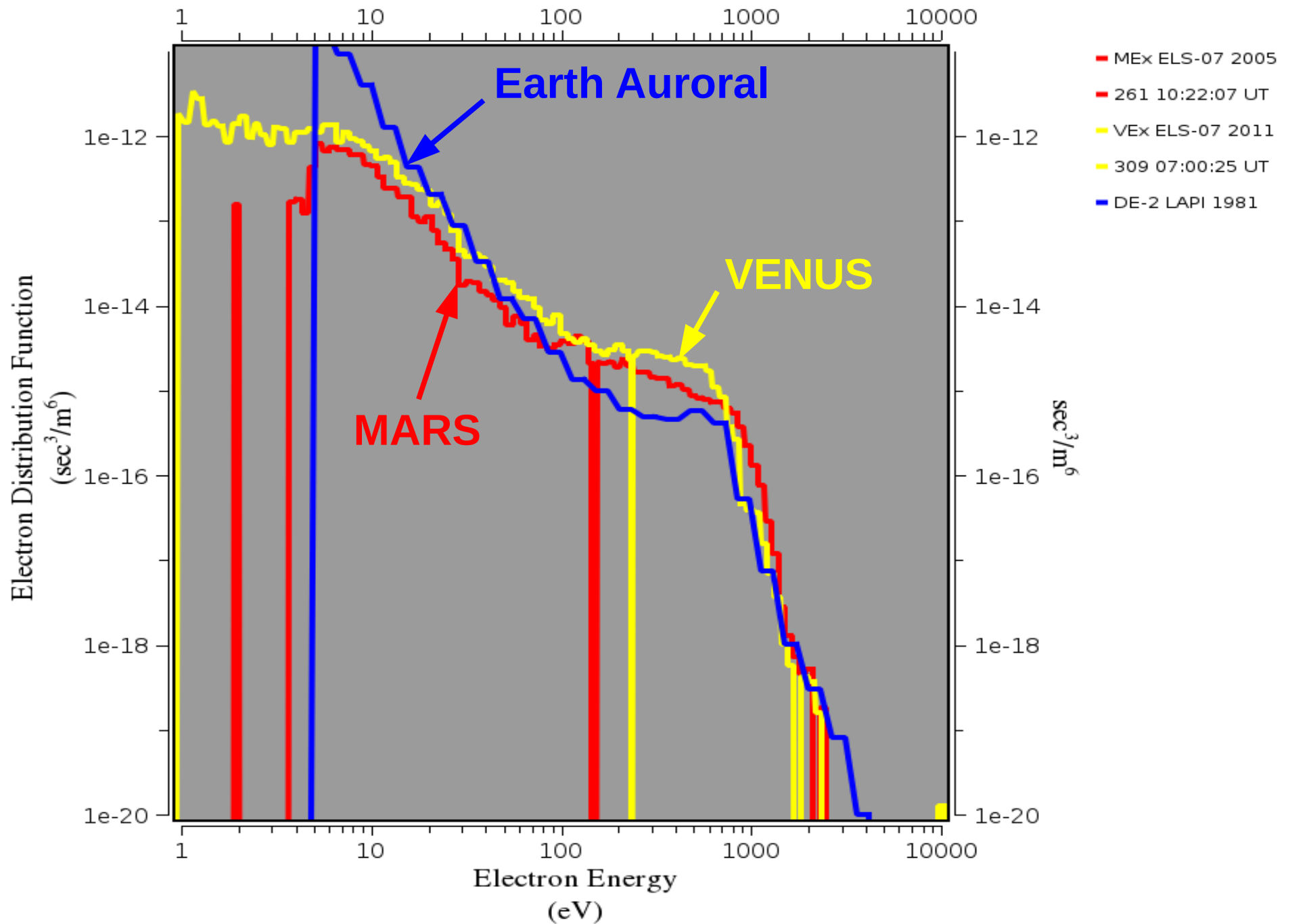
- \* The shape of the largest DEF electron spectrum is similar at Mars and Venus.
- \* The shape of the largest DEF electron spectra at Mars and Venus is similar to the electron spectrum detected during the times SPICAM detects “auroral” enhanced signatures. Since the magnetic field at Mars is chaotic, the largest DEF electron spectrum could be magnetically directed from the dayside to the nightside where it could precipitate causing the same “auroral” signature seen by SPICAM.
- \* The shapes of the largest DEF electron spectra at Mars, Venus and SPICAM “auroral” times, are similar to auroral spectra found at the Earth.

**BACK UP**

2005:261:10:22:07.338

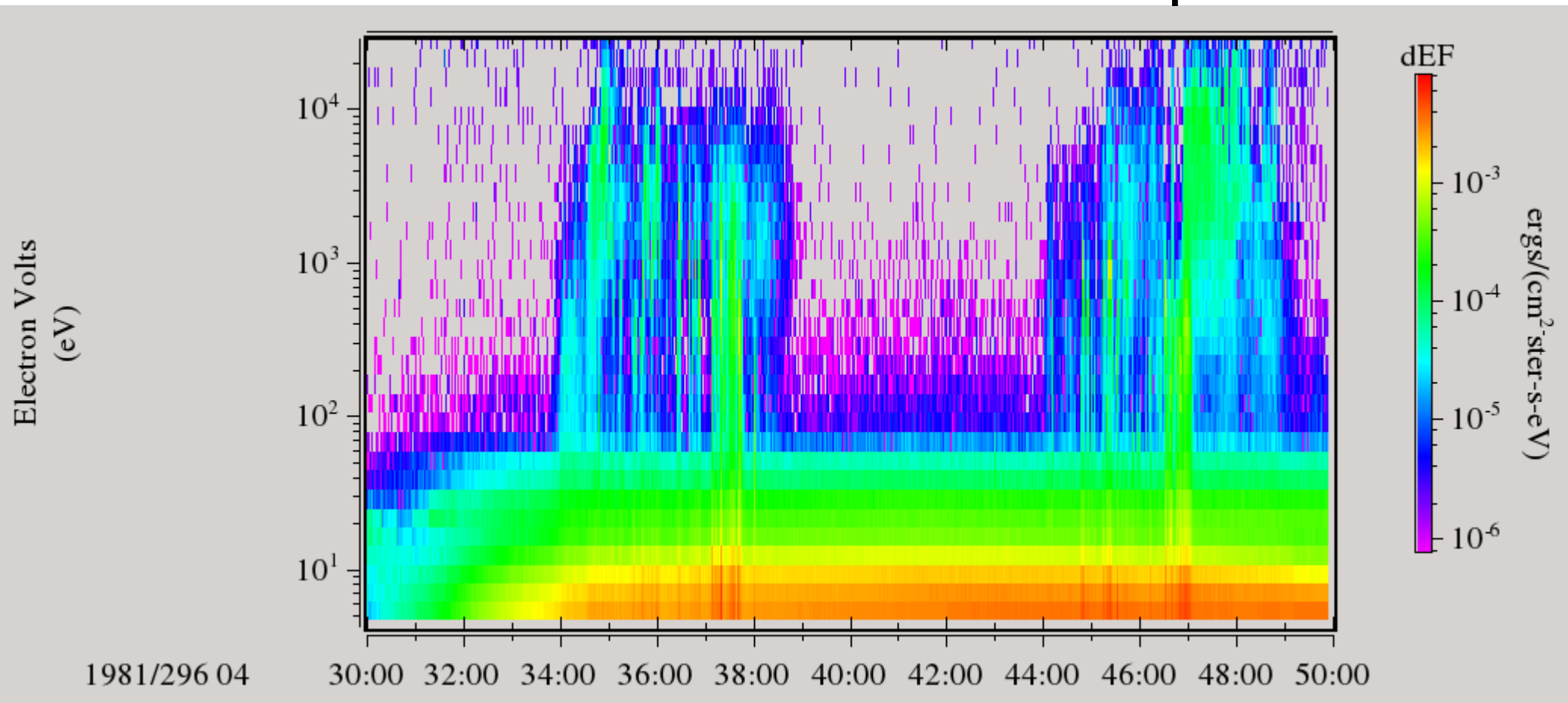
2011:309:07:00:25.899

1981:296:04:46:31.655





# Earth DE-2 LAPI



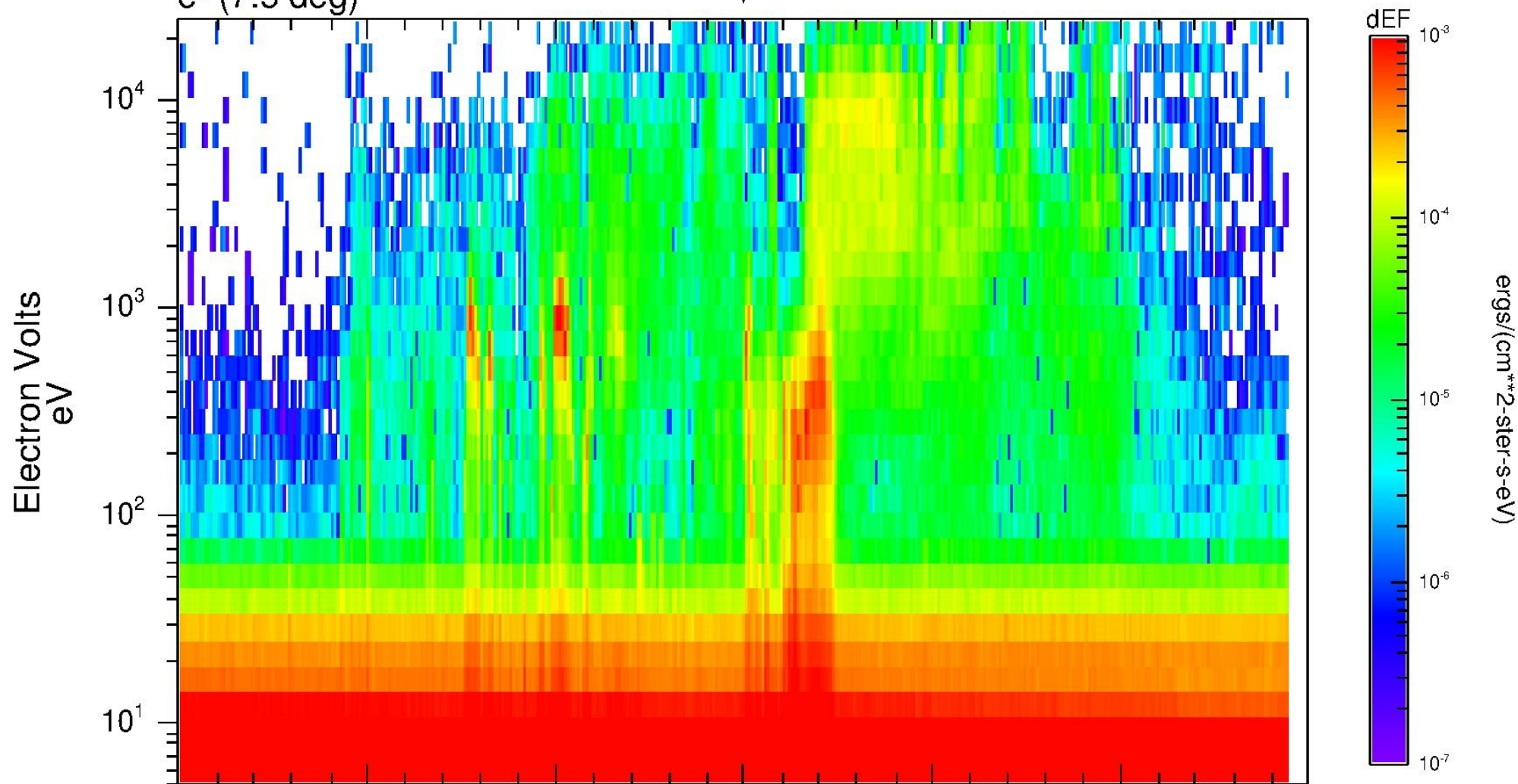
Location of narrow auroral arc in  $7.5^\circ$  electron sensor

Next slide shows a blow-up

# Earth

Location of narrow auroral arc in the 7.5° electron sensor of DE-2 LAPI

DE-2 LAPI  
e- (7.5 deg)



1981/296:04	43:00	44:10	45:20	46:30	47:40	48:50	50:00
L-Shell	14.77	11.68	8.93	6.83	5.32	4.24	3.46
IL (deg)	74.92	72.99	70.45	67.50	64.30	60.95	57.48
SZA (deg)	70.37	67.34	64.42	61.61	58.96	56.47	54.18
LT (hr)	8.86	8.87	8.87	8.87	8.87	8.87	8.87