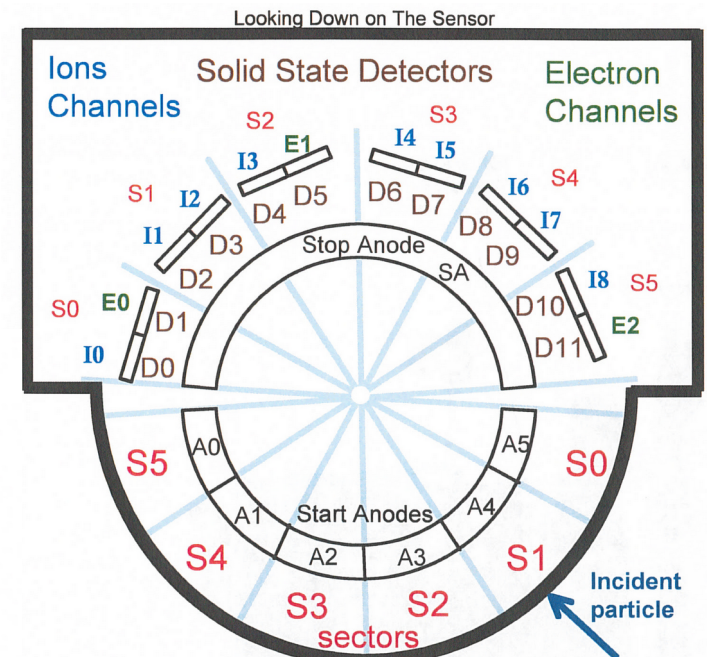
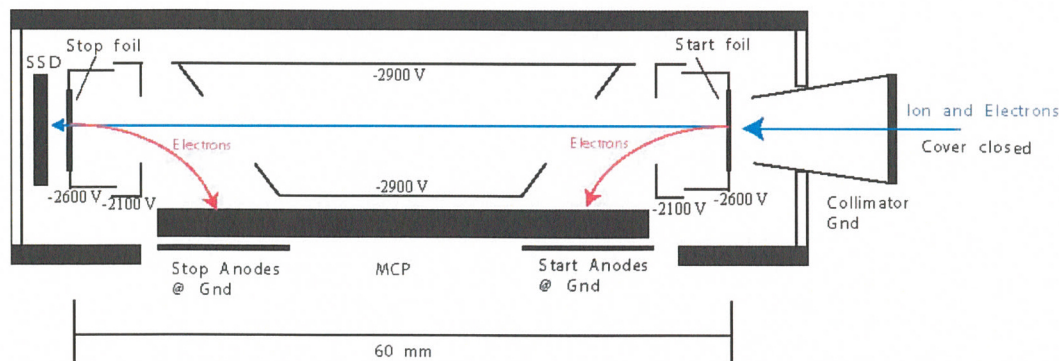


New Horizons Pluto Energetic Particle Spectrometer Science Investigation (PEPSSI)

PRINCIPAL INVESTIGATOR: Ralph McNutt, APL
 DESCRIPTION: Medium Energy Particle Spectrometer
 ENERGY RANGE: 25-1000 keV (protons)
 60-1000 keV (atomic ions)
 25-500 keV (electrons)
 FIELD OF VIEW: 160 deg x 12 deg
 ANGULAR RESOLUTION: 25 deg x 12 deg
 ENERGY RESOLUTION: 0.25 keV
 SENSOR SIZE: 7.6 cm dia. x 2.5 cm thick
 POWER: 1.4 watt
 MASS: 1.5 kg



New Horizons PEPSSI Data Sets

RAW Data Sets:

nh-a-pepssi-2-kem1-v4.0

CALIBRATED Data Sets:

nh-a-pepssi-3-kem1-v4.0

New Horizons PEPSSI Data Set Evaluation Tools

Staging and Evaluation -

Machine: Dell Precision Tower 5810

Operating System: Fedora 31 linux

Data Processing -

Machine: Sun Ultra-350

Operating System: Sun Solaris OS 5.9

Minor Diagnostics -

Machine: Dell 7520

Operating System: Fedora 31 linux

Documentation Evaluation

nh-a-pepssi-2-kem1-v4.0
nh-a-pepssi-3-kem1-v4.0
aareadme.txt

GOOD

nh-a-pepssi-2-kem1-v4.0
nh-a-pepssi-3-kem1-v4.0
voldesc.txt

GOOD

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
catinfo.txt

GOOD

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
dataset.cat

GOOD

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
nhsc.cat

Minor edits sent to PDS

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
nh_kem.cat

Minor edits send to PDS

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
pepssi.cat

Under the section: Data sampling and priority for TOF-only data

```
suppress the more desirable TOF > 20 ns events. Additionally, the N3  
PHA data uses a different priority scheme than the N2 PHA data (this  
may be changed in a future software update, but that hasn't happened as  
of June, 2016). In the N3 PHA the TOF < 20 ns priority group is only
```

What about this data set? Since the instrument commanding for v4.0 has already occurred, the instrument team should already know if they have changed the priority scheme.

nh-a-pepssi-2-kem1-v4.0/catalog
nh-a-pepssi-3-kem1-v4.0/catalog
ref.cat

GOOD

nh-a-pepssi-3-kem1-v4.0/document
docinfo.txt

GOOD

nh-a-pepssi-3-kem1-v4.0/document
codmac_level_definitions.lbl
codmac_level_definitions.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
lunineetal1995.lbl & lunineetal1995.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
nh_met2utc.tbl & nh_met2utc.tab

GOOD

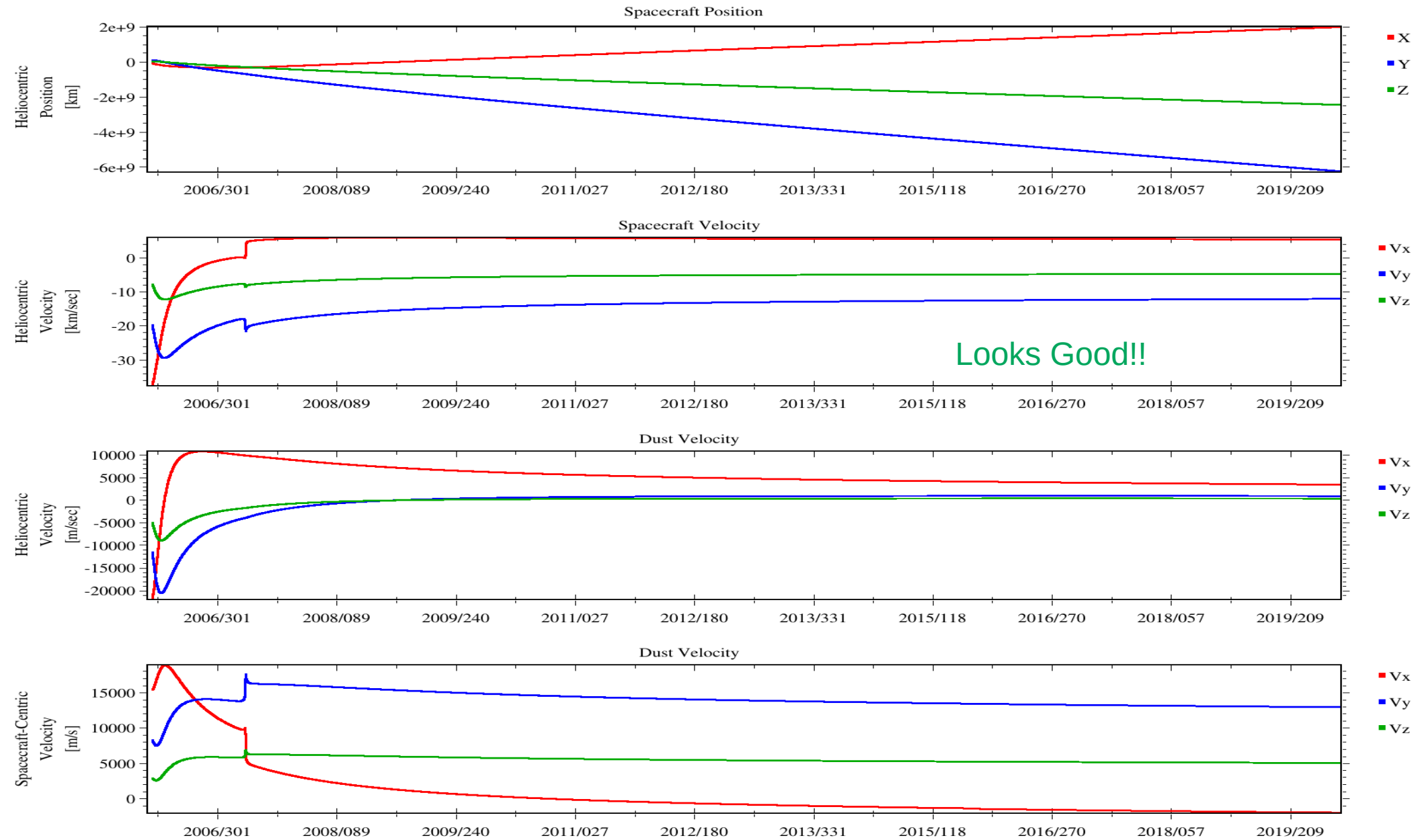
nh-a-pepssi-3-kem1-v4.0/document
nh_fov.lbl & nh_fov.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
nh_mission_trajectory.lbl

GOOD

nh-a-pepssi-3-kem1-v4.0/document nh_mission_trajectory.tab



nh-a-pepssi-3-kem1-v4.0/document
nh_pepssi_v110_ti.txt

GOOD

nh-a-pepssi-3-kem1-v4.0/document
payload_ssr.lbl & payload_ssr.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
pep_bti.lbl & pep_bti.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
pepssi_ssr.lbl & pepssi_ssr.pdf

GOOD

nh-a-pepssi-3-kem1-v4.0/document
quat_xyz_instr_to_j2k.lbl
quat_xyz_instr_to_j2k.asc

GOOD

nh-a-pepssi-3-kem1-v4.0/document
seq_pepssi_kem1.tbl
seq_pepssi_kem1.tab

GOOD

nh-a-pepssi-3-kem1-v4.0/calib
calinfo.txt

GOOD

nh-a-pepssi-3-kem1-v4.0/calib
hk_n1_input_20050228.lbl
hk_n1_input_20050228.tab

GOOD

nh-a-pepssi-3-kem1-v4.0/calib
hk_stat_input_20041016.tbl
hk_stat_input_20041016.tab

GOOD

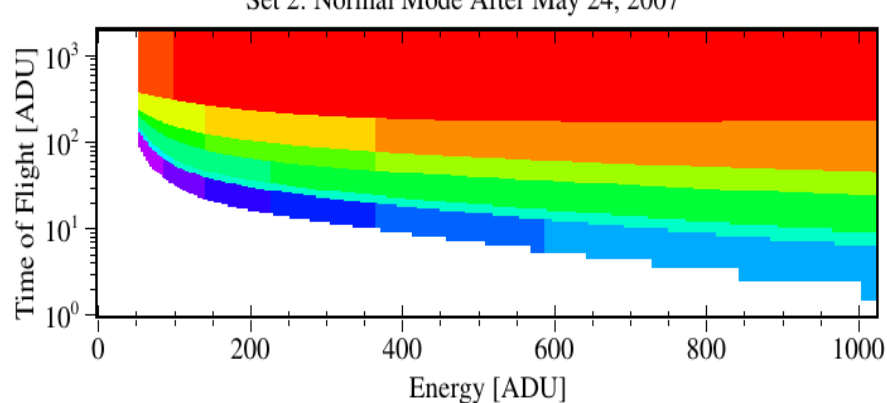
nh-a-pepssi-3-kem1-v4.0/calib
rateboxdefinitionplanes.tbl

GOOD

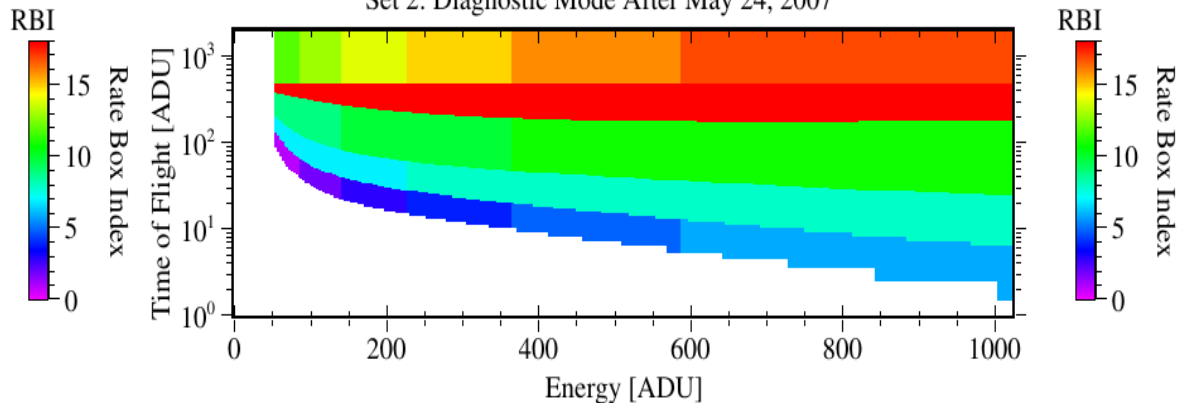
nh-a-pepssi-3-kem1-v4.0/calib rateboxdefinitionplanes.fit

6

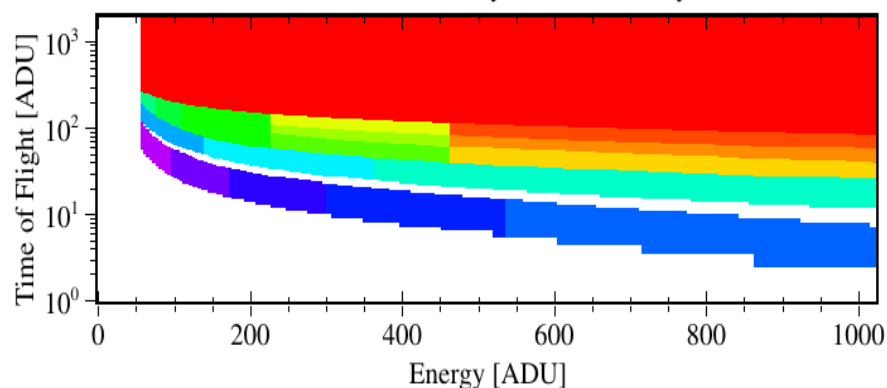
Set 2: Normal Mode After May 24, 2007



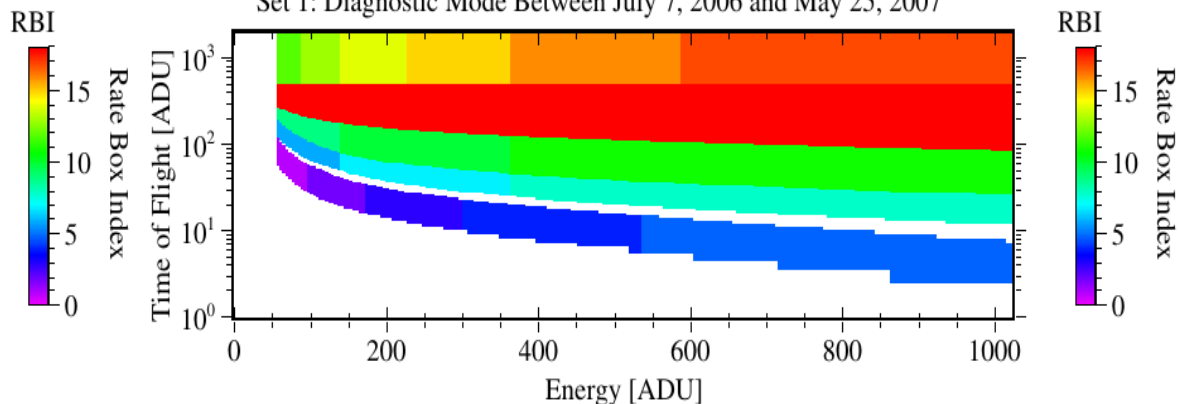
Set 2: Diagnostic Mode After May 24, 2007



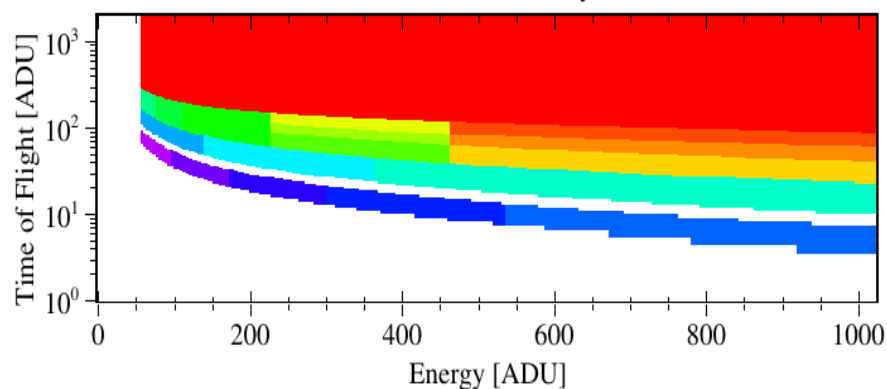
Set 1: Normal Mode Between July 7, 2006 and May 25, 2007



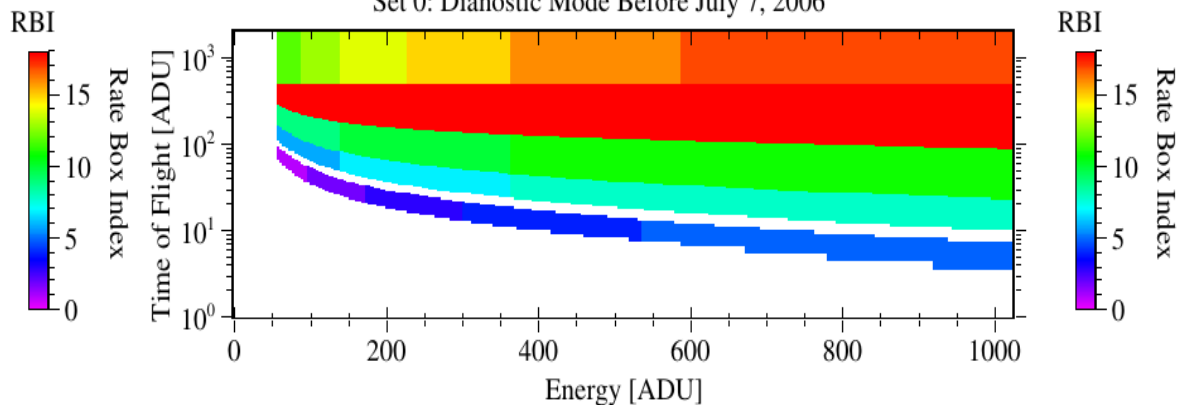
Set 1: Diagnostic Mode Between July 7, 2006 and May 25, 2007



Set 0: Normal Mode Before July 7, 2006



Set 0: Diagnostic Mode Before July 7, 2006



nh-a-pepssi-3-kem1-v4.0/calib/calpars
calpinfo.txt

GOOD

nh-a-pepssi-3-kem1-v4.0/calib/calpars
calpar_columns.fmt

GOOD

nh-a-pepssi-3-kem1-v4.0/calib/calpars
pep_0429861117_0x691_calpar.tab

GOOD

nh-a-pepssi-2-kem1-v4.0/index
nh-a-pepssi-3-kem1-v4.0/index
indxinfo.txt

GOOD

nh-a-pepssi-2-kem1-v4.0/index
nh-a-pepssi-3-kem1-v4.0/index
checksum.tbl & checksum.tab

GOOD

nh-a-pepssi-2-kem1-v4.0/index
nh-a-pepssi-3-kem1-v4.0/index
slimindx.lbl & slimindx.tab

GOOD

nh-a-pepssi-2-kem1-v4.0/index
nh-a-pepssi-3-kem1-v4.0/index
index.lbl & index.tab

GOOD

Data Evaluation

nh-a-pepssi-3-kem1-v4.0/data

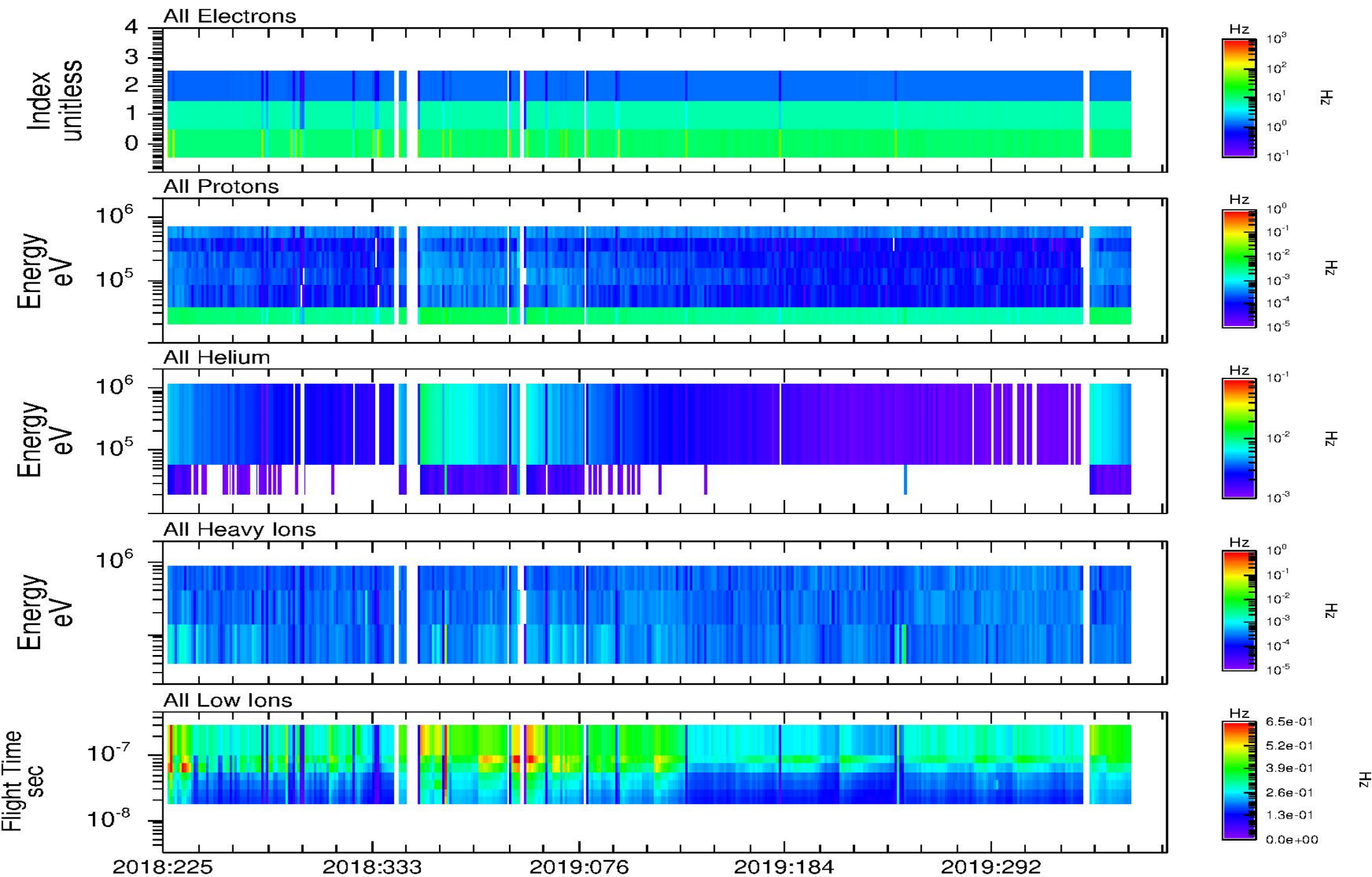
PEPSSI FIT File Structure

fv: Summary of pep_0414395517_0x691_sci.fit in /mnt/..._2020b/nh-a-pepssi-3-kem1-v3.0/data/20190309_041439/

Index	Extension	Type	Dimension	View				
0	Primary	Image	1017 X 614	Header	Image	Table		
1	SPEC_Protons	Image	1440 X 6	Header	Image	Table		
2	SPEC_Helium	Image	1440 X 2	Header	Image	Table		
3	SPEC_Heavies	Image	1440 X 3	Header	Image	Table		
4	SPEC_Electrons	Image	1440 X 3	Header	Image	Table		
5	SPEC_LowIon	Image	1440 X 8	Header	Image	Table		
6	FLUX	Binary	796 cols X 1066 rows	Header	Hist	Plot	All	Select
7	FLUXN1A	Binary	466 cols X 184 rows	Header	Hist	Plot	All	Select
8	FLUXN1B	Binary	344 cols X 184 rows	Header	Hist	Plot	All	Select
9	PHA_ELECTRON	Binary	8 cols X 31804 rows	Header	Hist	Plot	All	Select
10	PHA_LOW_ION	Binary	23 cols X 2585 rows	Header	Hist	Plot	All	Select
11	PHA_HIGH_ION	Binary	19 cols X 2874 rows	Header	Hist	Plot	All	Select

nh-a-pepssi-3-kem1-v4.0/data Quick Look Spectrograms

9



nh-a-pepssi-3-kem1-v4.0/data

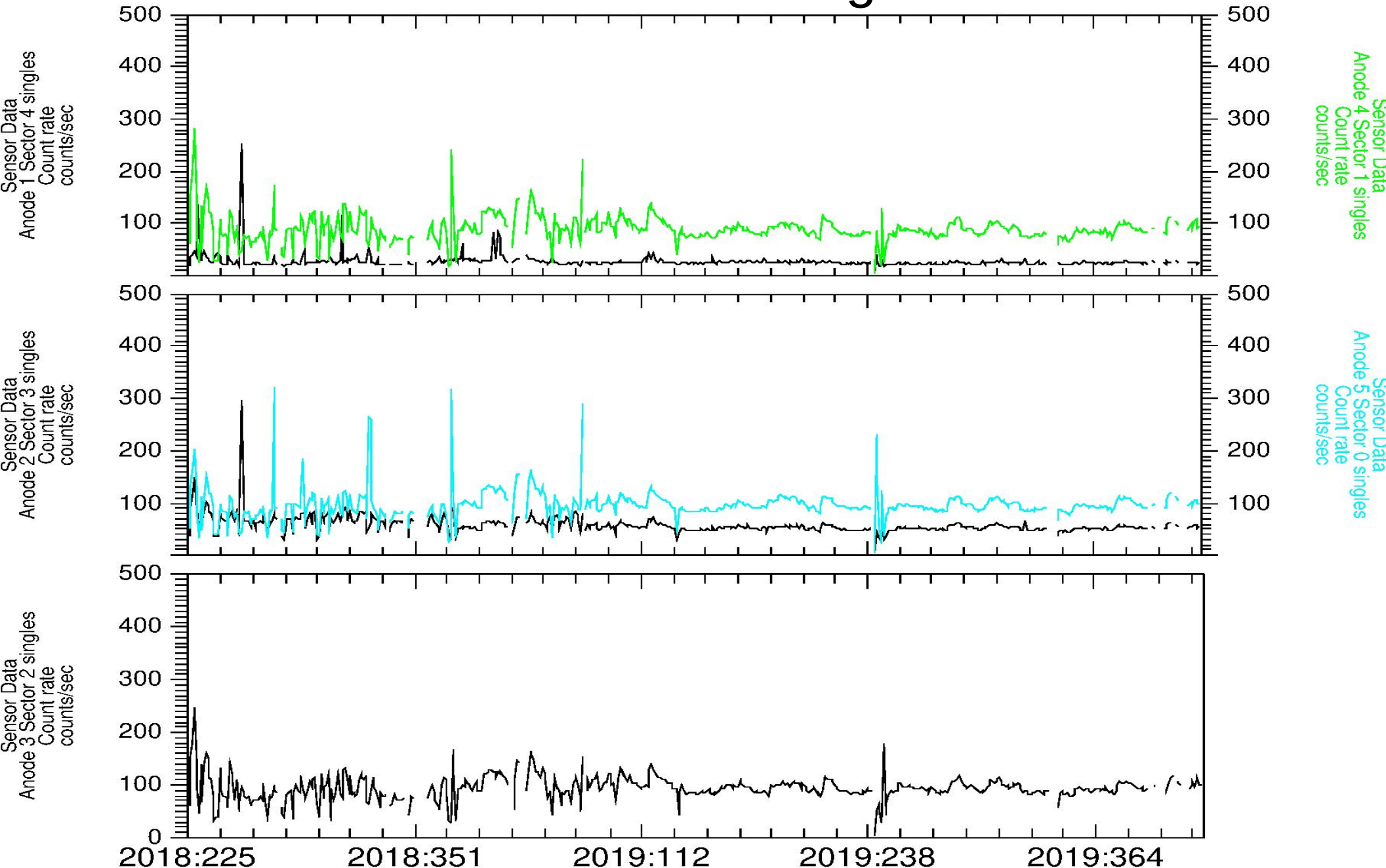
PEPSSI FIT File Structure

fv: Summary of pep_0414395517_0x691_sci.fit in /mnt/..._2020b/nh-a-pepssi-3-kem1-v3.0/data/20190309_041439/

Index	Extension	Type	Dimension	View				
0	Primary	Image	1017 X 614	Header	Image	Table		
1	SPEC_Protons	Image	1440 X 6	Header	Image	Table		
2	SPEC_Helium	Image	1440 X 2	Header	Image	Table		
3	SPEC_Heavies	Image	1440 X 3	Header	Image	Table		
4	SPEC_Electrons	Image	1440 X 3	Header	Image	Table		
5	SPEC_LowIon	Image	1440 X 8	Header	Image	Table		
6	FLUX	Binary	796 cols X 1066 rows	Header	Hist	Plot	All	Select
7	FLUXN1A	Binary	466 cols X 184 rows	Header	Hist	Plot	All	Select
8	FLUXN1B	Binary	344 cols X 184 rows	Header	Hist	Plot	All	Select
9	PHA_ELECTRON	Binary	8 cols X 31804 rows	Header	Hist	Plot	All	Select
10	PHA_LOW_ION	Binary	23 cols X 2585 rows	Header	Hist	Plot	All	Select
11	PHA_HIGH_ION	Binary	19 cols X 2874 rows	Header	Hist	Plot	All	Select

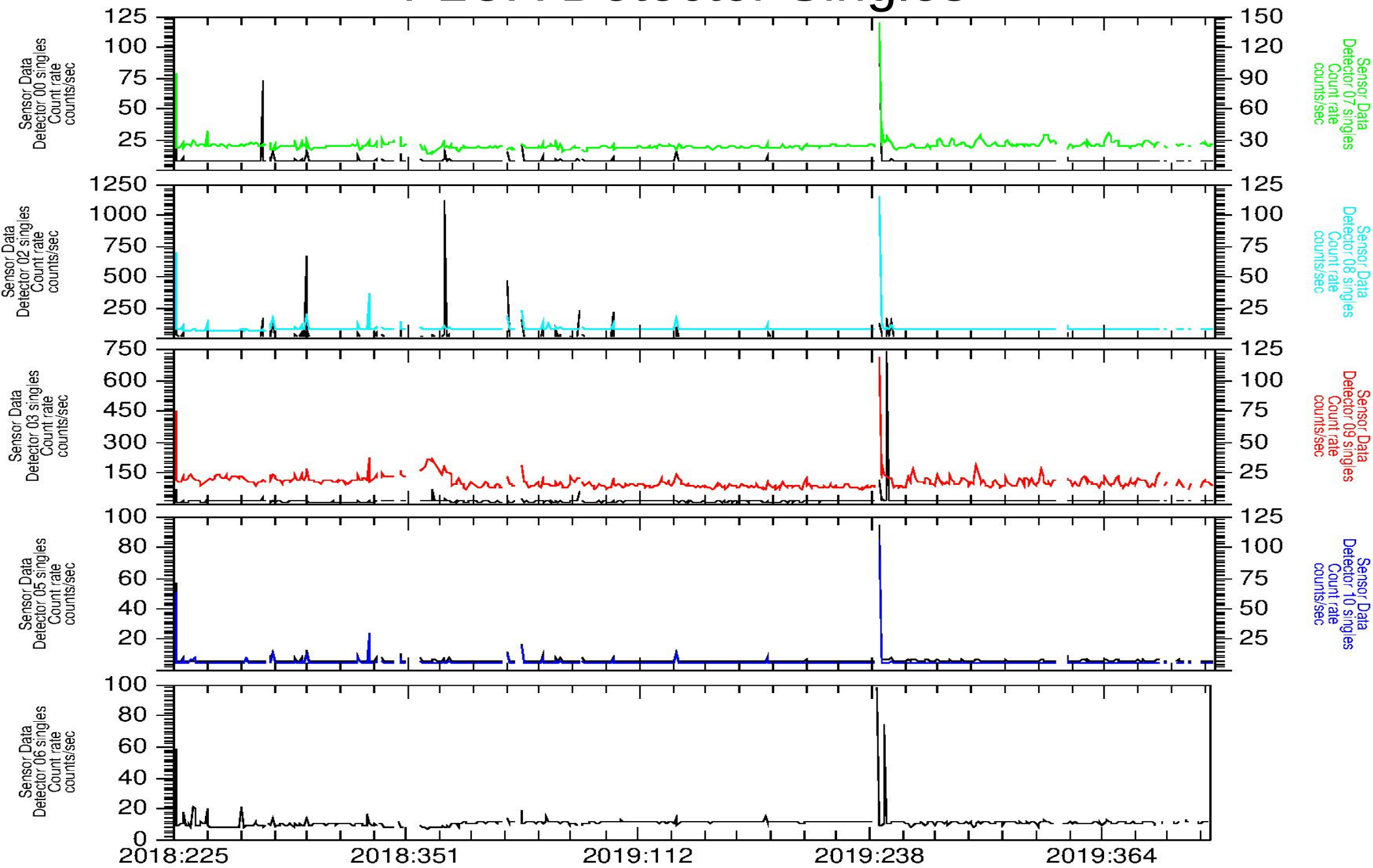
nh-a-pepssi-3-kem1-v4.0/data

FLUX Anode Singles

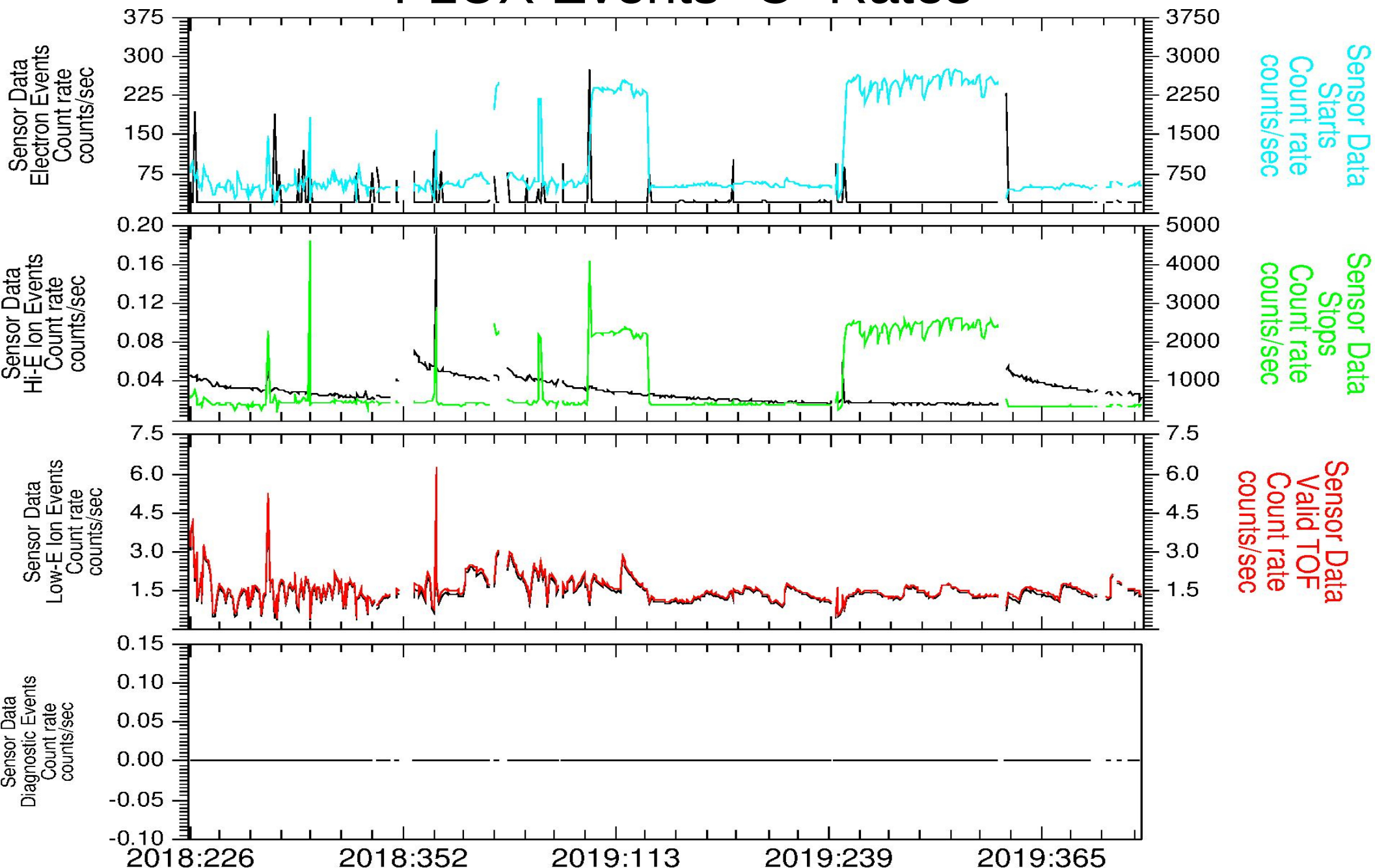


nh-a-pepssi-3-kem1-v4.0/data FLUX Detector Singles

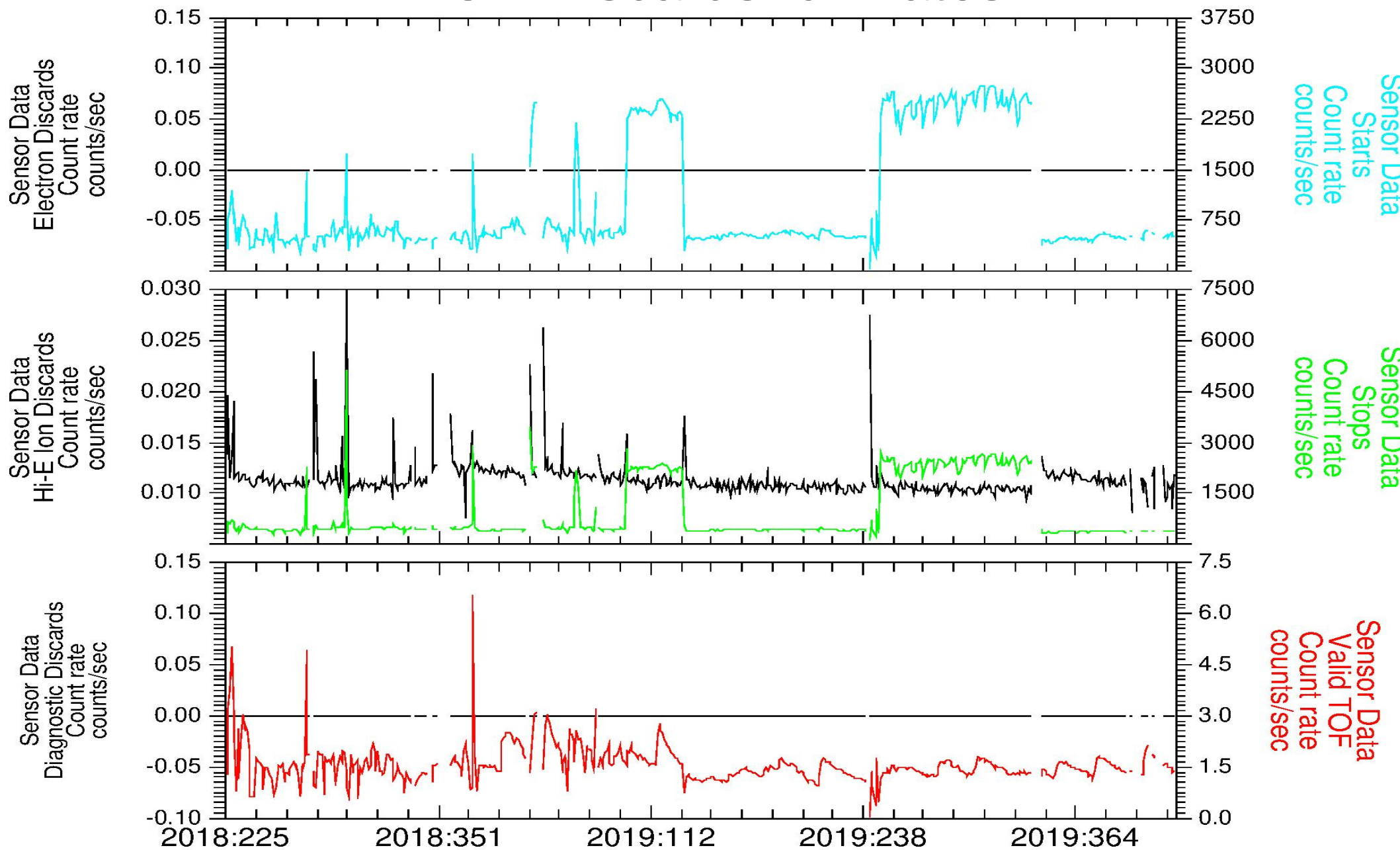
12



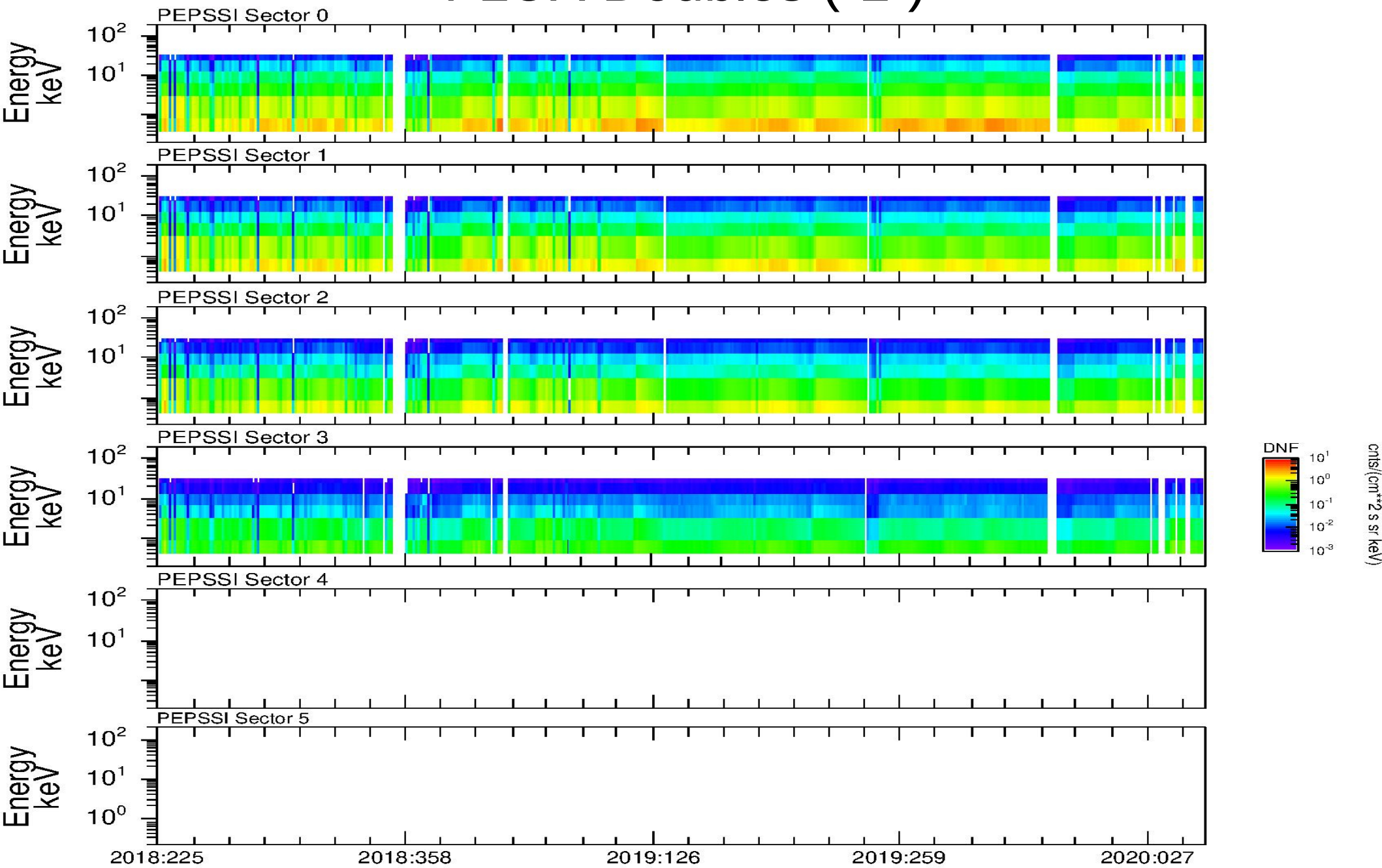
nh-a-pepssi-3-kem1-v4.0/data FLUX Events "C" Rates



nh-a-pepssi-3-kem1-v4.0/data FLUX Discards "J" Rates

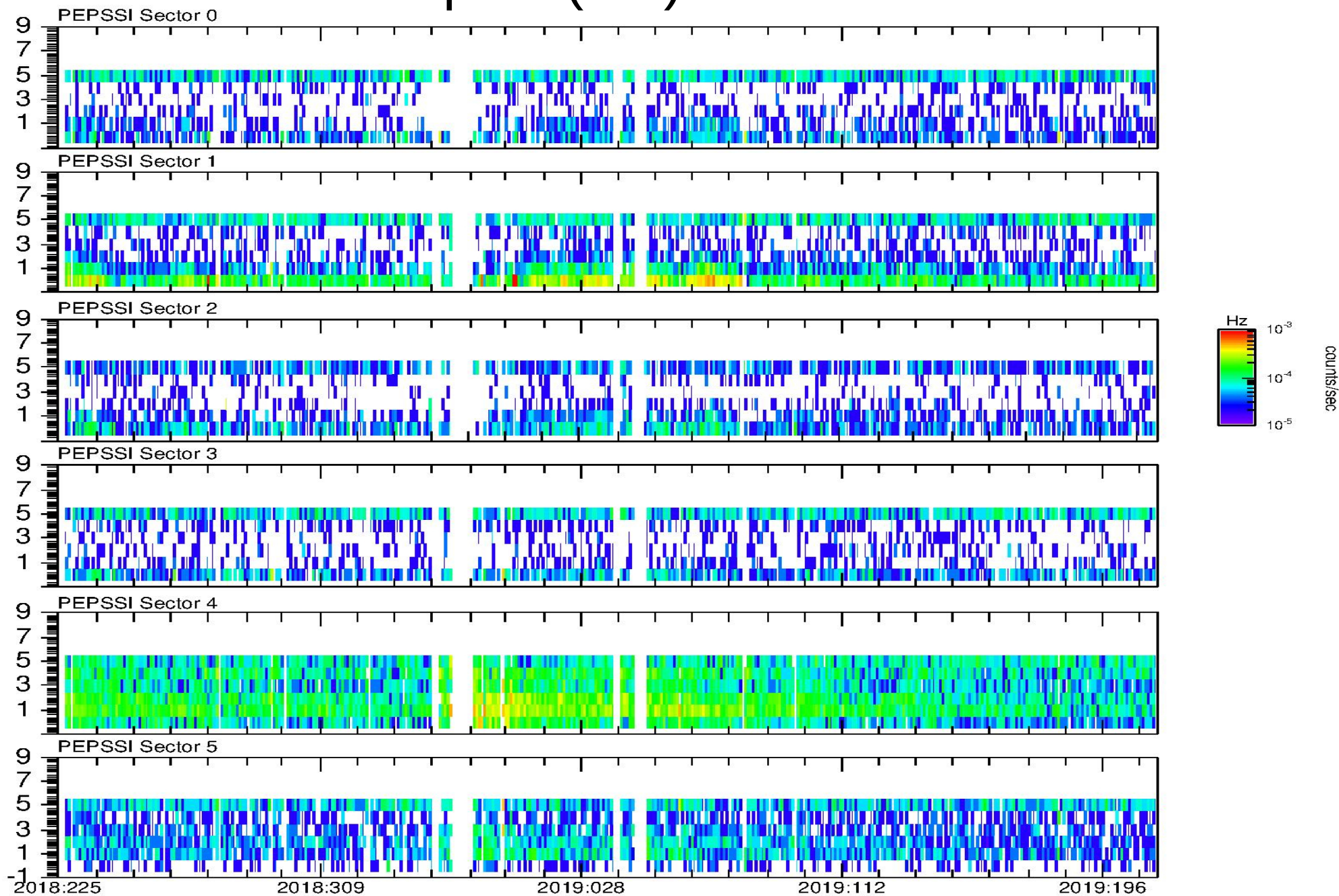


nh-a-pepssi-3-kem1-v4.0/data FLUX Doubles ("L")

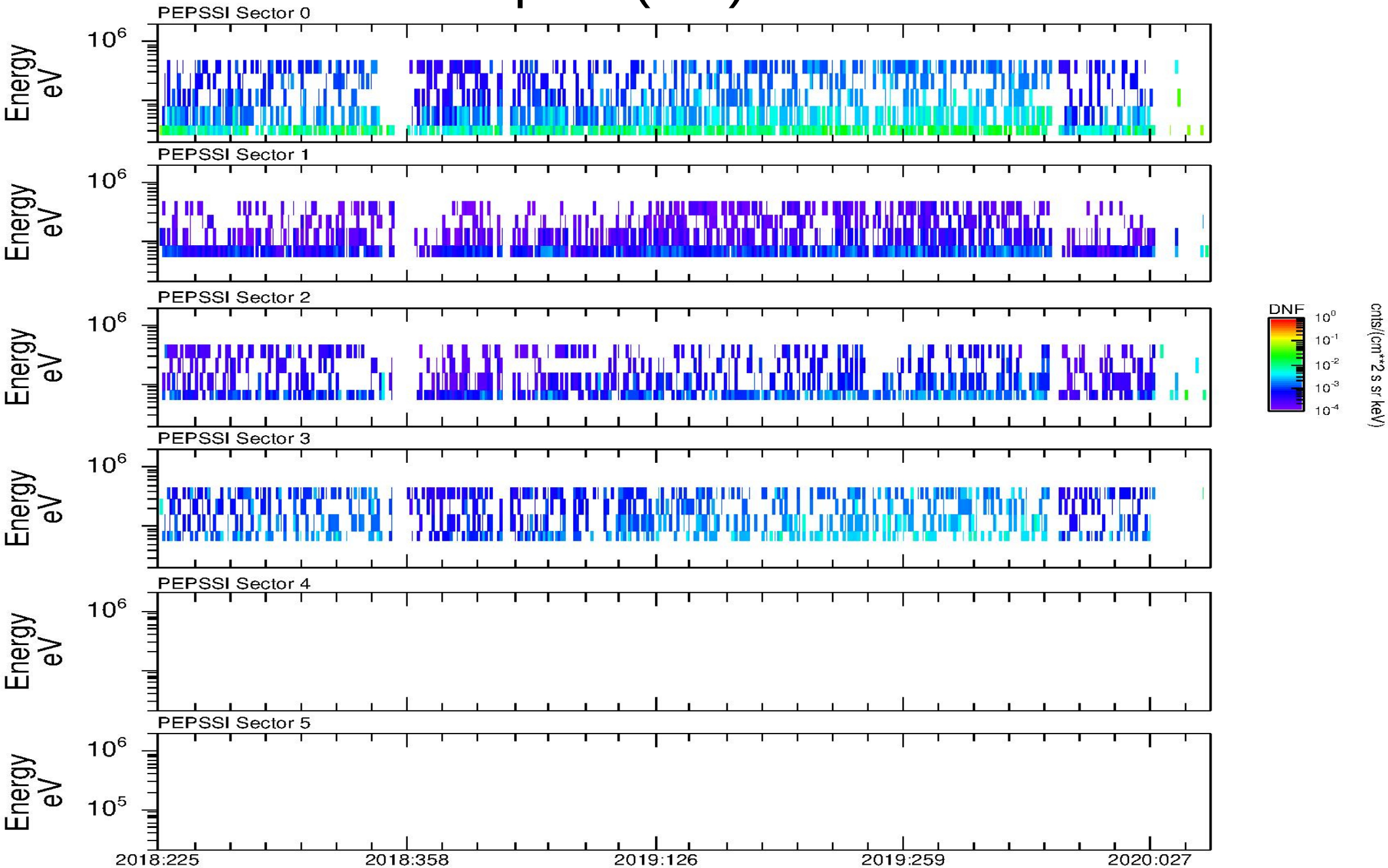


nh-a-pepssi-3-kem1-v4.0/data FLUX Triples ("D") CPS Protons

16

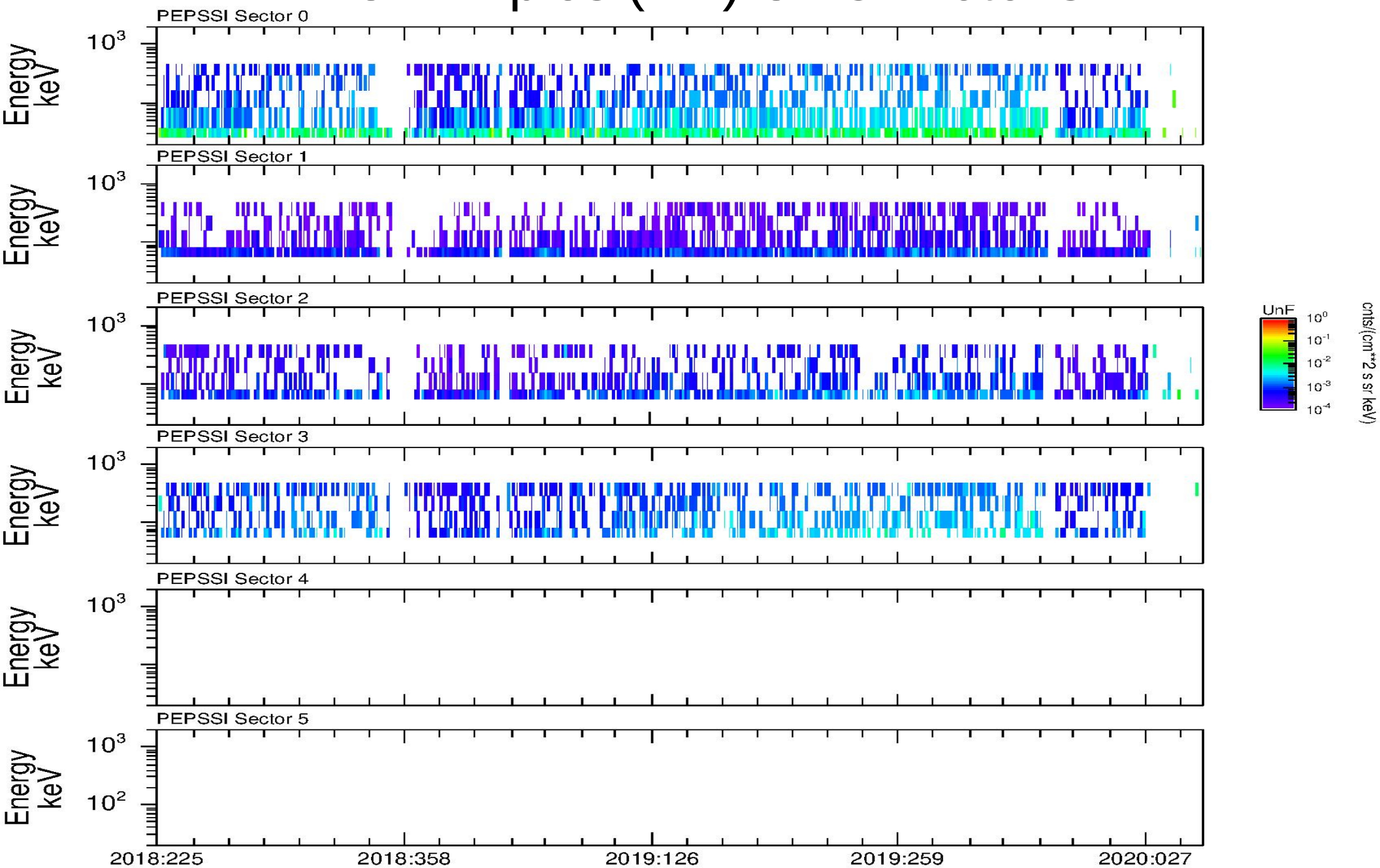


nh-a-pepssi-3-kem1-v4.0/data FLUX Triples ("D") DNF Protons



nh-a-pepssi-3-kem1-v4.0/data FLUX Triples ("D") UNC Protons

18



nh-a-pepssi-3-kem1-v4.0/data

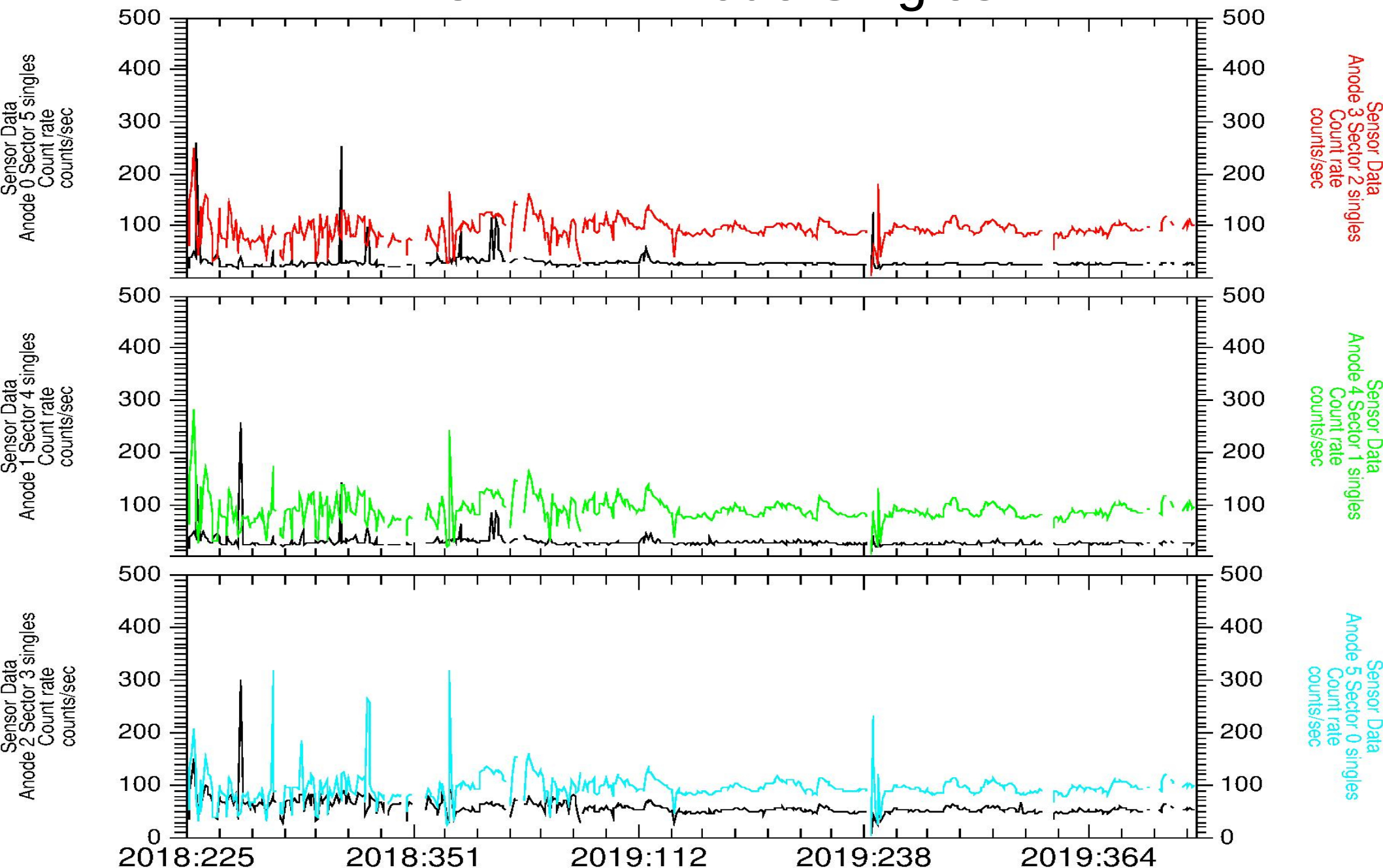
PEPSSI FIT File Structure

fv: Summary of pep_0414395517_0x691_sci.fit in /mnt/..._2020b/nh-a-pepssi-3-kem1-v3.0/data/20190309_041439/

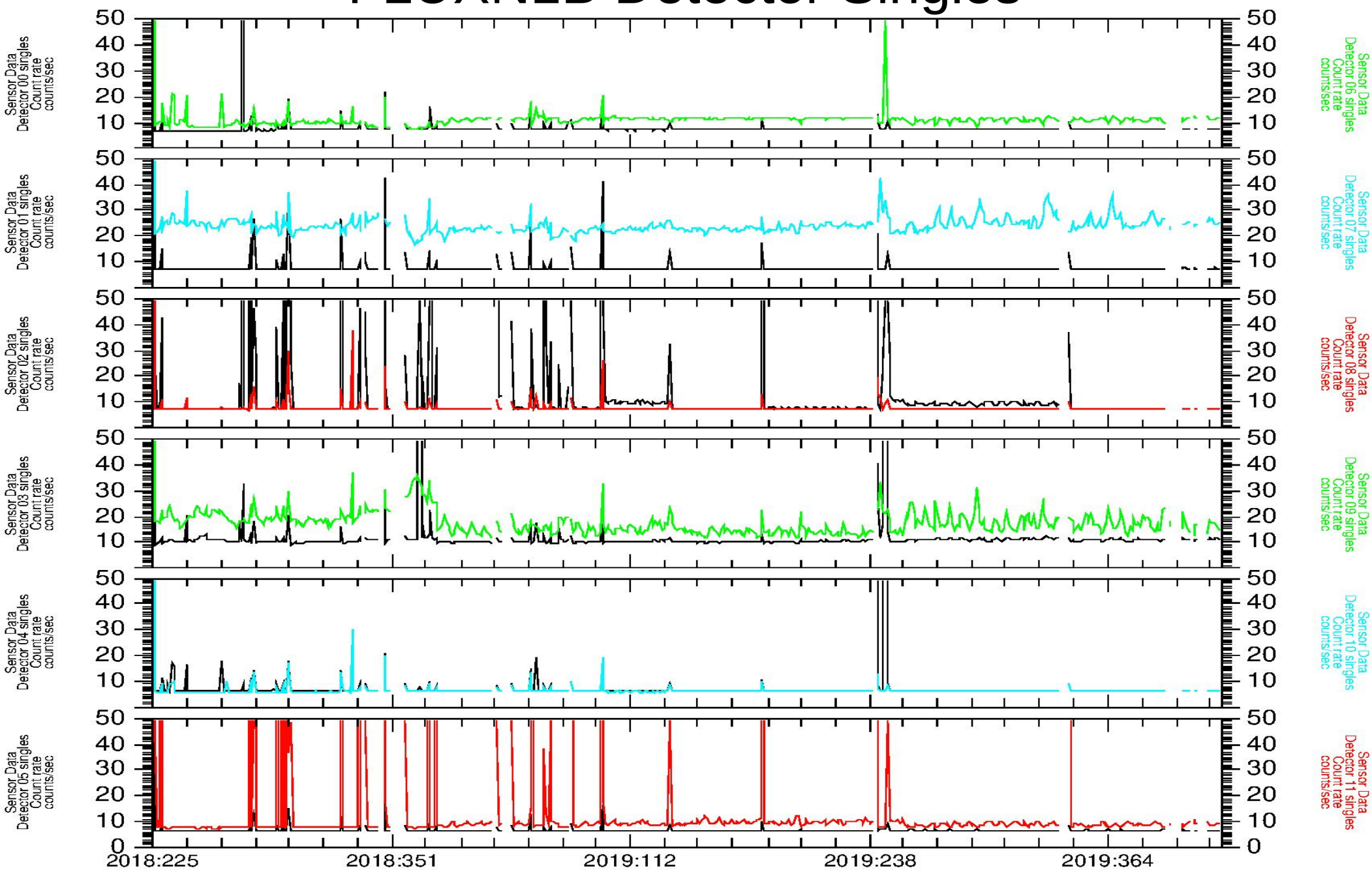
Index	Extension	Type	Dimension	View				
0	Primary	Image	1017 X 614	Header	Image	Table		
1	SPEC_Protons	Image	1440 X 6	Header	Image	Table		
2	SPEC_Helium	Image	1440 X 2	Header	Image	Table		
3	SPEC_Heavies	Image	1440 X 3	Header	Image	Table		
4	SPEC_Electrons	Image	1440 X 3	Header	Image	Table		
5	SPEC_LowIon	Image	1440 X 8	Header	Image	Table		
6	FLUX	Binary	796 cols X 1066 rows	Header	Hist	Plot	All	Select
7	FLUXN1A	Binary	466 cols X 184 rows	Header	Hist	Plot	All	Select
8	FLUXN1B	Binary	344 cols X 184 rows	Header	Hist	Plot	All	Select
9	PHA_ELECTRON	Binary	8 cols X 31804 rows	Header	Hist	Plot	All	Select
10	PHA_LOW_ION	Binary	23 cols X 2585 rows	Header	Hist	Plot	All	Select
11	PHA_HIGH_ION	Binary	19 cols X 2874 rows	Header	Hist	Plot	All	Select

nh-a-pepssi-3-kem1-v4.0/data

FLUXN1B Anode Singles

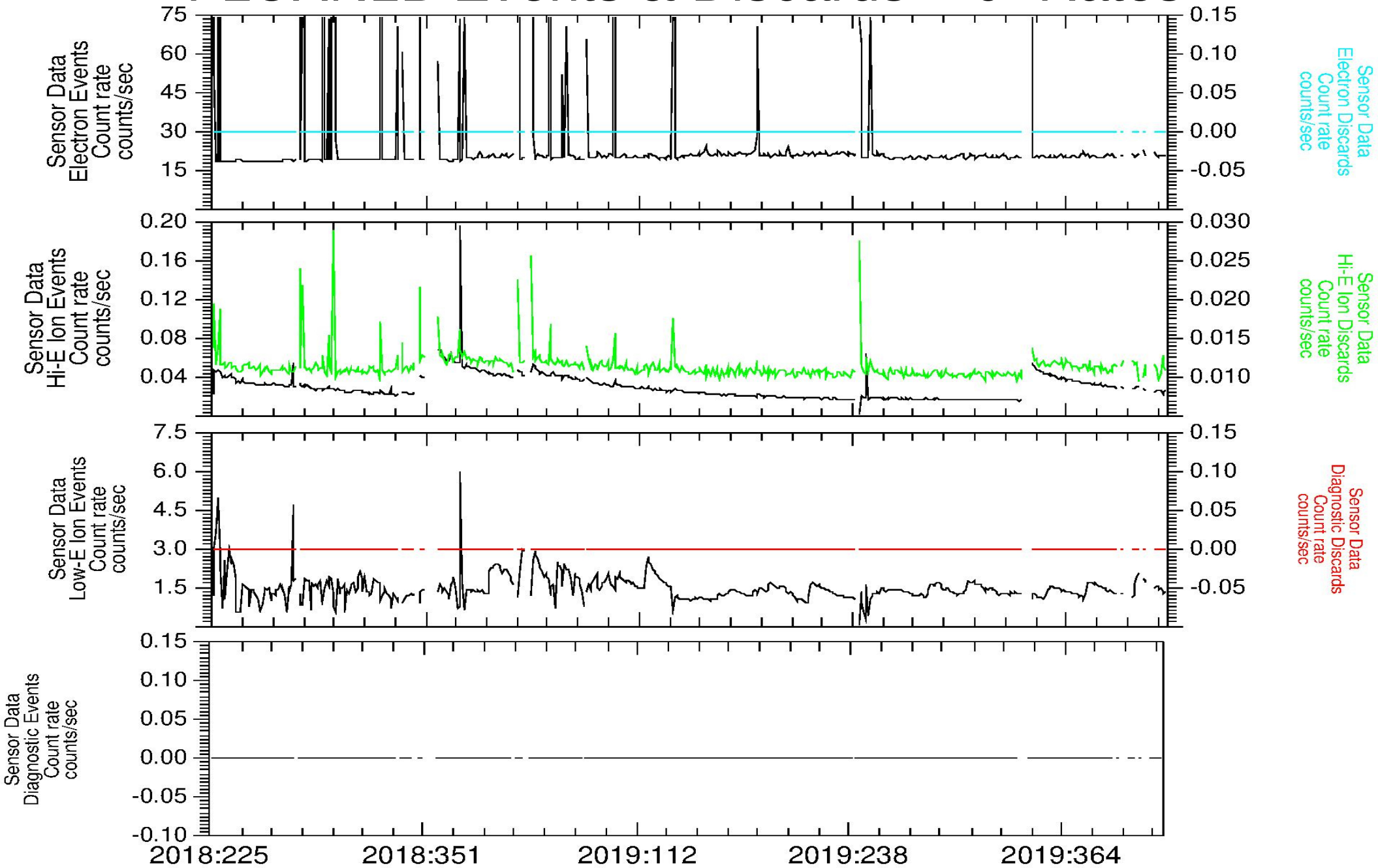


nh-a-pepssi-3-kem1-v4.0/data FLUXN1B Detector Singles



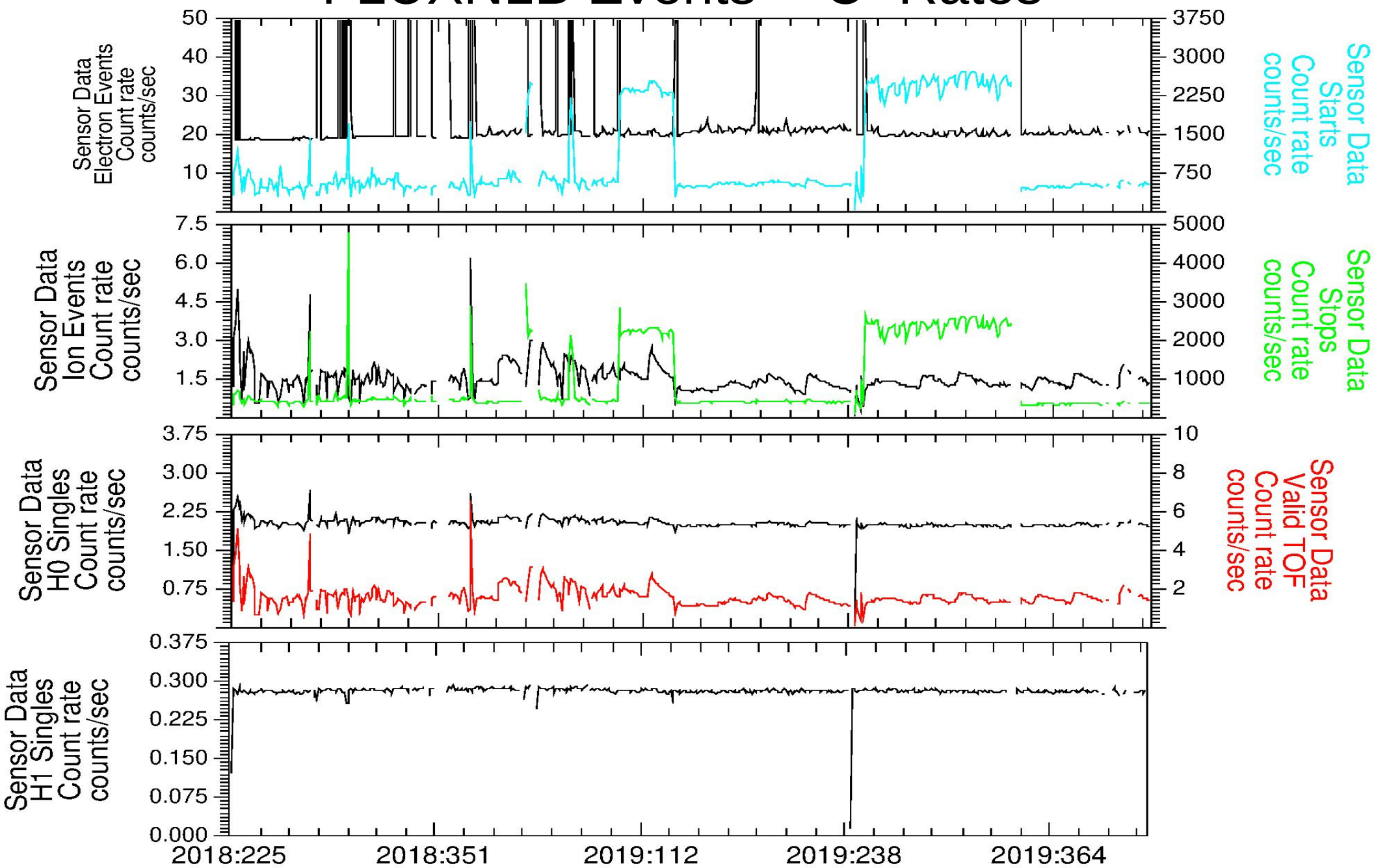
nh-a-pepssi-3-kem1-v4.0/data

FLUXN1B Events & Discards - "J" Rates

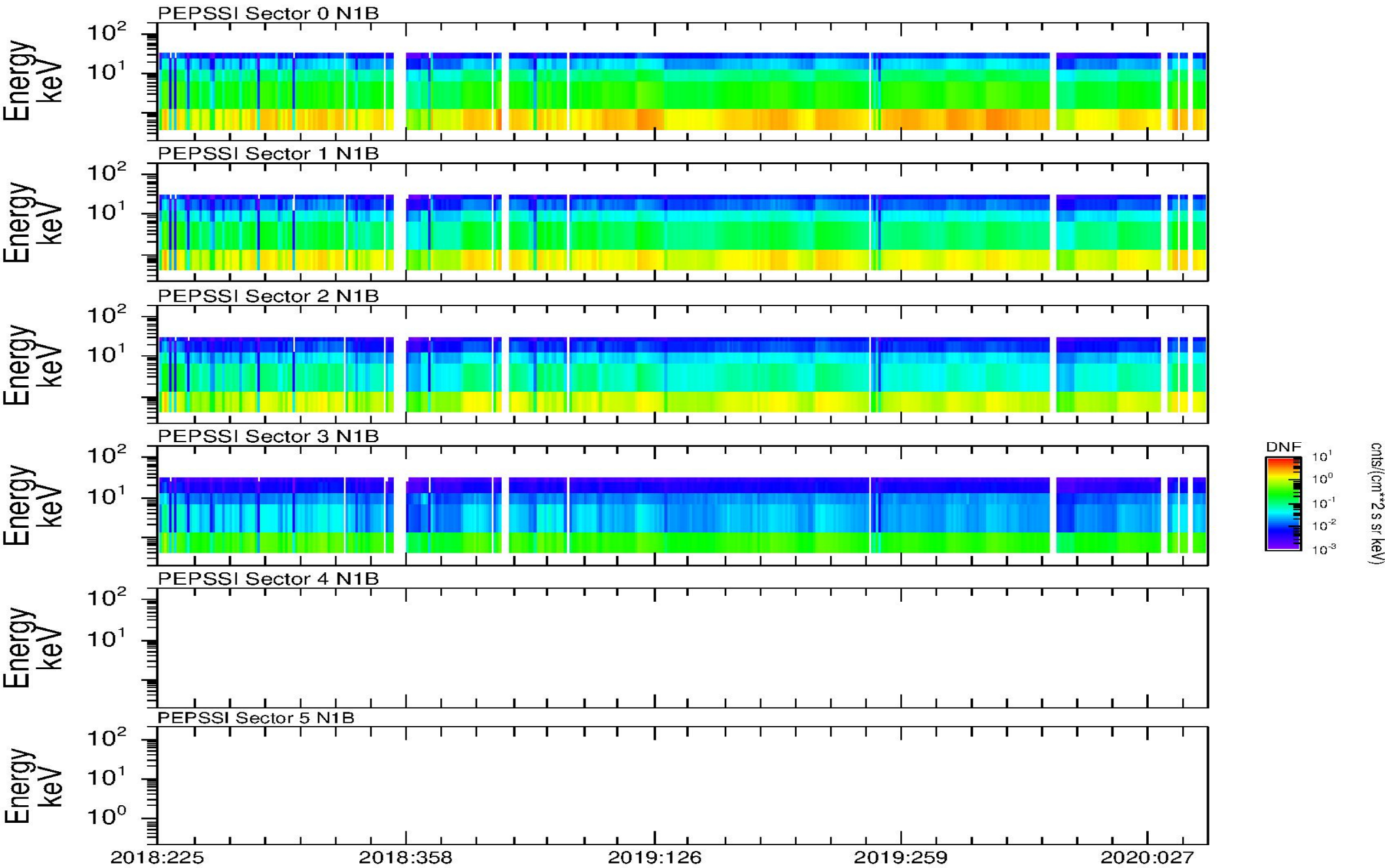


nh-a-pepssi-3-kem1-v4.0/data FLUXN1B Events - "C" Rates

23

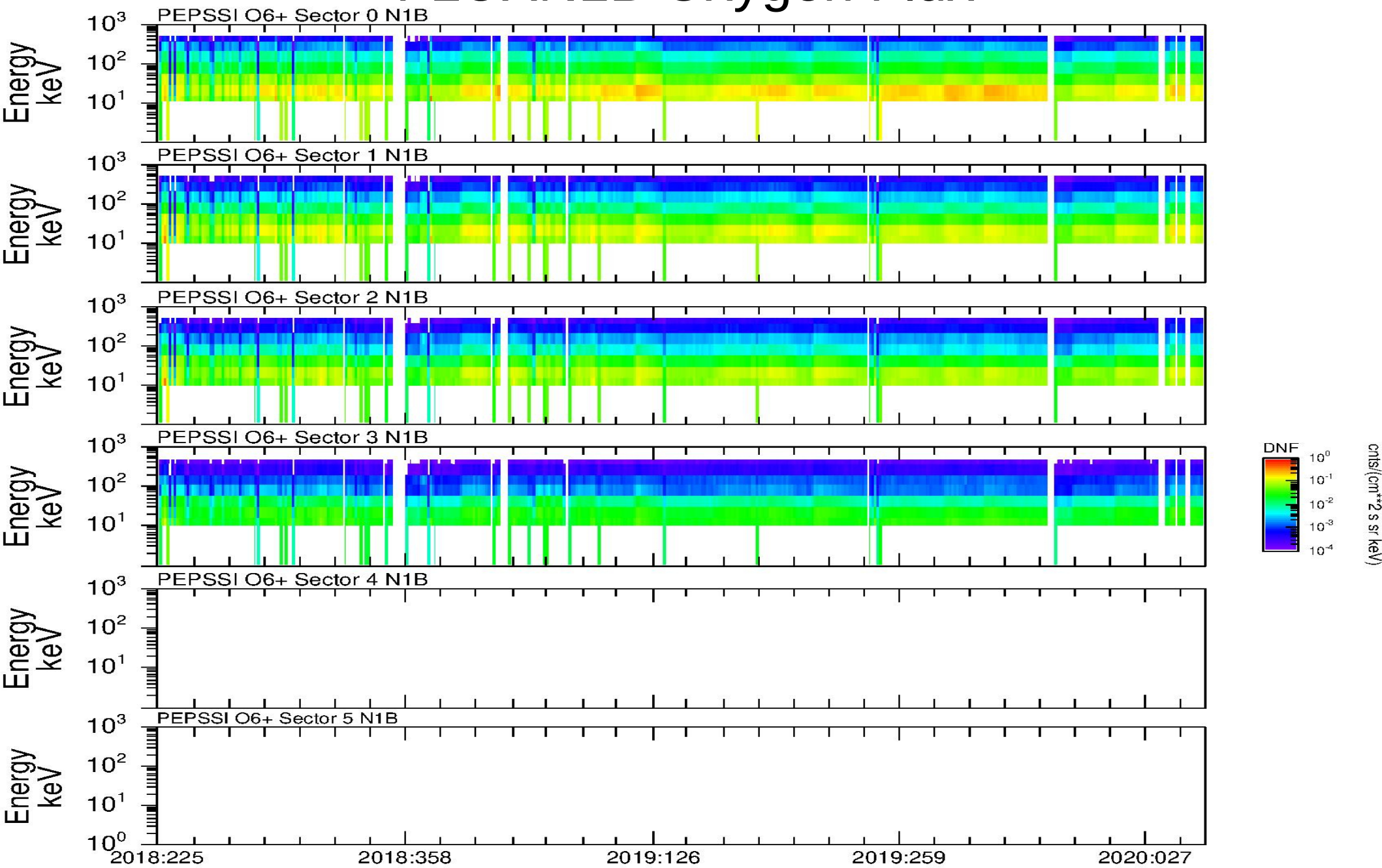


nh-a-pepssi-3-kem1-v4.0/data FLUXN1B Proton Flux

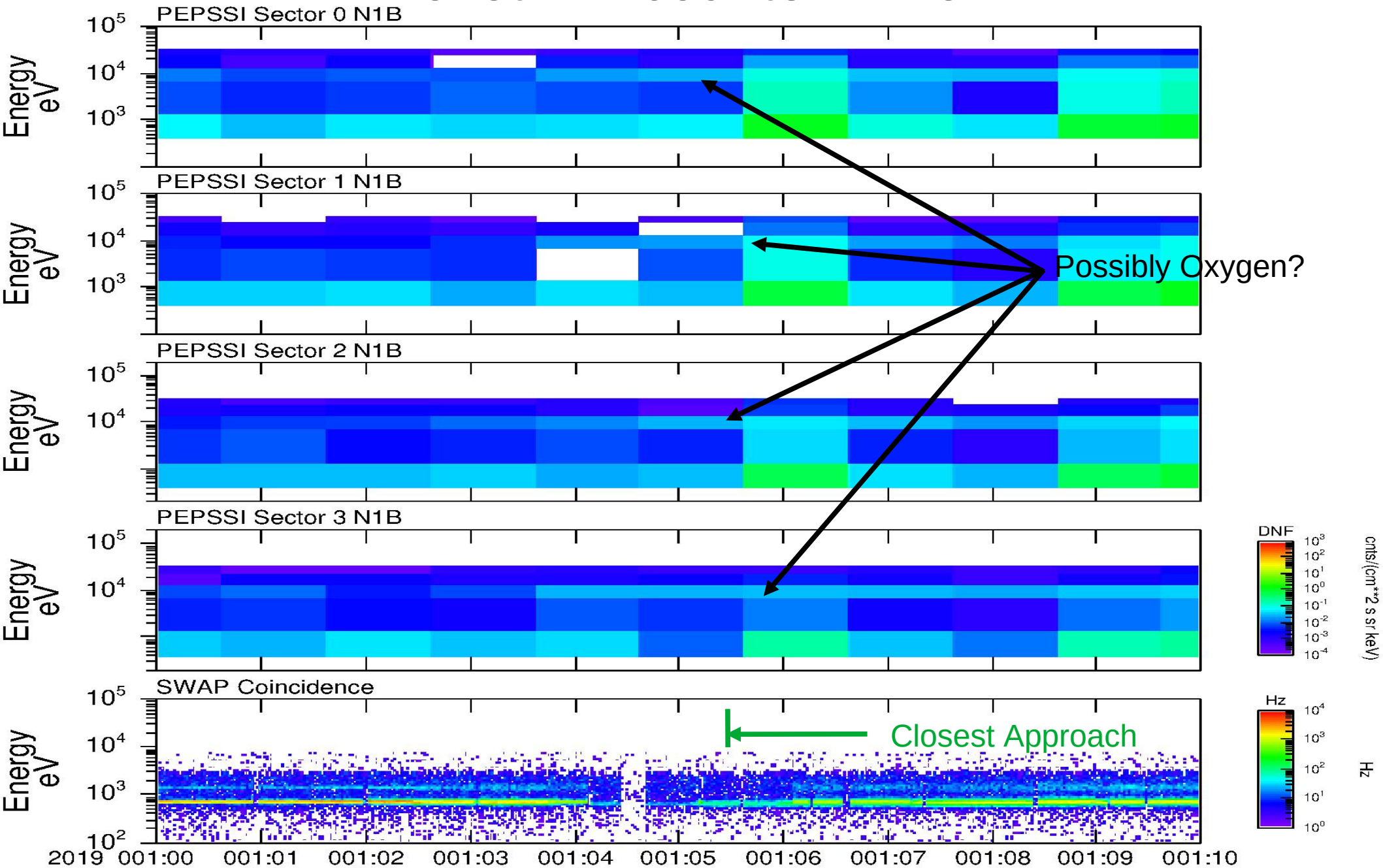


nh-a-pepssi-3-kem1-v4.0/data FLUXN1B Oxygen Flux

25

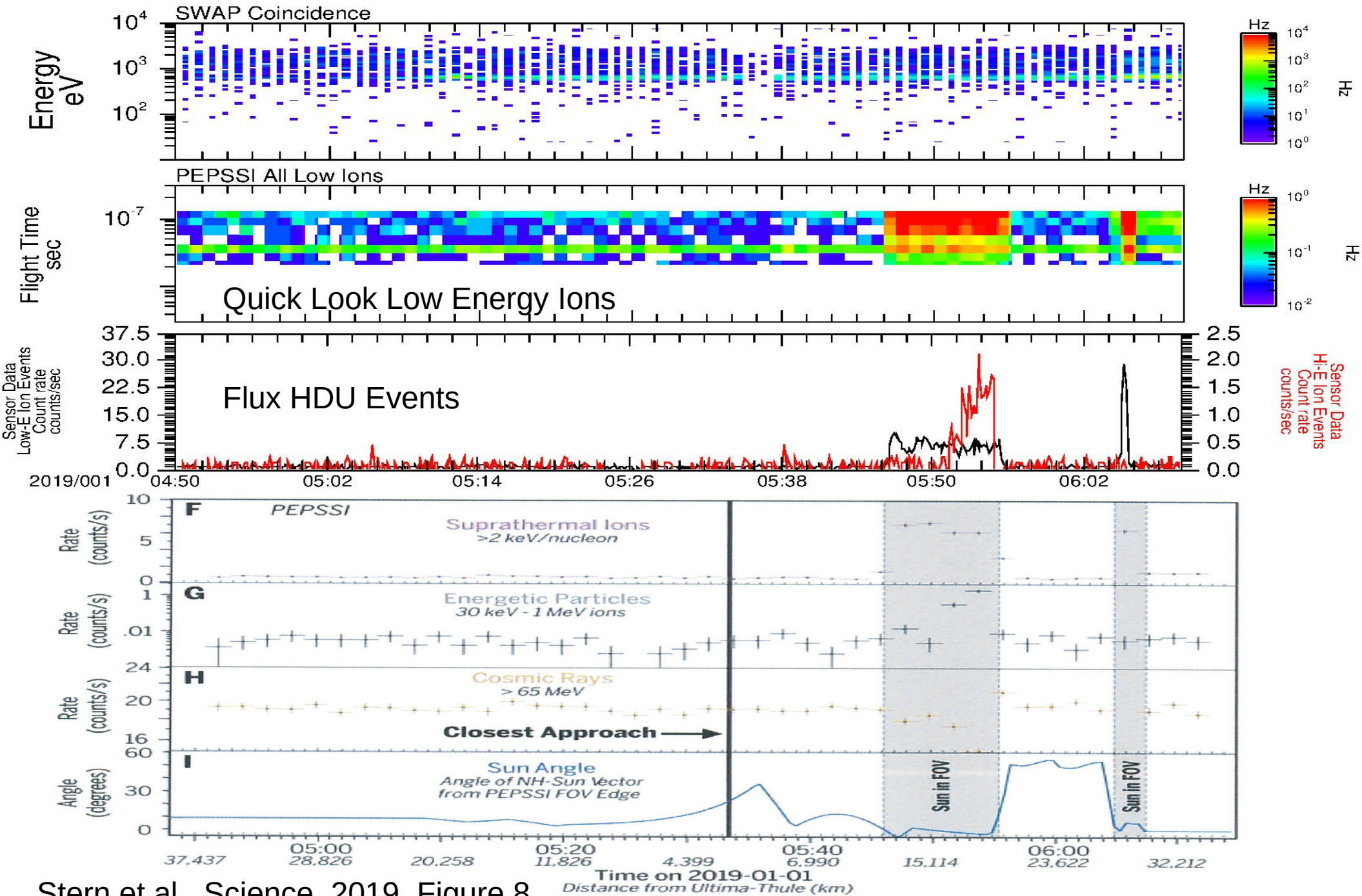


PEPSSI-SWAP Arrokoth Encounter – 1 of 2



PEPSSI-SWAP Arrokoth Encounter – 2 of 2

27



Stern et al., Science, 2019, Figure 8

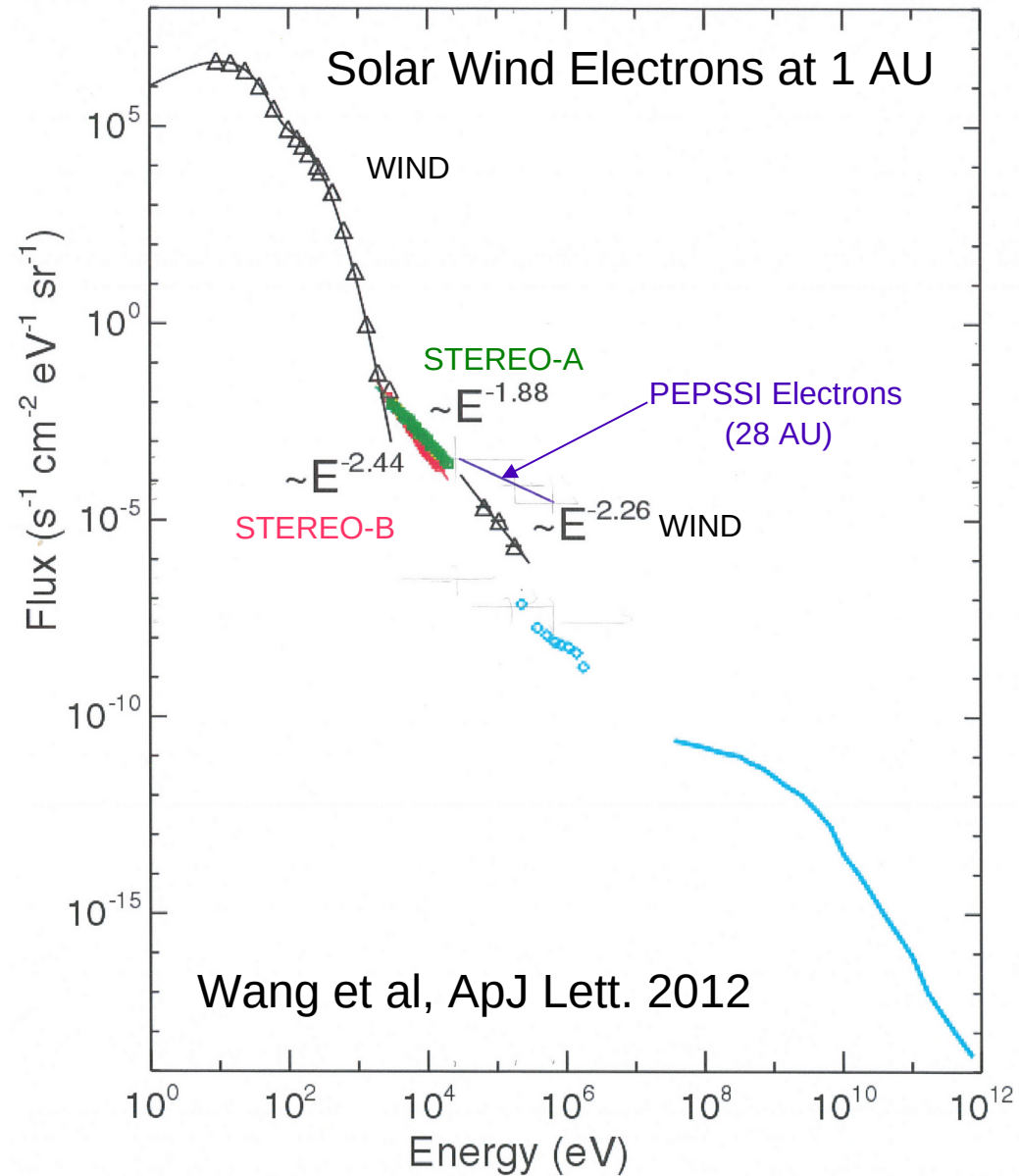
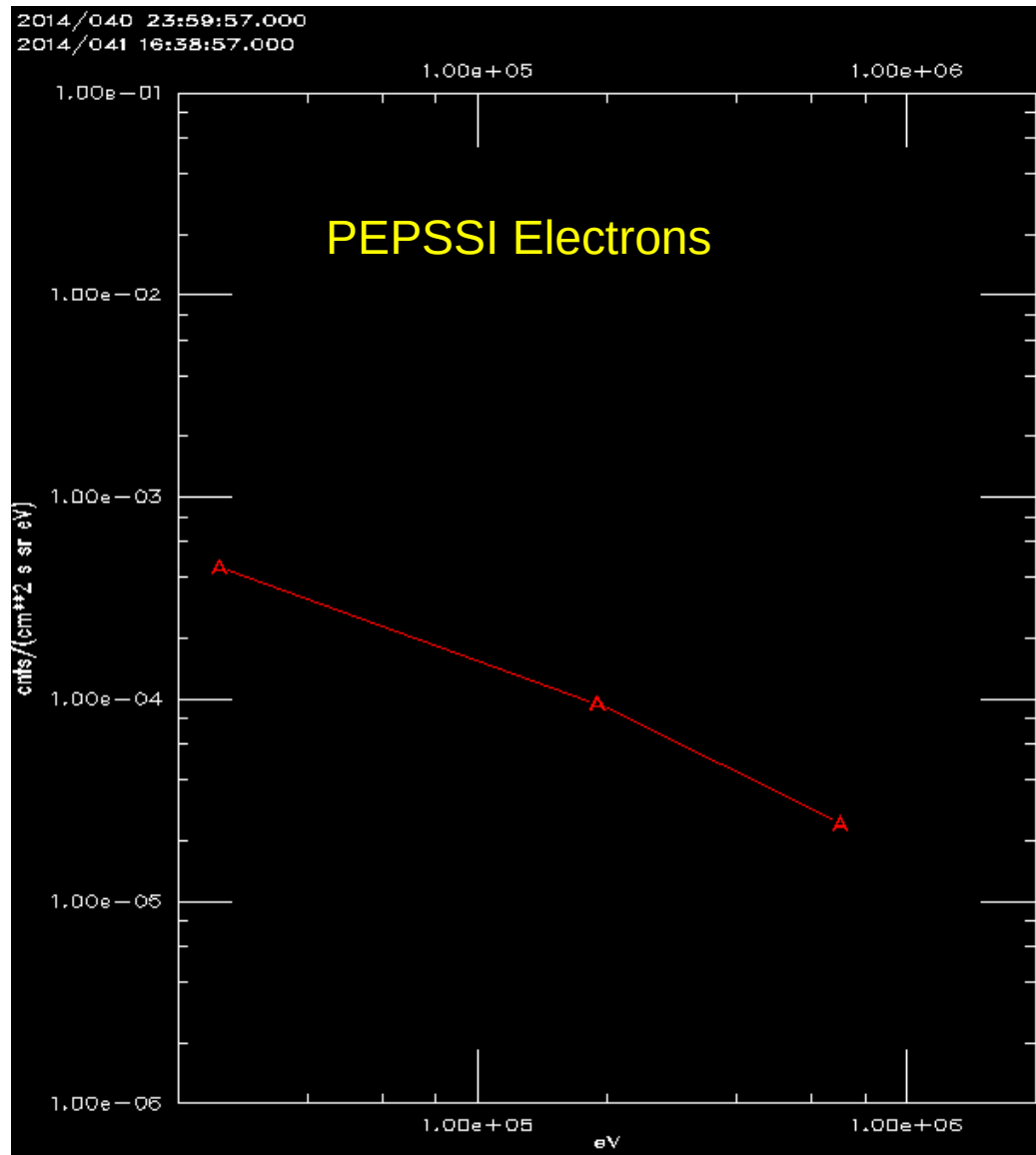
Certification

This data can be certified.

BACK-UP Slides

PEPSSI Electrons - 3

Why are the fluxes from PEPSSI abnormally high?



nh-a-pepssi-3-kem1-v3.0/document
soc_inst_icd.tbl

?

nh-a-pepssi-3-kem1-v3.0/document
soc_inst_icd.pdf

?