

Solar Wind Around Pluto

SWAP

PRINCIPAL INVESTIGATOR
Dave McComas, Princeton University

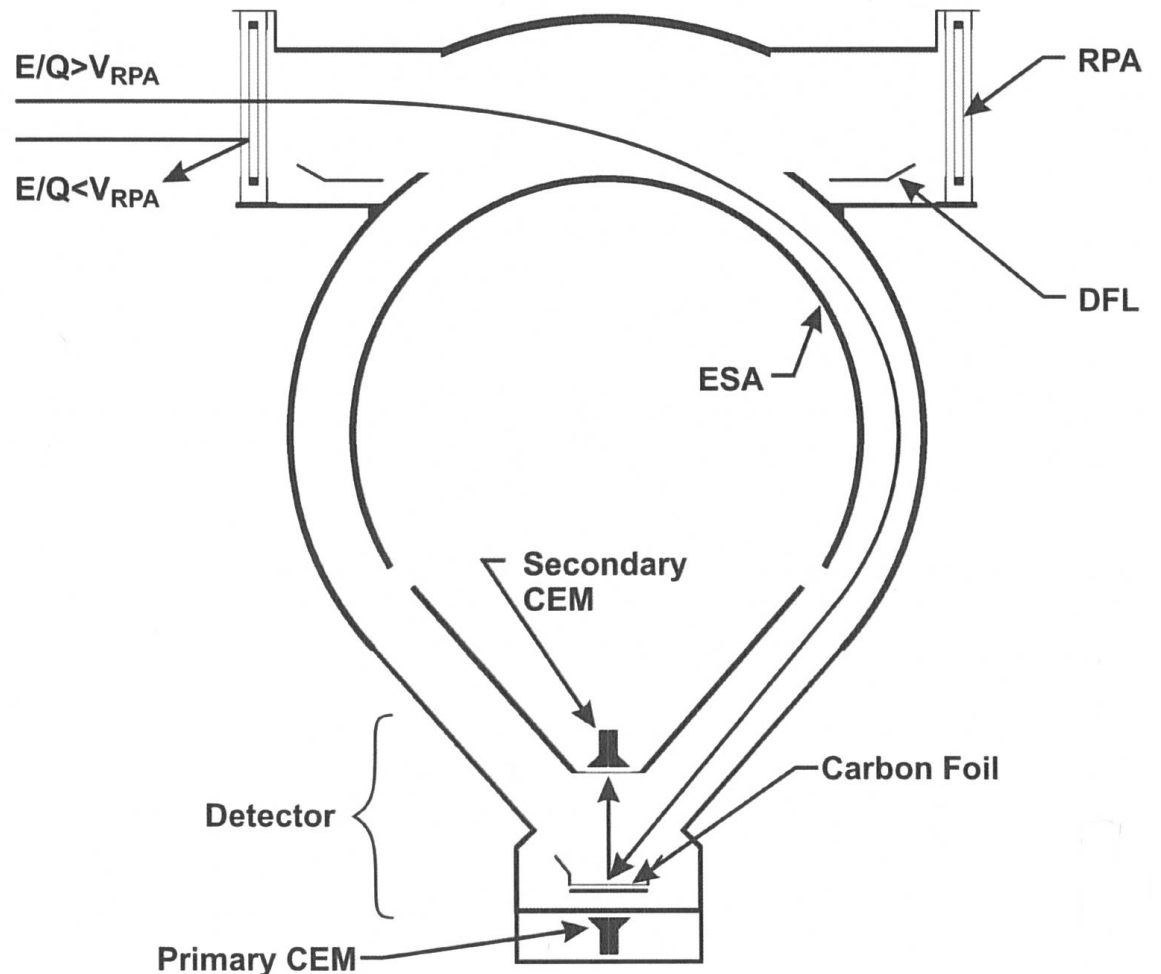
DESCRIPTION
Low Energy Plasma Instrument

ENERGY RANGE
30 eV - 7.7 keV

FIELD OF VIEW
270 deg x 10 deg
(deflection angles up to +15 deg)

ENERGY RESOLUTION
1 eV (< 2 keV); 9% (> 2 keV)

SPECIES
All Ions



New Horizons SWAP Data Sets

2

RAW Data Sets:

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

CALIBRATED Data Sets:

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

New Horizons SWAP 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

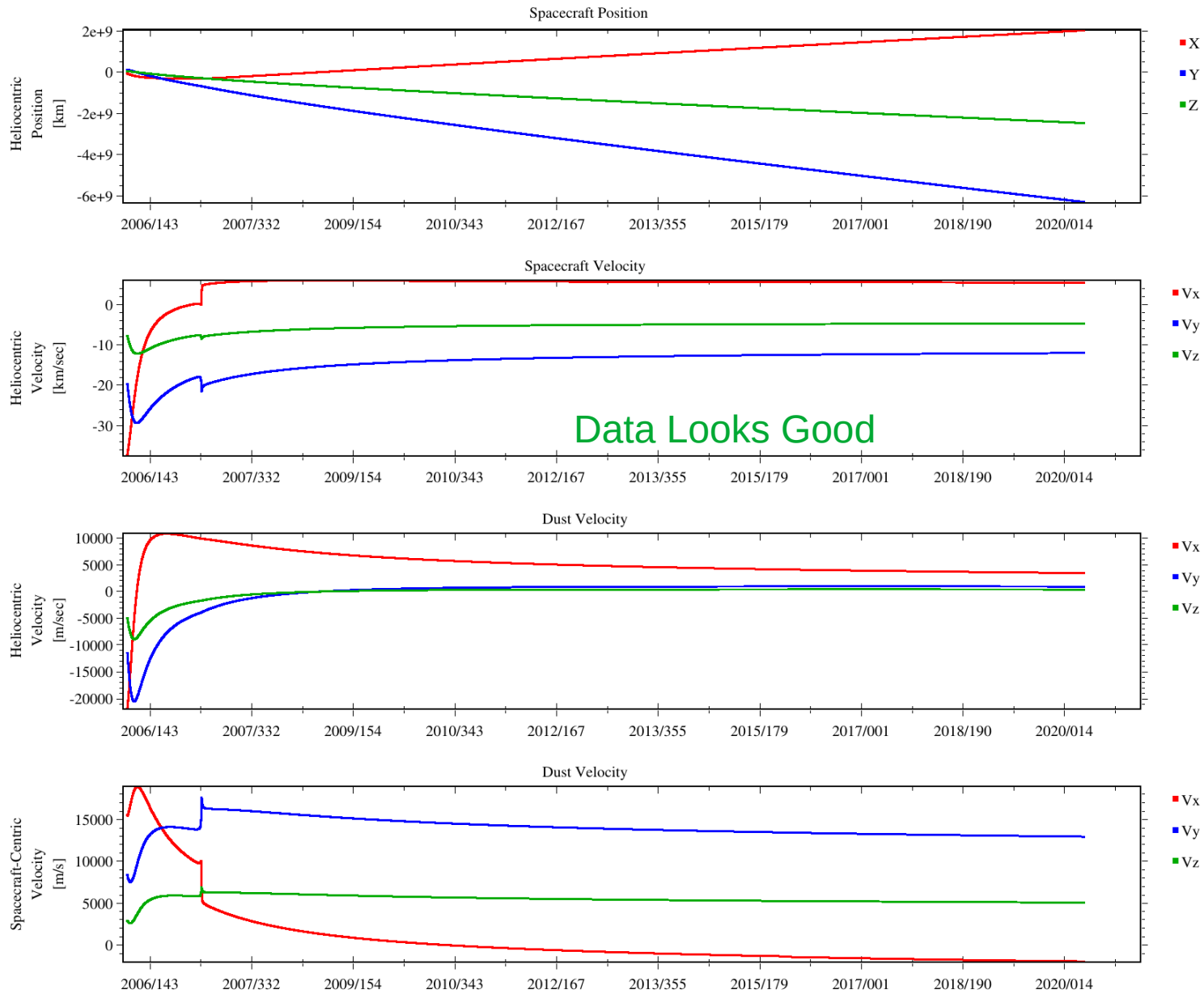
Minor Diagnostics -

Machine: Dell 7520

Operating System: Fedora 31 linux

SWAP Documentation Evaluation

nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document nh_mission_trajectory.tab



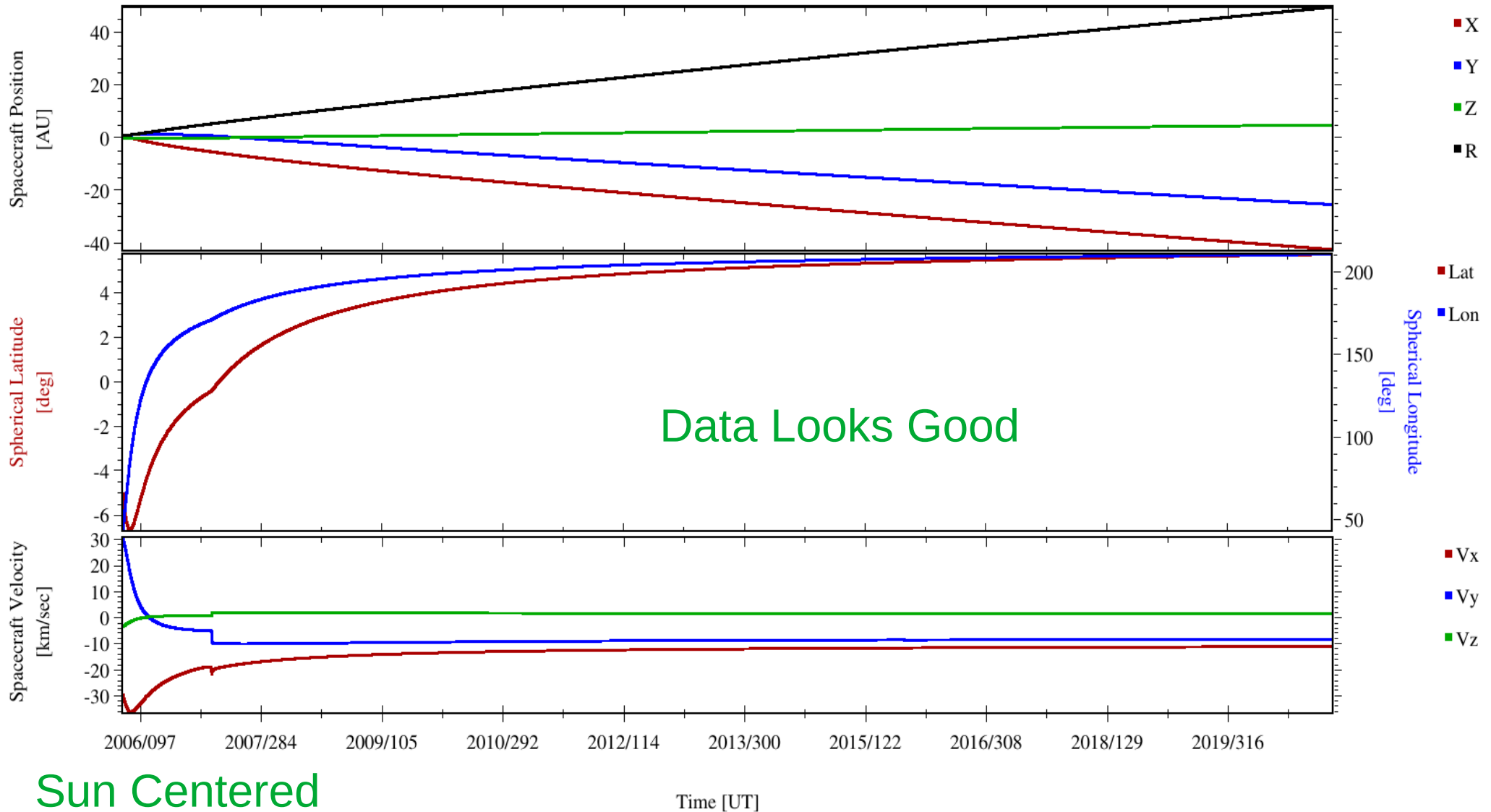
nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
soc_inst_icd.pdf

6

The title of Section 14.11 “SWAP Publications to Date” should probably be renamed to “SWAP Example publications” since there have been no updates since 2013.

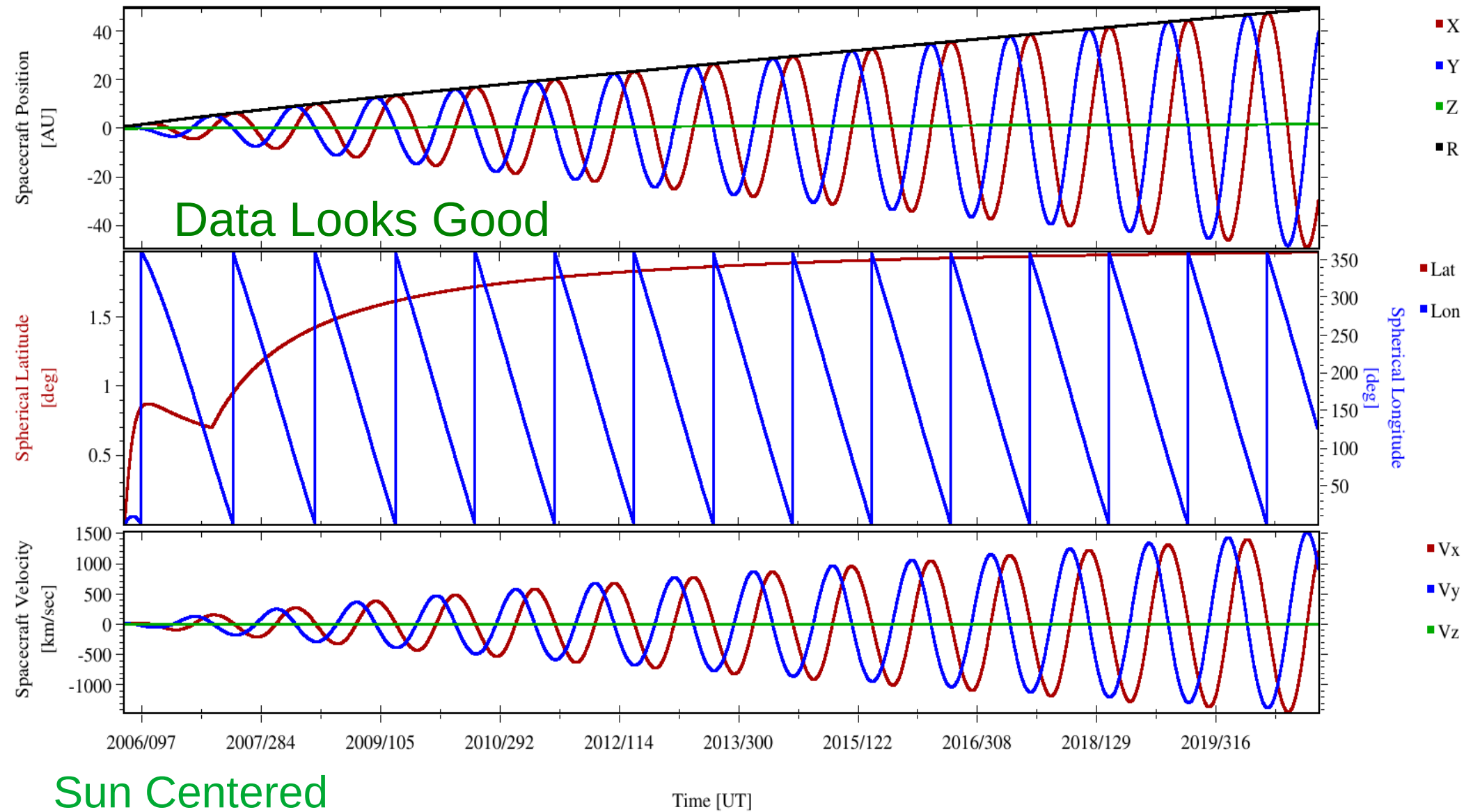
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - HCI

HCI Coordinate System - Sun Center



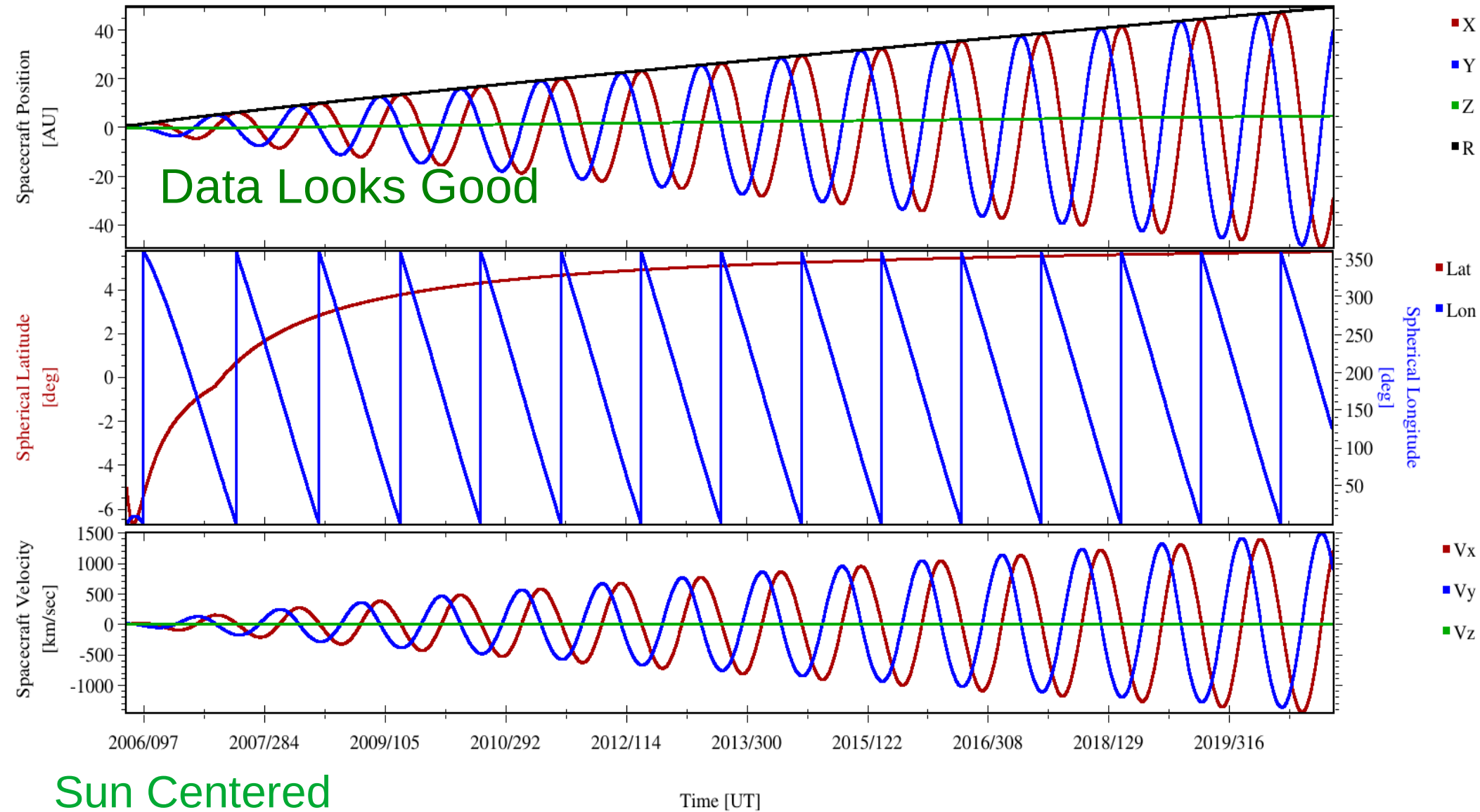
nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tab - HEE

HEE Coordinate System - Sun Center



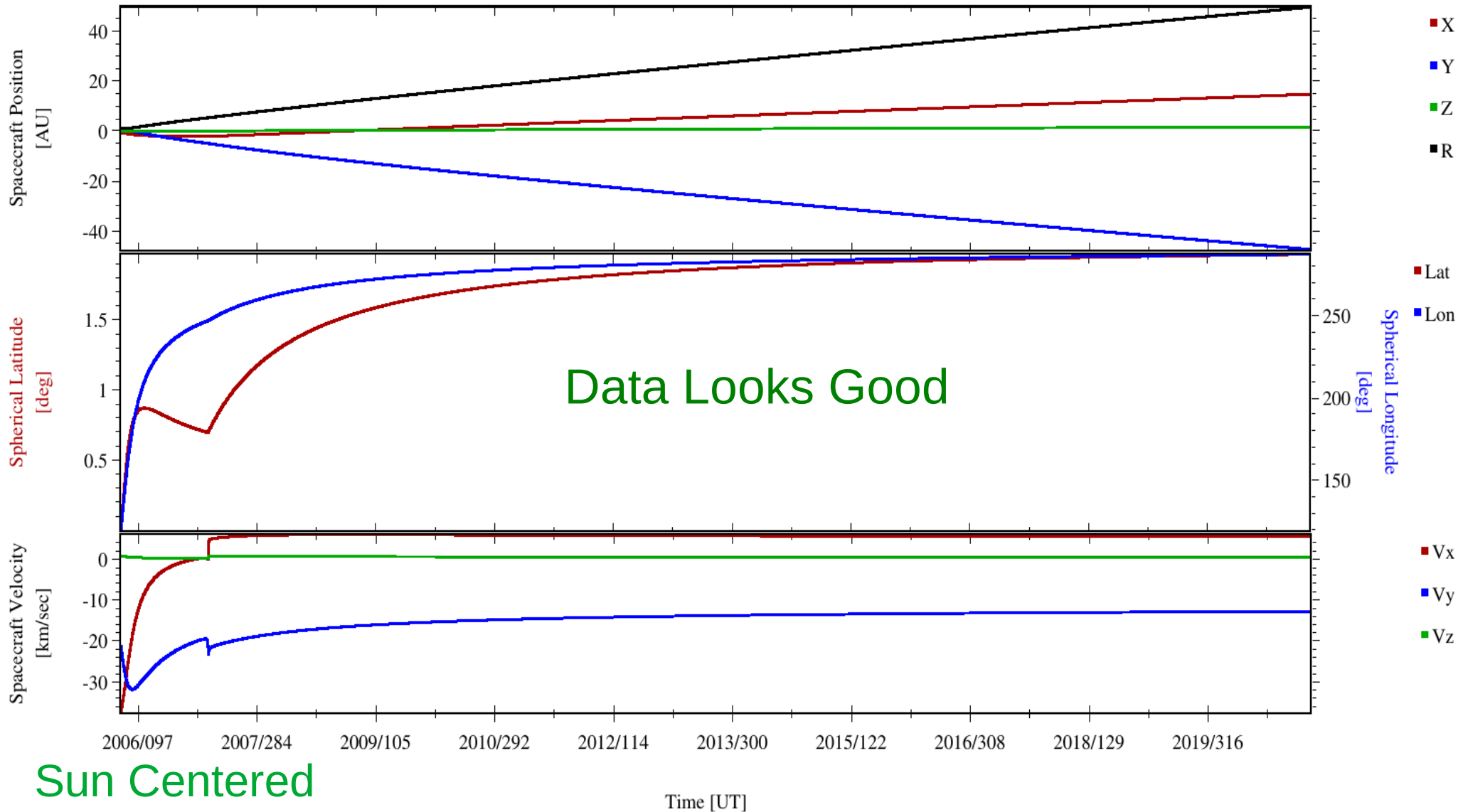
nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tab - HEEQ

HEEQ Coordinate System - Sun Center



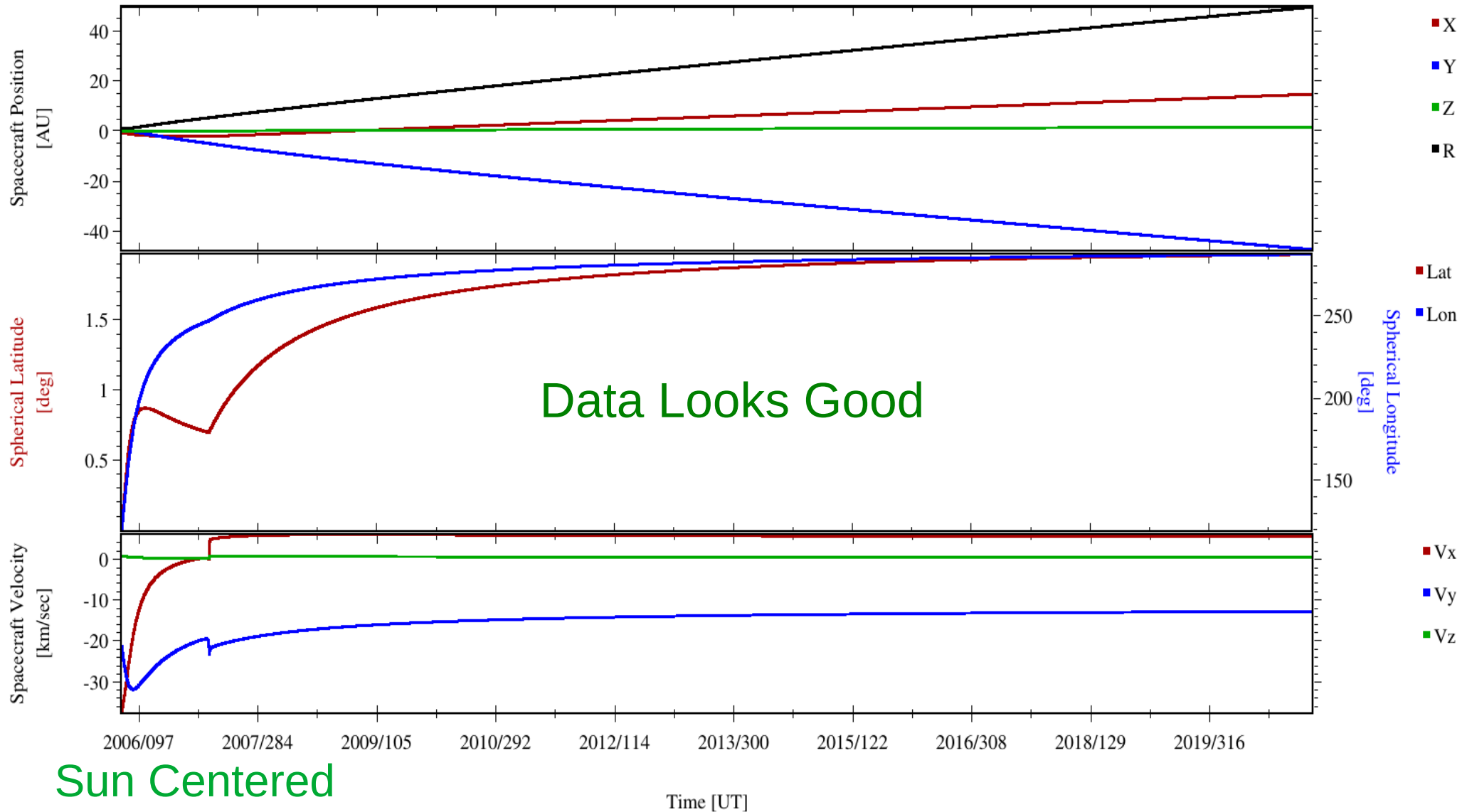
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - ECLIPJ2000

ECLIPDATE or HAE_DATE Coordinate System - Sun Center



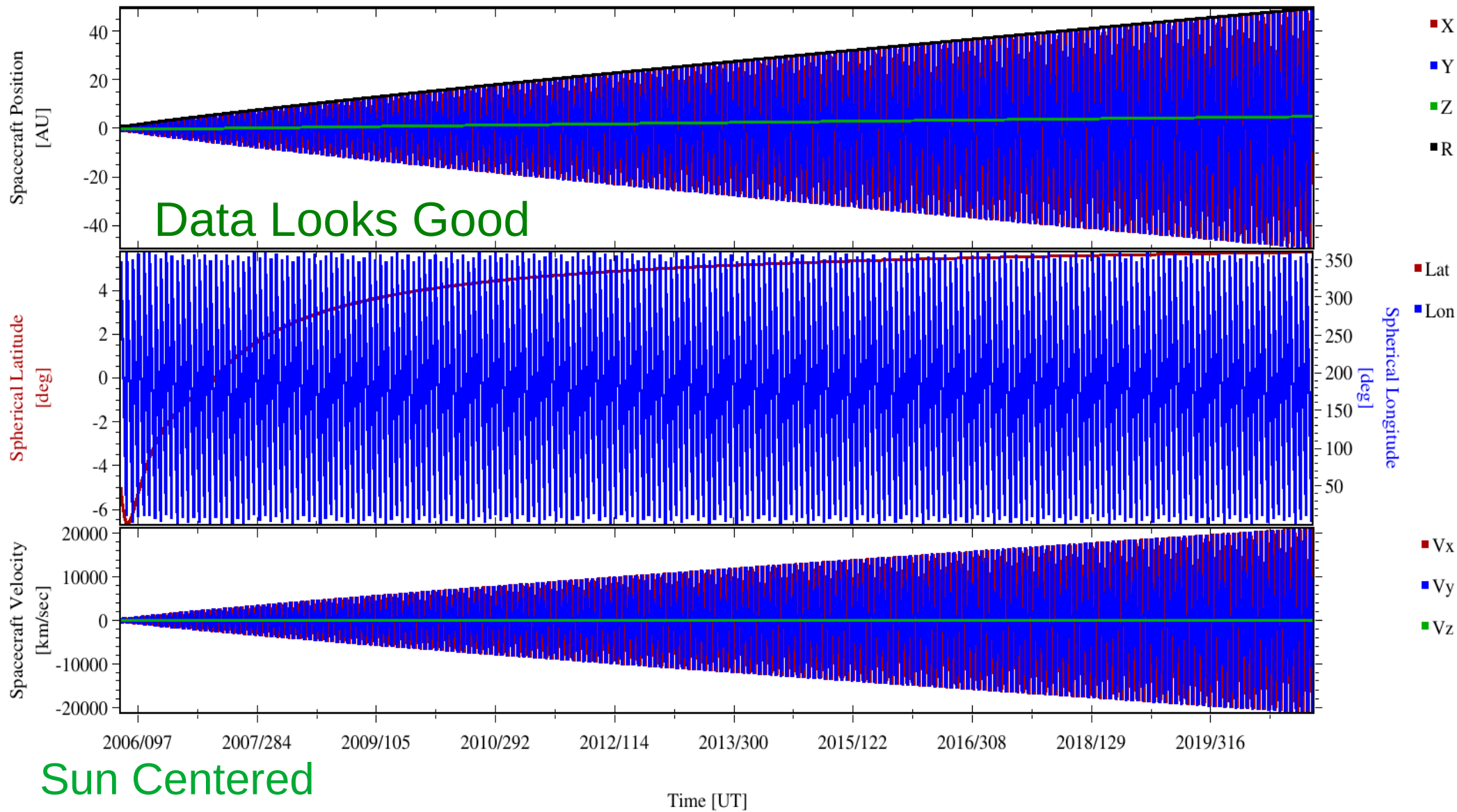
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - ECLIPDATE

ECLIPDATE or HAE_DATE Coordinate System - Sun Center



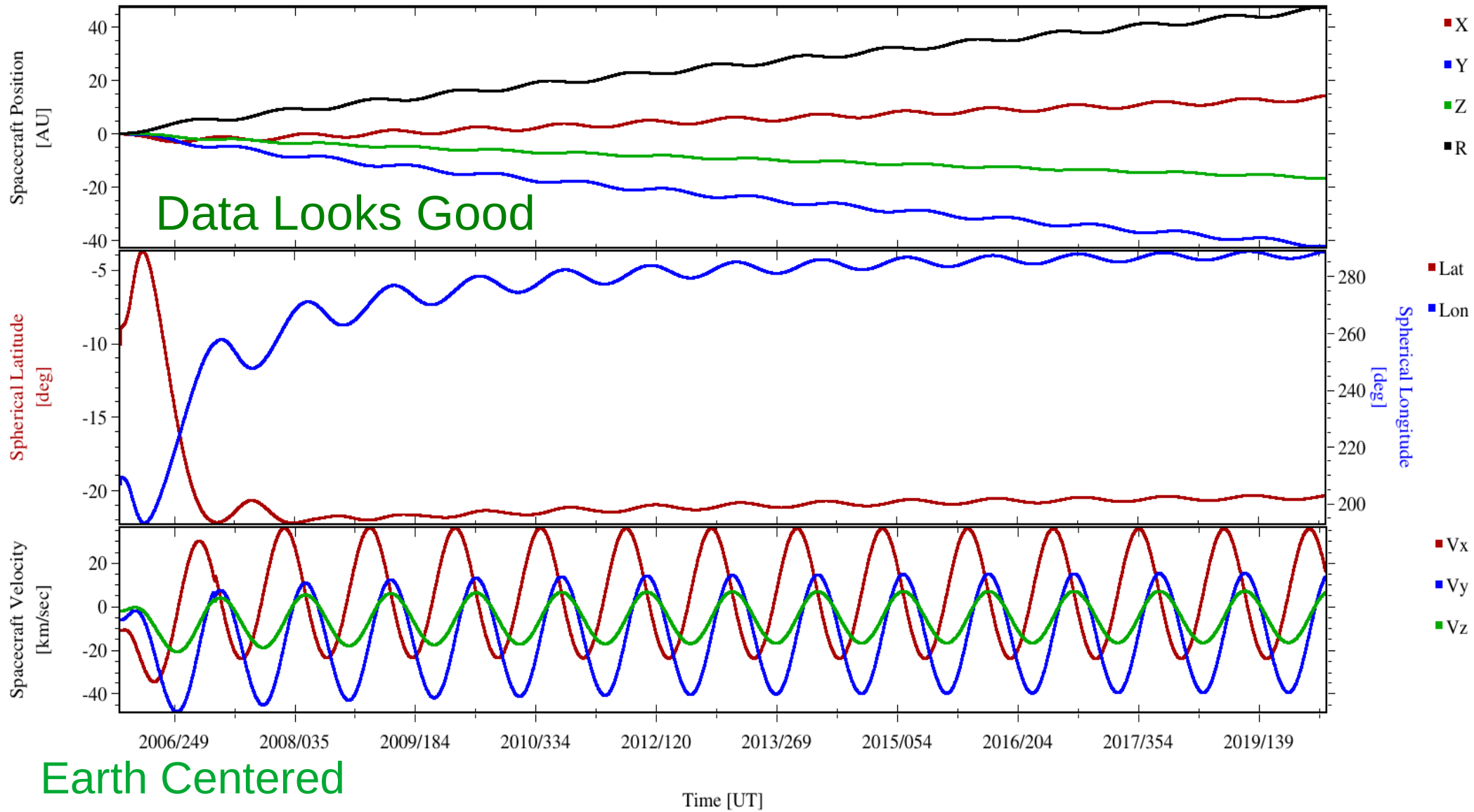
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - IAU_SUN

IAU_SUN Coordinate System - Sun Center



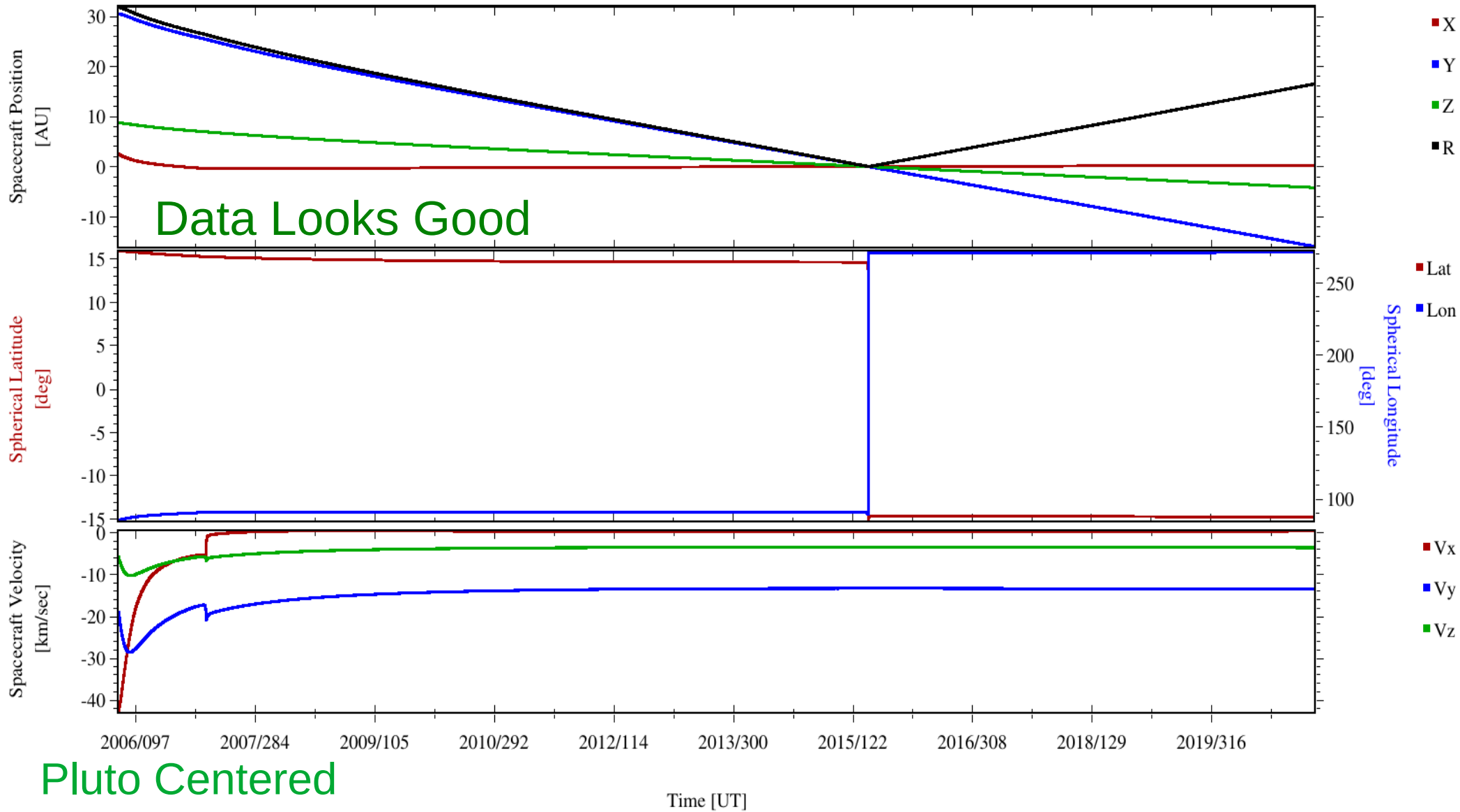
nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tab - J2000

J2000 Coordinate System - Earth Center



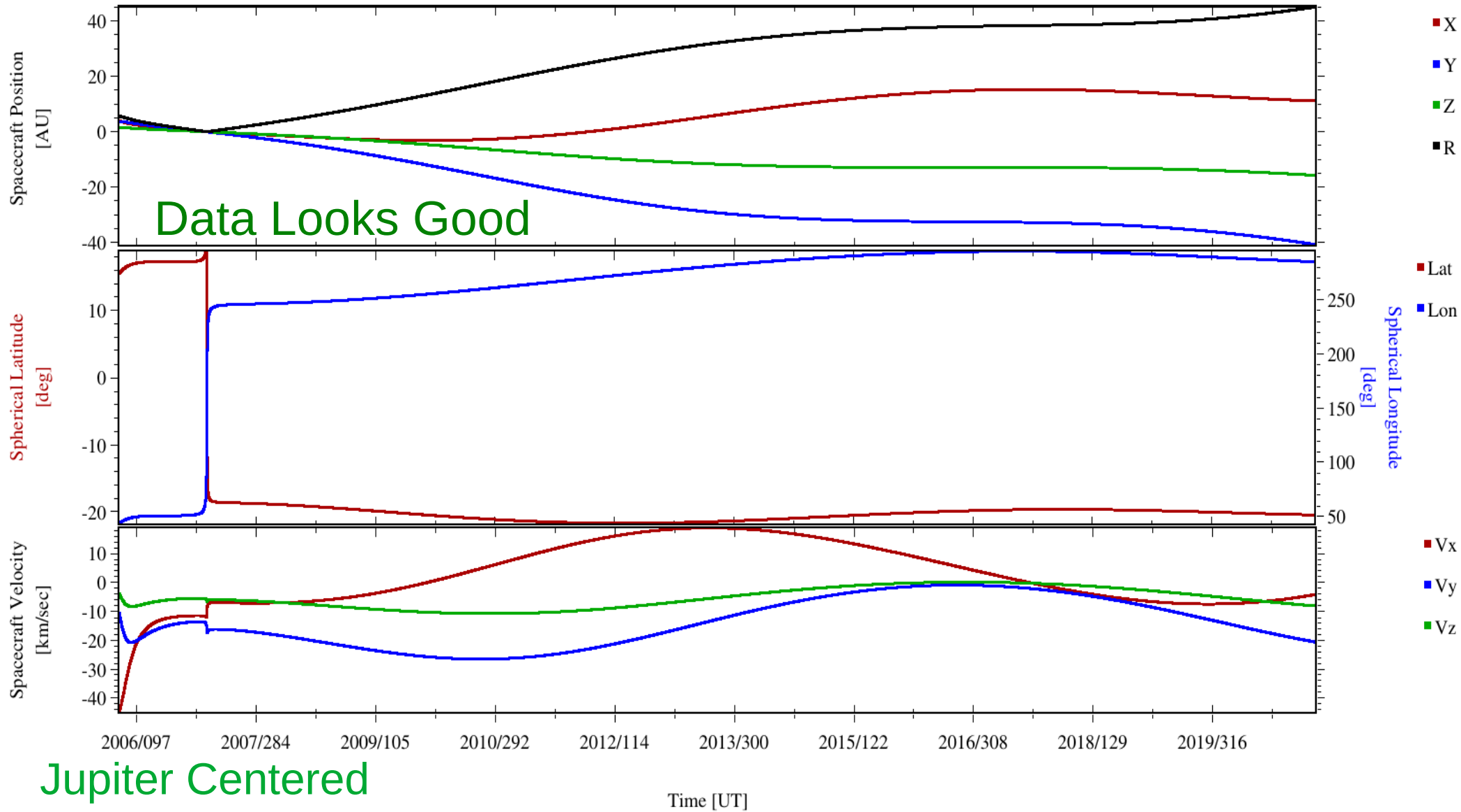
nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tab - J2000

J2000 Coordinate System - Pluto Center



nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tab - J2000

J2000 Coordinate System - Jupiter Center



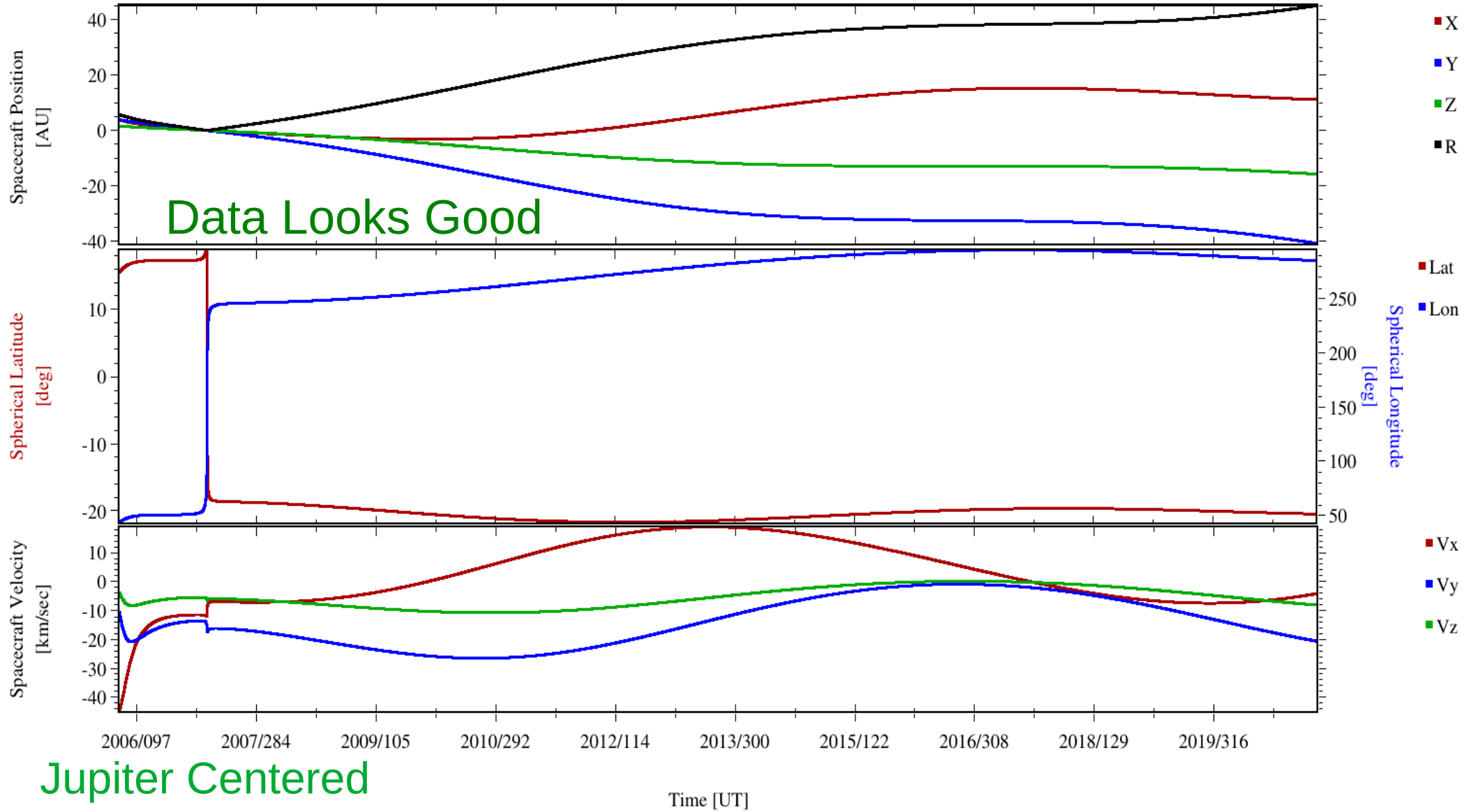
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - IAU_PLUTO

IAU_PLUTO Coordinate System - Pluto Center



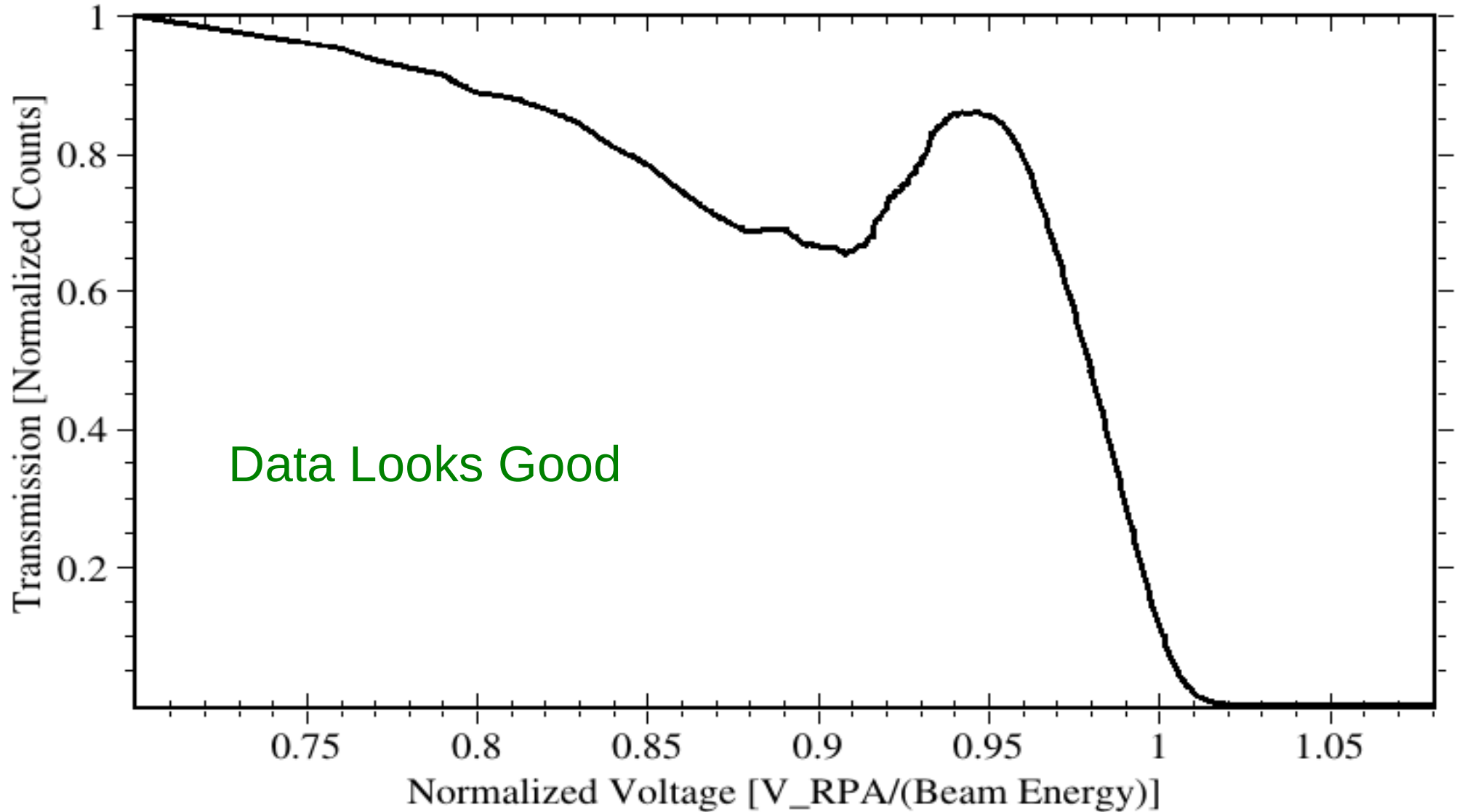
nh-a-swap-2-kem1-v4.0/document nh-a-swap-3-kem1-v4.0/document traj/traj_2006_2021_1d.tab - IAU_JUPITER

J2000 Coordinate System - Jupiter Center



nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
rpa_shape.tab

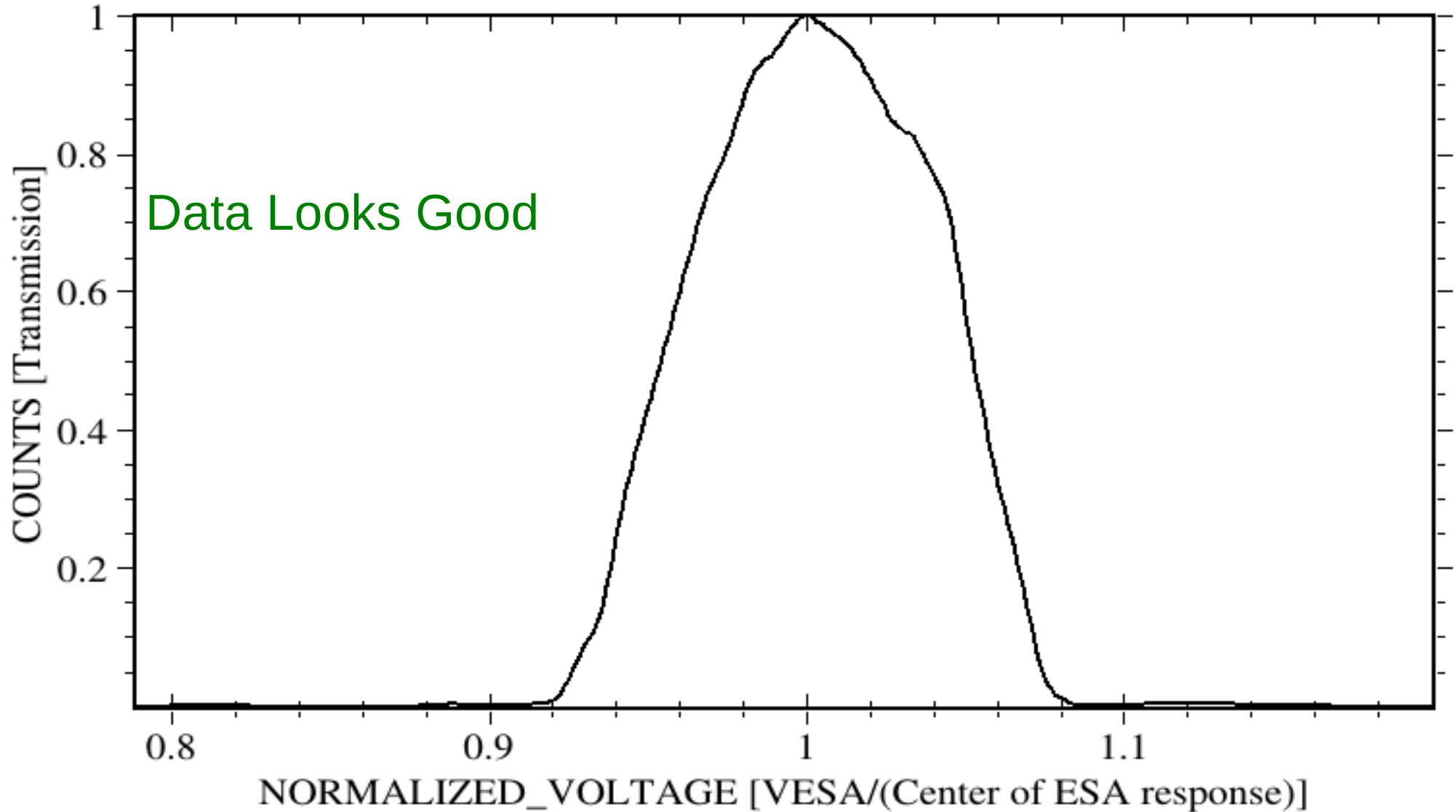
RPA Response Curve



Data Looks Good

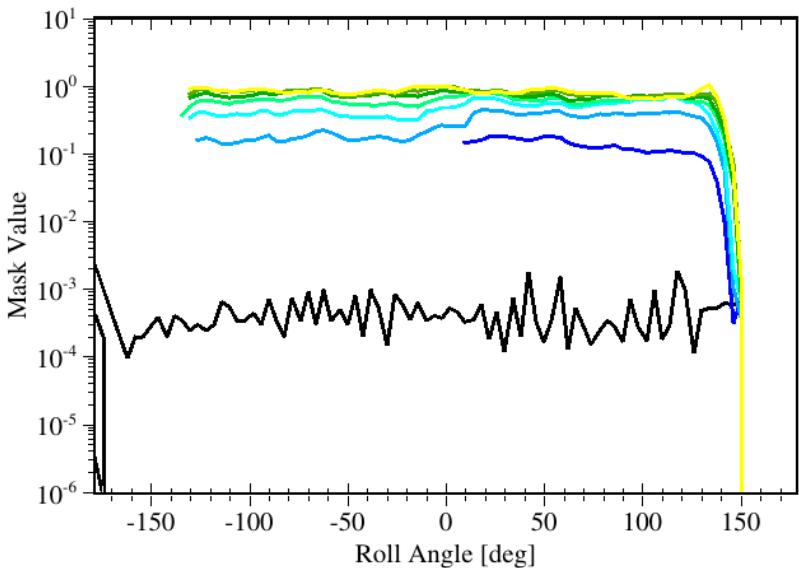
nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
esa_shape.tab

SWAP esa_shape.tab



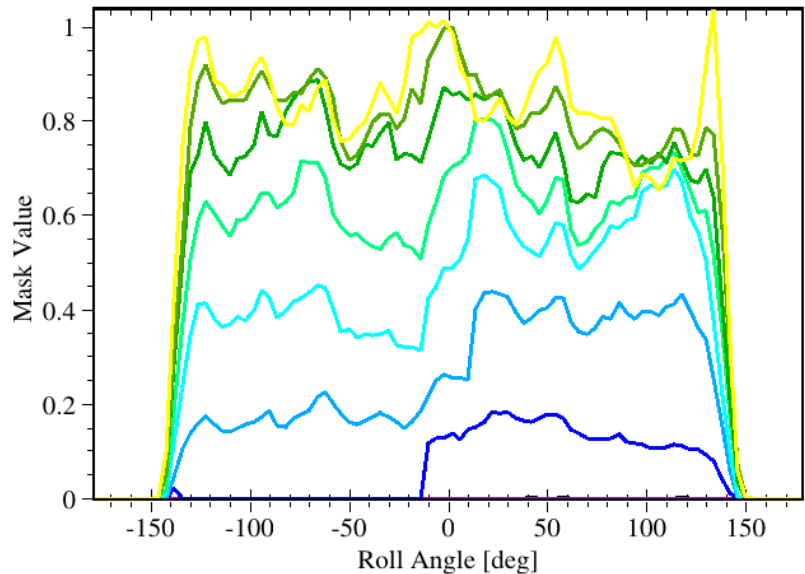
nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib fov_mask_2d.tab

SWAP FOV Mask (Negative Azimuth)



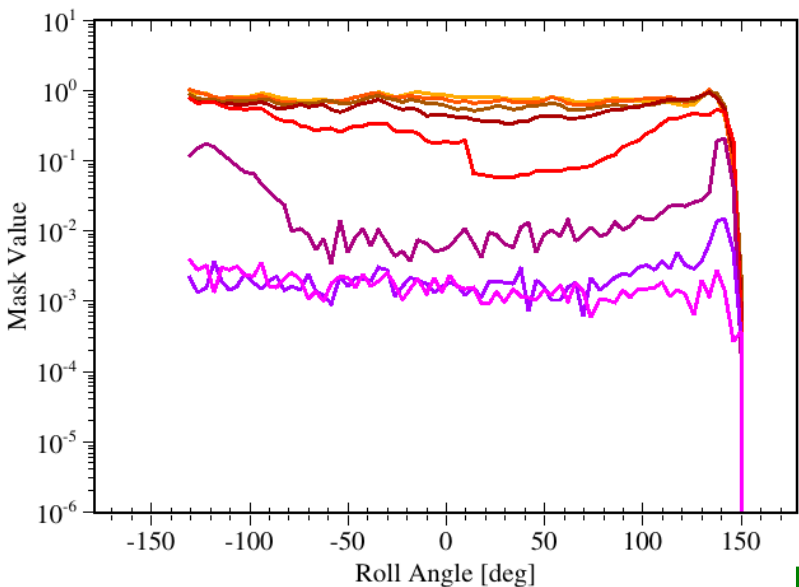
- 8 deg Azimuth
- 7 deg Azimuth
- 6 deg Azimuth
- 5 deg Azimuth
- 4 deg Azimuth
- 3 deg Azimuth
- 2 deg Azimuth
- 1 deg Azimuth
- 0 deg Azimuth

SWAP FOV Mask (Negative Azimuth)



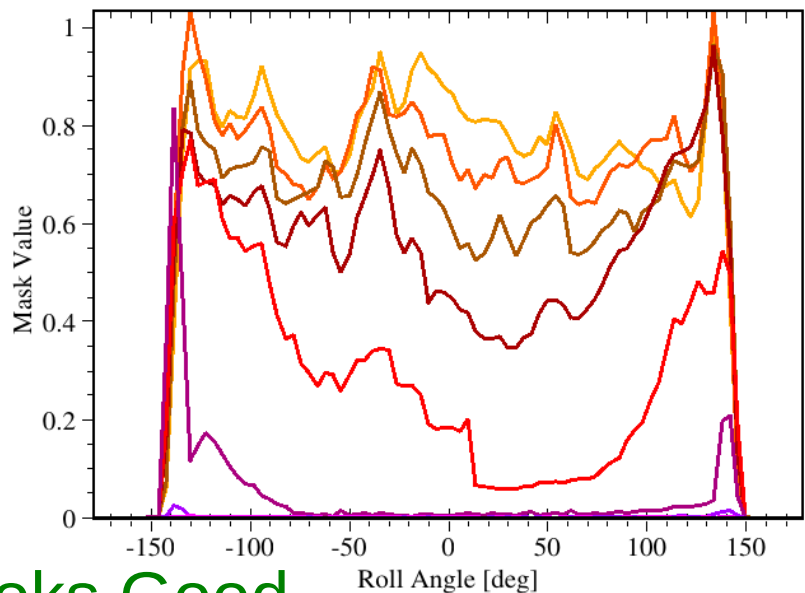
- 8 deg Azimuth
- 7 deg Azimuth
- 6 deg Azimuth
- 5 deg Azimuth
- 4 deg Azimuth
- 3 deg Azimuth
- 2 deg Azimuth
- 1 deg Azimuth
- 0 deg Azimuth

SWAP FOV Mask (Positive Azimuth)



- +1 deg Azimuth
- +2 deg Azimuth
- +3 deg Azimuth
- +4 deg Azimuth
- +5 deg Azimuth
- +6 deg Azimuth
- +7 deg Azimuth
- +8 deg Azimuth
- +9 deg Azimuth
- +10 deg Azimuth

SWAP FOV Mask (Positive Azimuth)

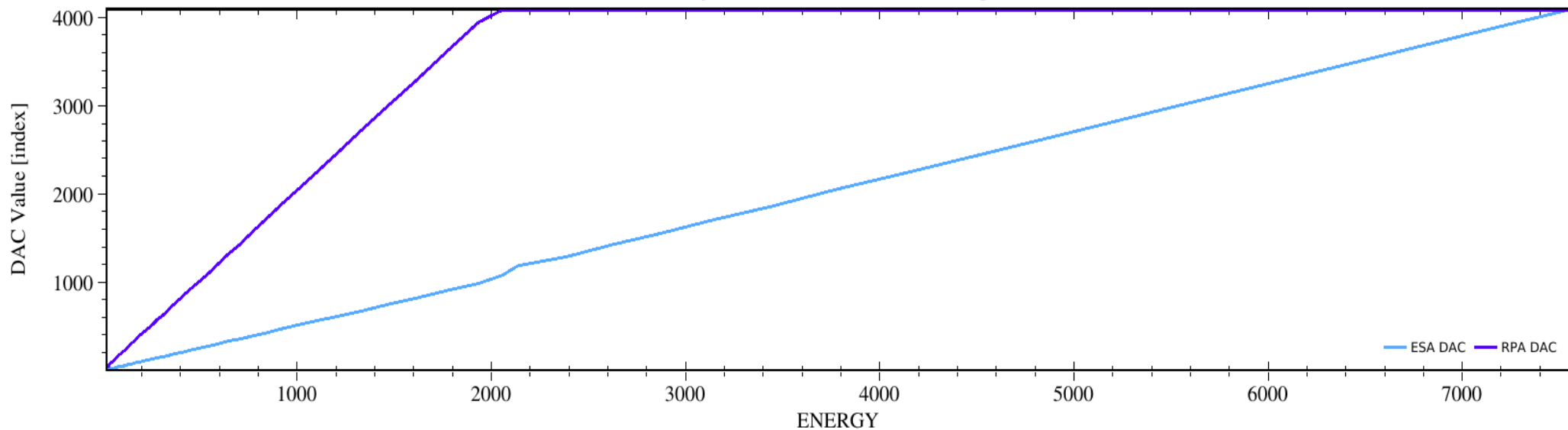


- +1 deg Azimuth
- +2 deg Azimuth
- +3 deg Azimuth
- +4 deg Azimuth
- +5 deg Azimuth
- +6 deg Azimuth
- +7 deg Azimuth
- +8 deg Azimuth
- +9 deg Azimuth
- +10 deg Azimuth

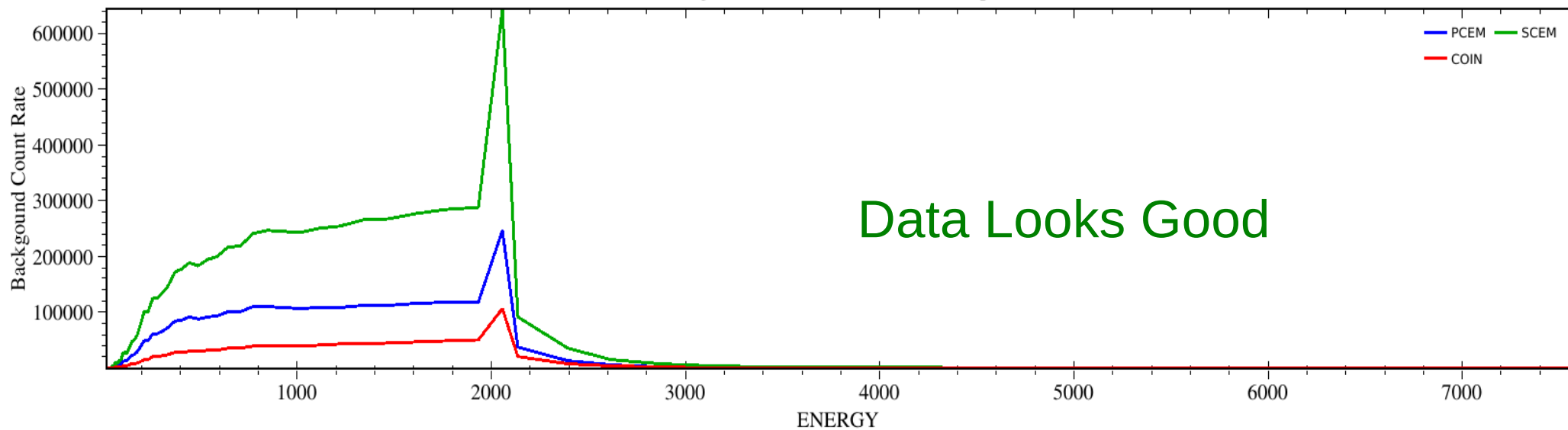
Data Looks Good

nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib background_009_dac.tab

SWAP background_009_dac.tab: Plan 3, Sweep 3



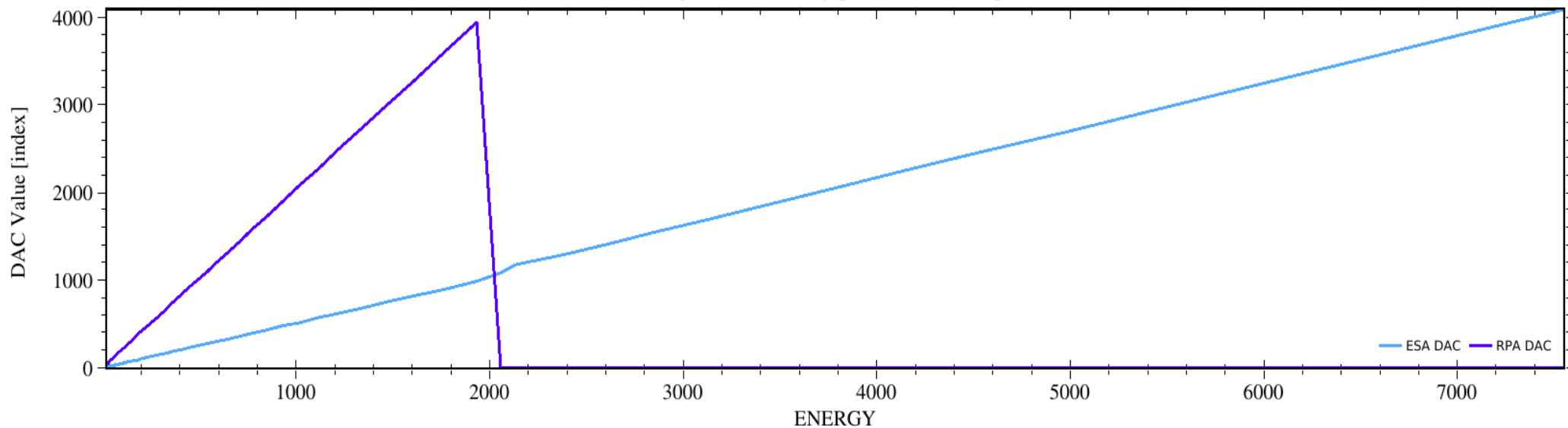
SWAP background_009_dac.tab: Plan 3, Sweep 3



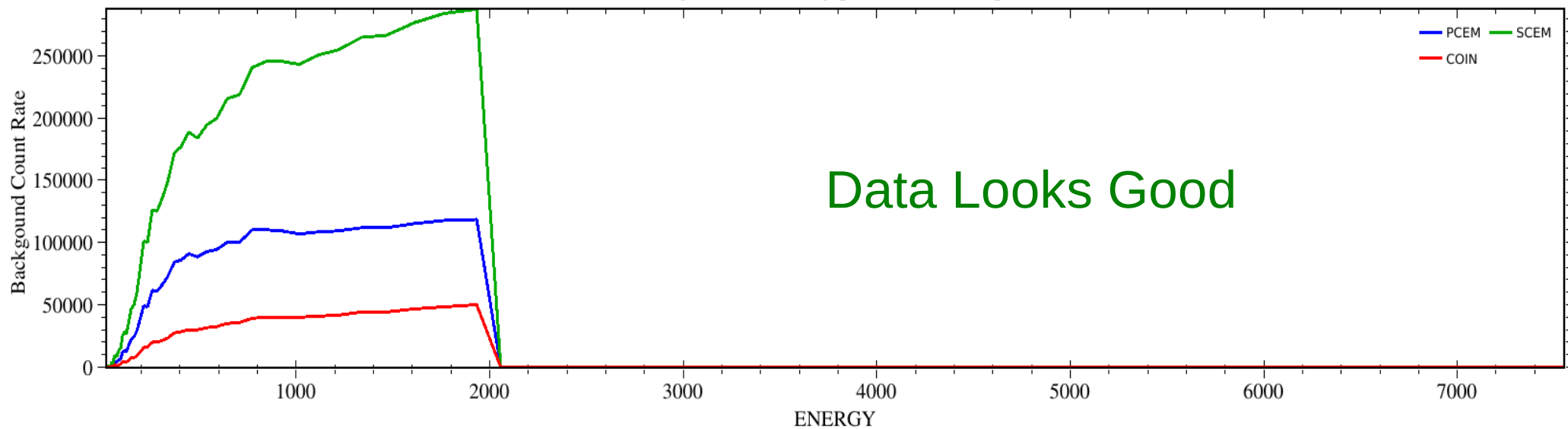
Data Looks Good

nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib background_009_dac_jup.tab

SWAP background_009_dac_jup.tab: Plan 0, Sweep 0



SWAP background_009_dac_jup.tab: Plan 0, Sweep 0



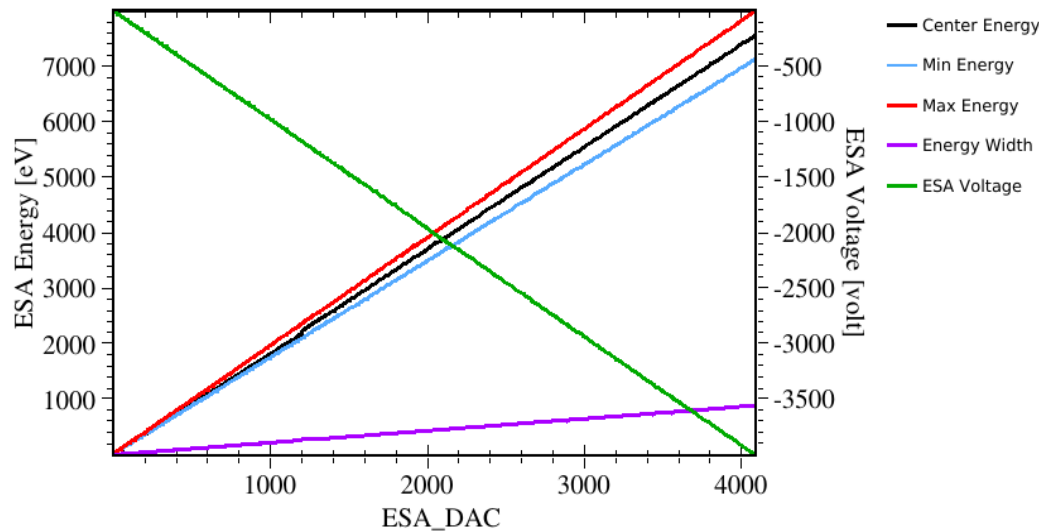
Data Looks Good

nh-a-swap-2-kem1-v4.0/calib

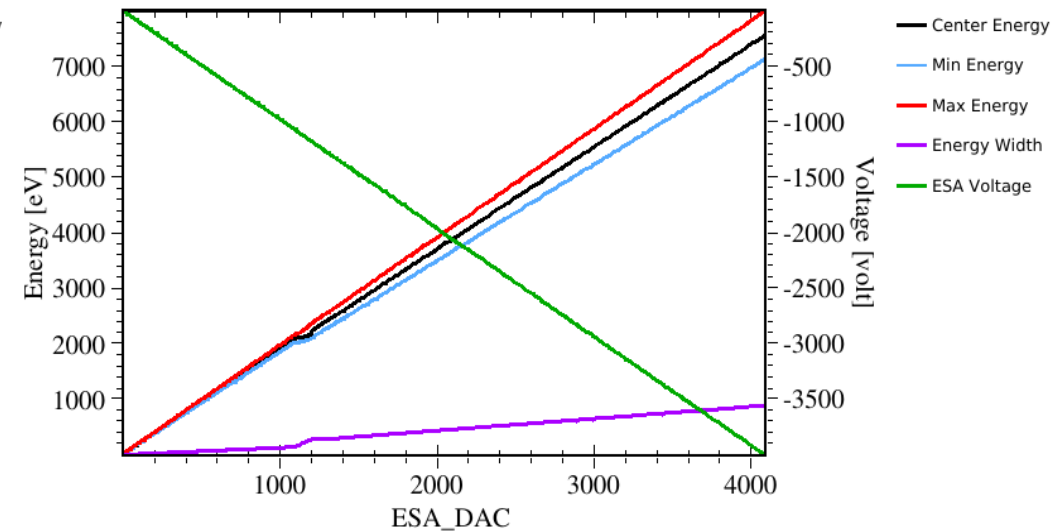
nh-a-swap-3-kem1-v4.0/calib

esa_rpa_v16_energy_binsf_new.tab

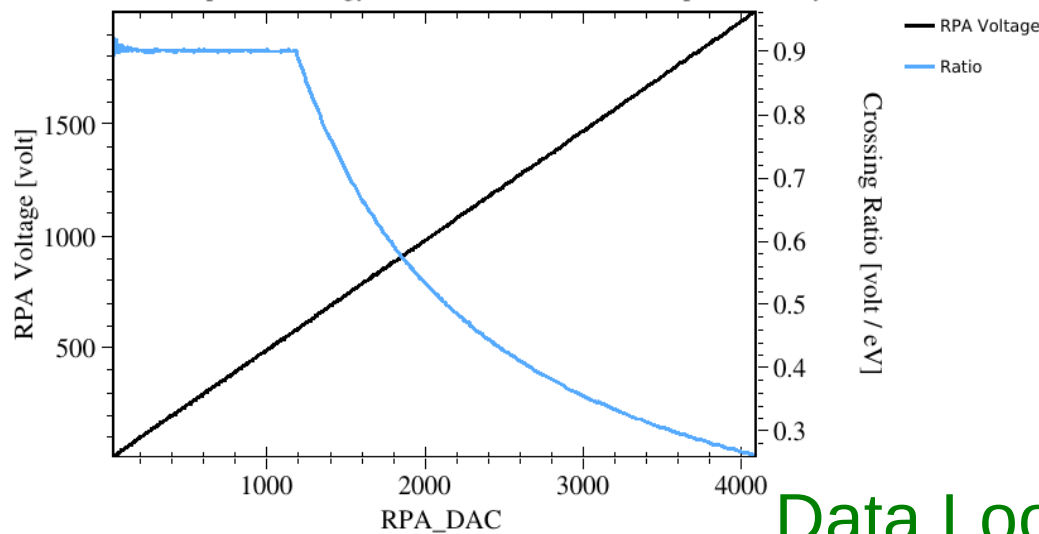
SWAP esa_rpa_v16_energy_binsf_new.tab: Plan 0, Sweep 0, 1st Entry



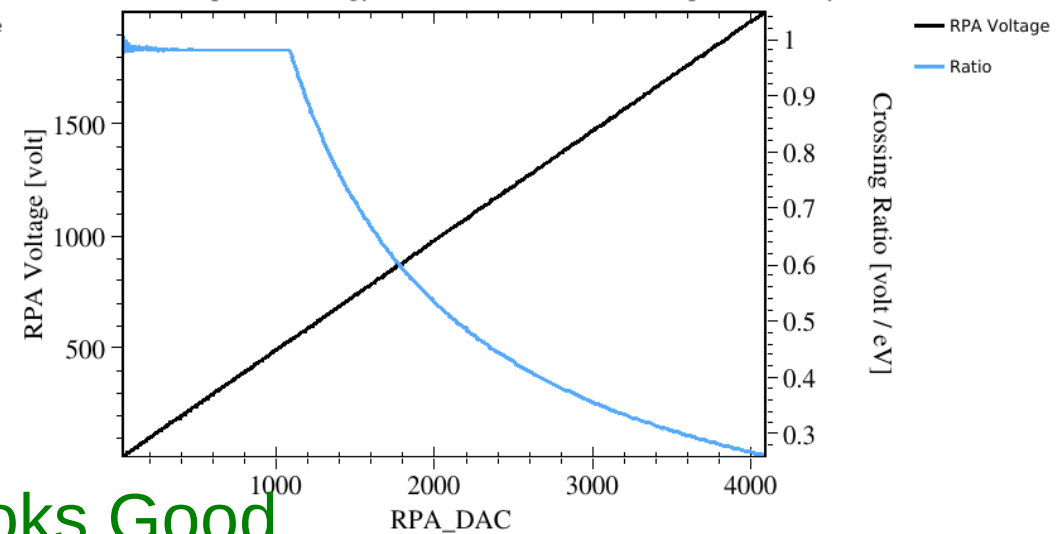
SWAP esa_rpa_v16_energy_binsf_new.tab: Plan 0, Sweep 0, 2nd Entry



SWAP esa_rpa_v16_energy_binsf_new.tab: Plan 0, Sweep 0, 1st Entry



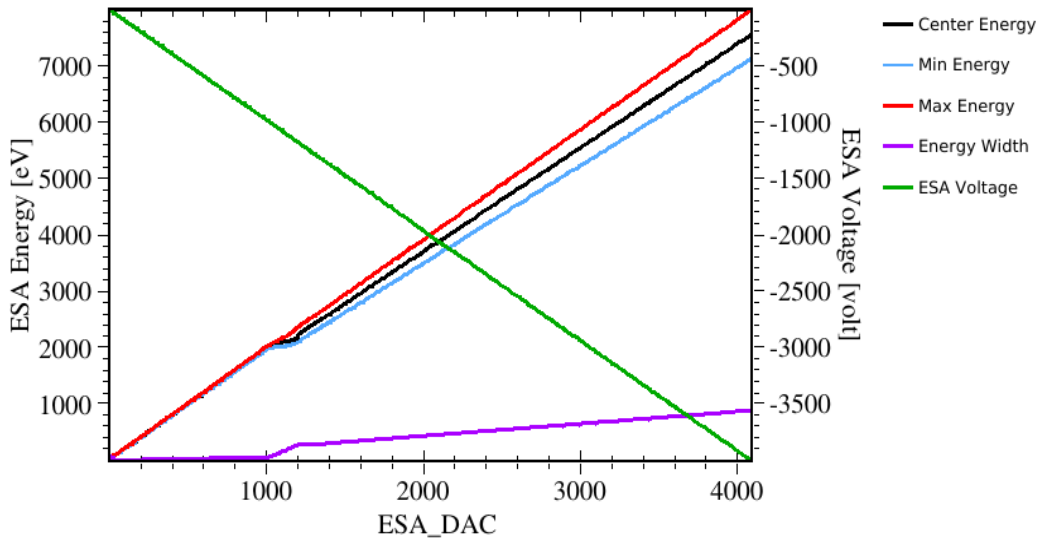
SWAP esa_rpa_v16_energy_binsf_new.tab: Plan 0, Sweep 0, 2nd Entry



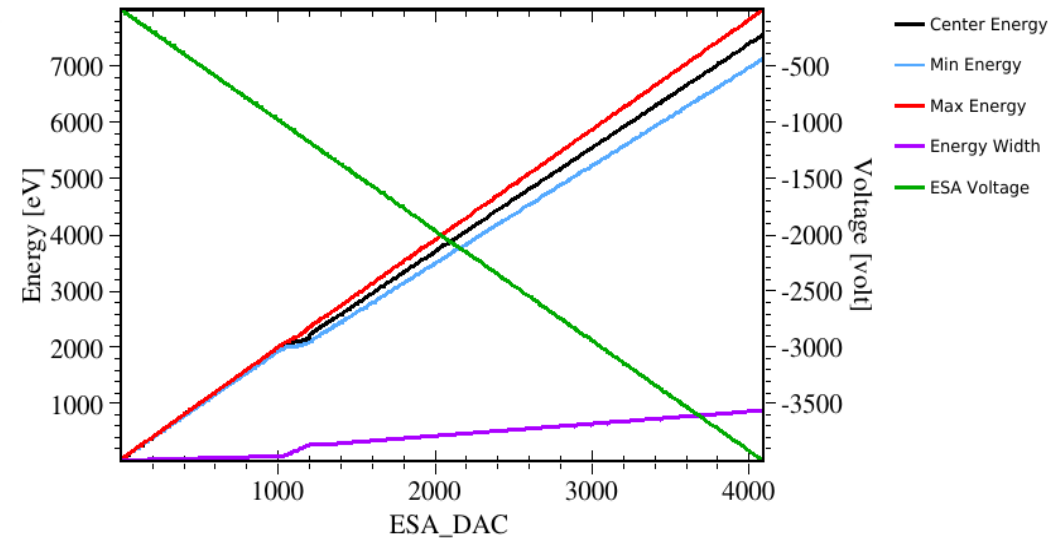
Data Looks Good

nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib esa_rpa_v18_energy_binsf_new.tab

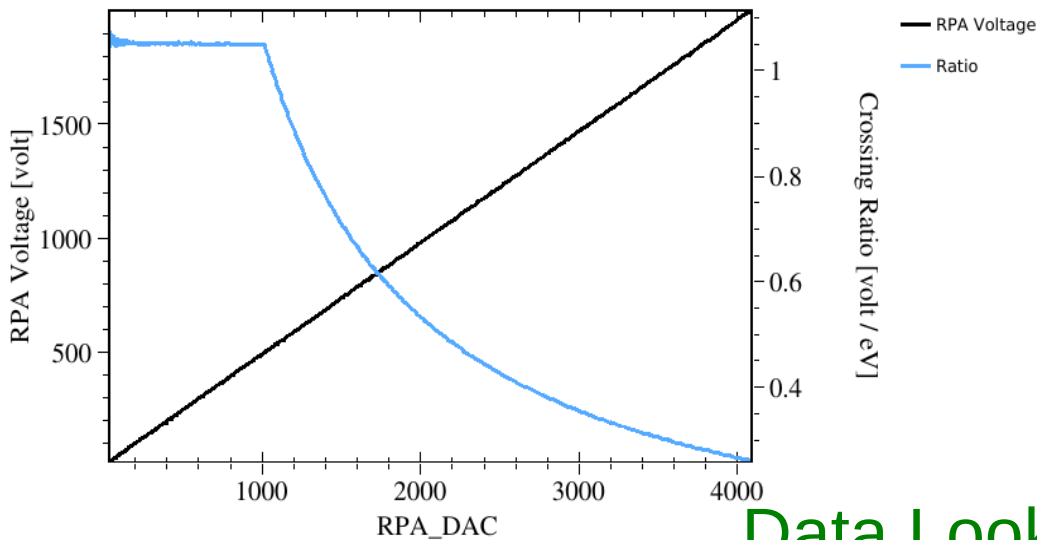
SWAP esa_rpa_v18_energy_binsf_new.tab: Plan 3, Sweep 3, 1st Entry



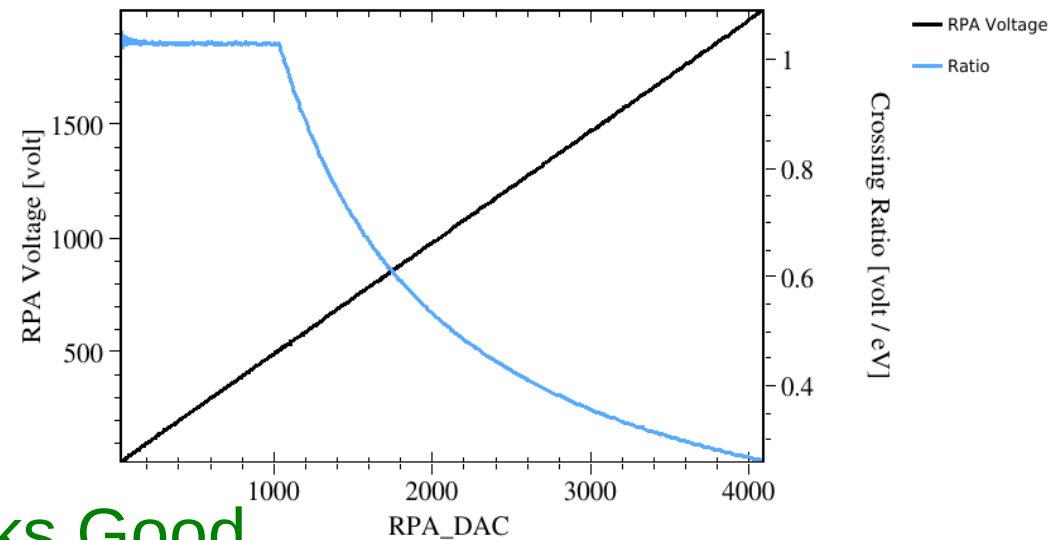
SWAP esa_rpa_v18_energy_binsf_new.tab: Plan 4, Sweep 4, 2nd Entry



SWAP esa_rpa_v18_energy_binsf_new.tab: Plan 3, Sweep 3, 1st Entry



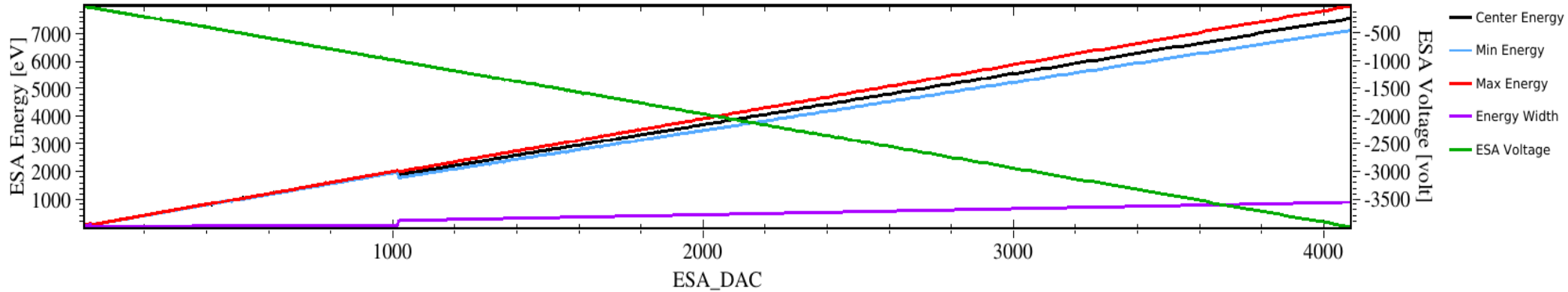
SWAP esa_rpa_v18_energy_binsf_new.tab: Plan 4, Sweep 4, 2nd Entry



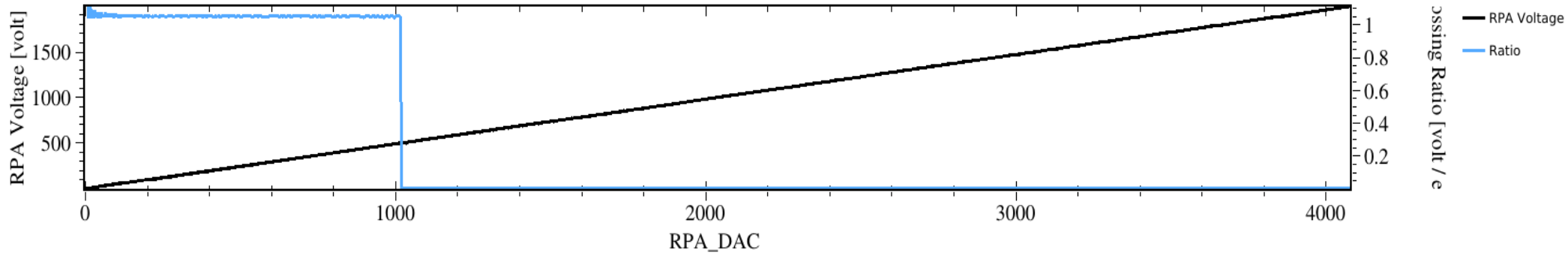
Data Looks Good

nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib esa_rpa_v19_energy_binsf_new2.tab

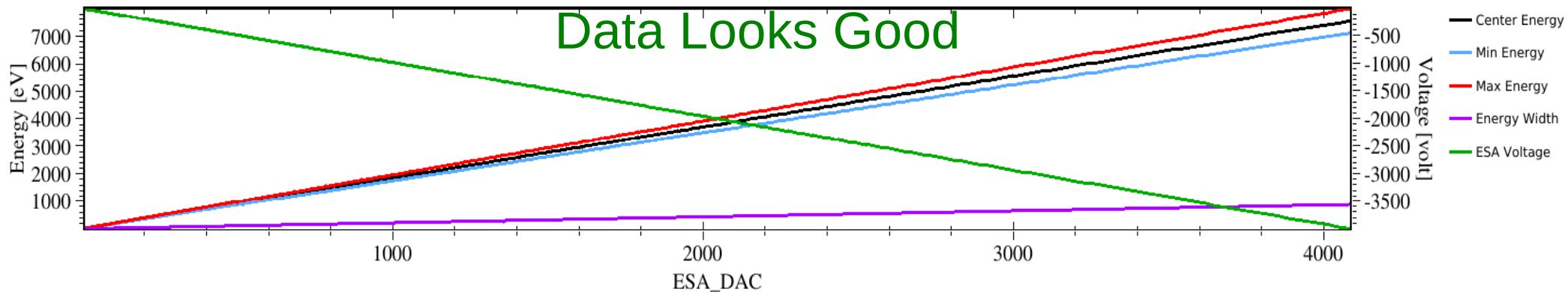
SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 0, Sweep 0, 1st Entry



SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 0, Sweep 0, 1st Entry

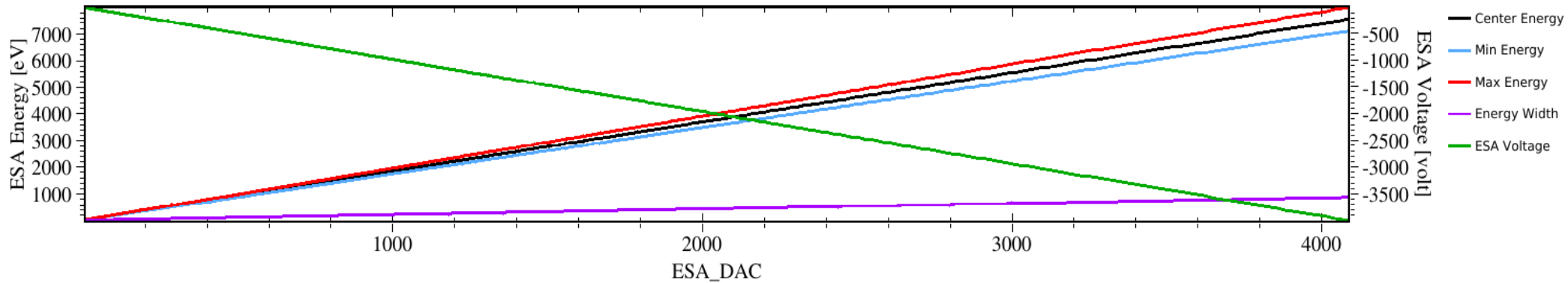


SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 5, Sweep 5, 2nd Entry

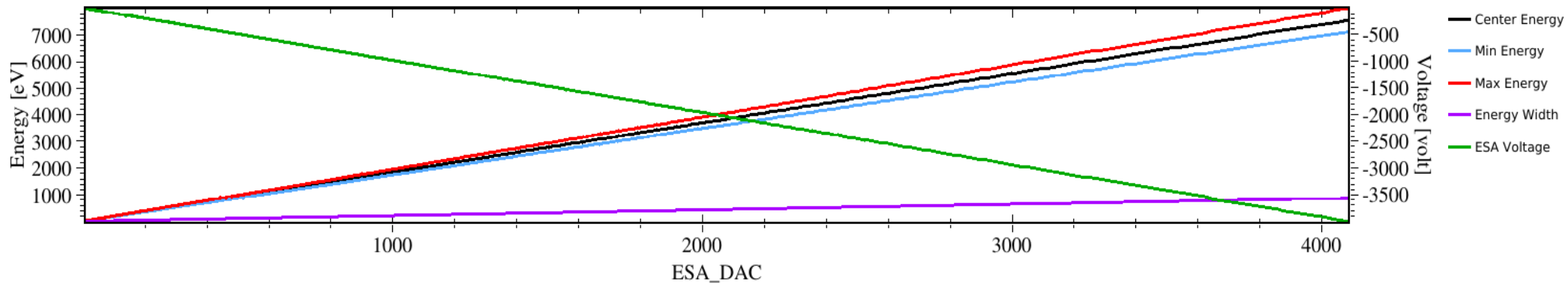


nh-a-swap-2-kem1-v4.0/calib nh-a-swap-3-kem1-v4.0/calib esa_rpa_v19_energy_binsf_new2.tab

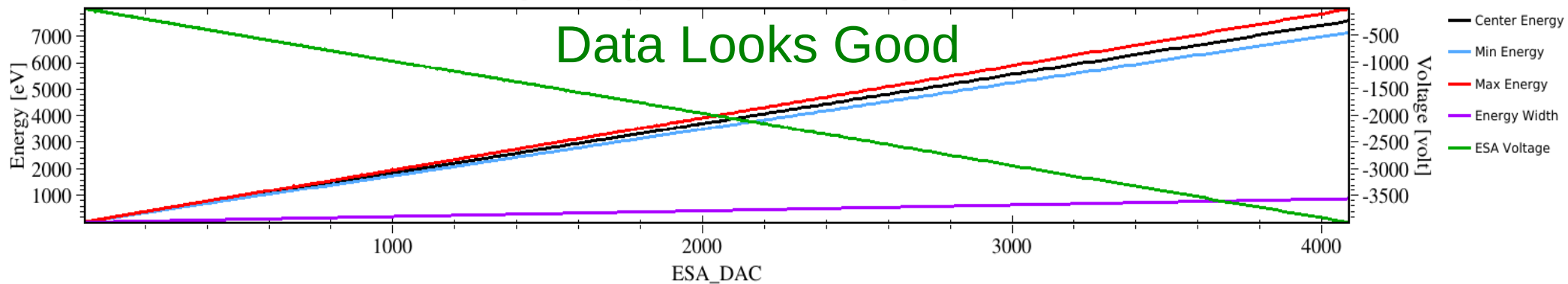
SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 2, Sweep 2, 3rd Entry



SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 12, Sweep 10, 4th Entry



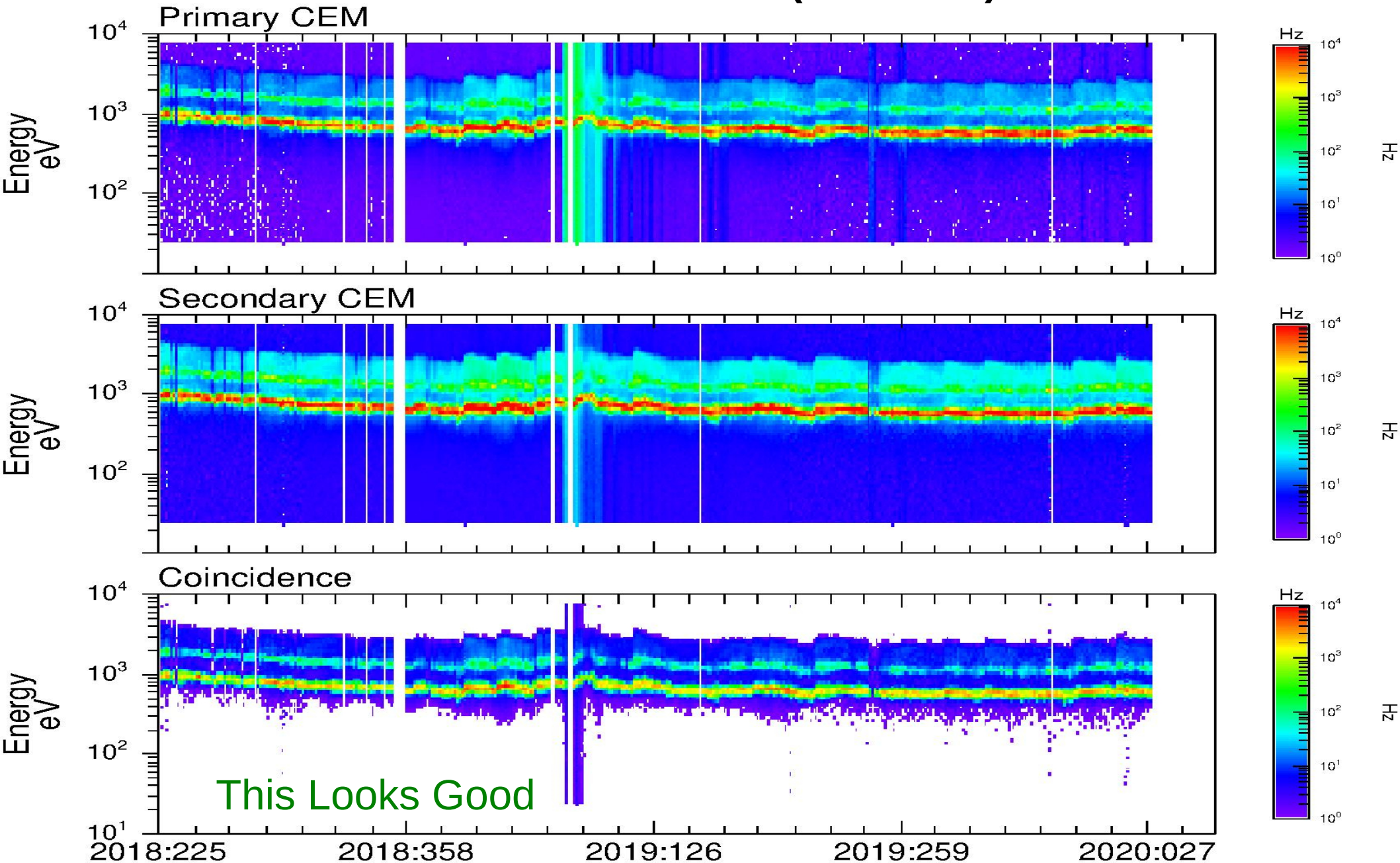
SWAP esa_rpa_v19_energy_binsf_new2.tab: Plan 12, Sweep 11, 5th Entry



SWAP Data Evaluation

nh-a-swap-3-kem1-v4.0/data Science Data (0x584)

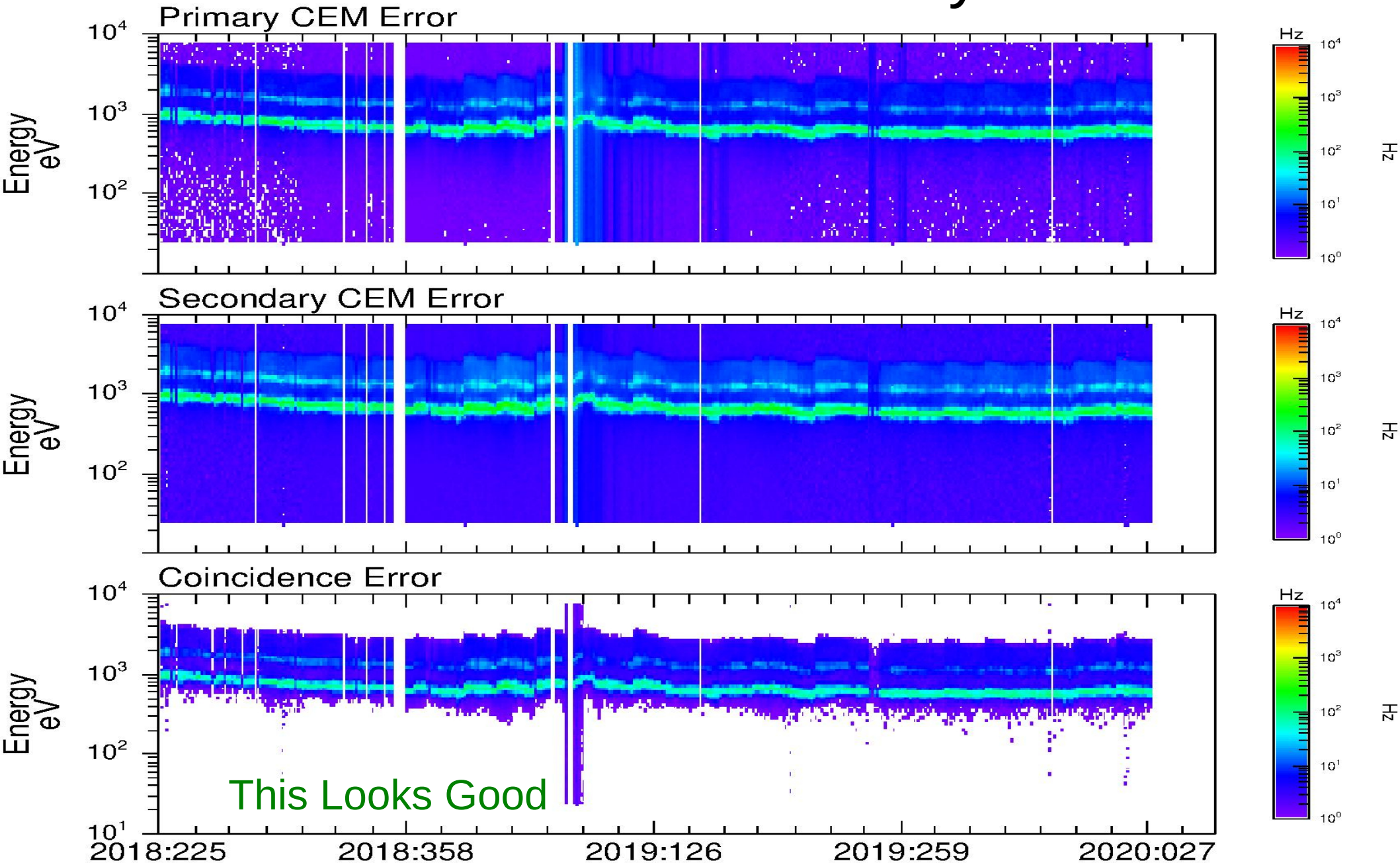
28



nh-a-swap-3-pluto-v4.0/data

Relative Uncertainty

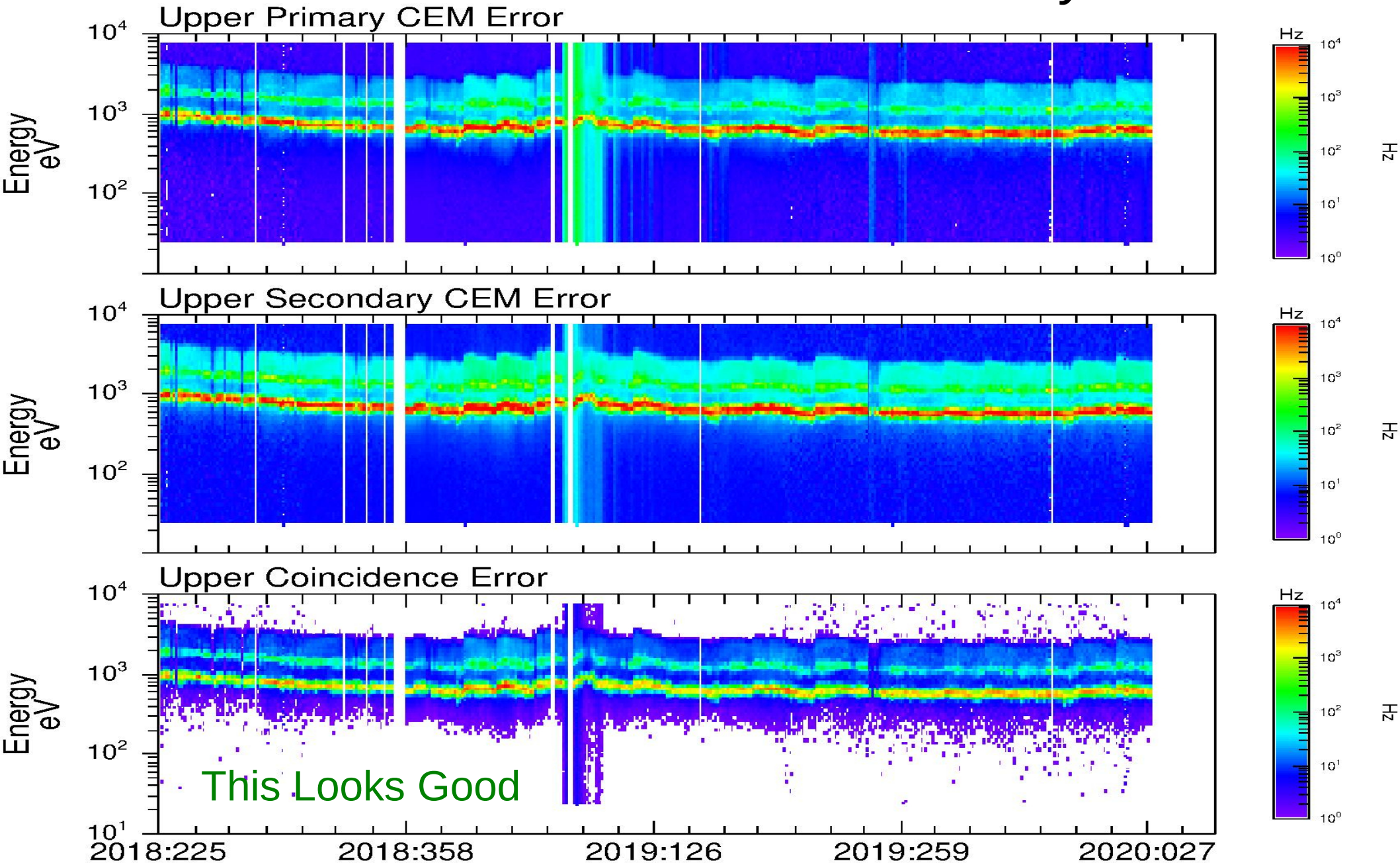
29



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

Absolute Maximum Uncertainty

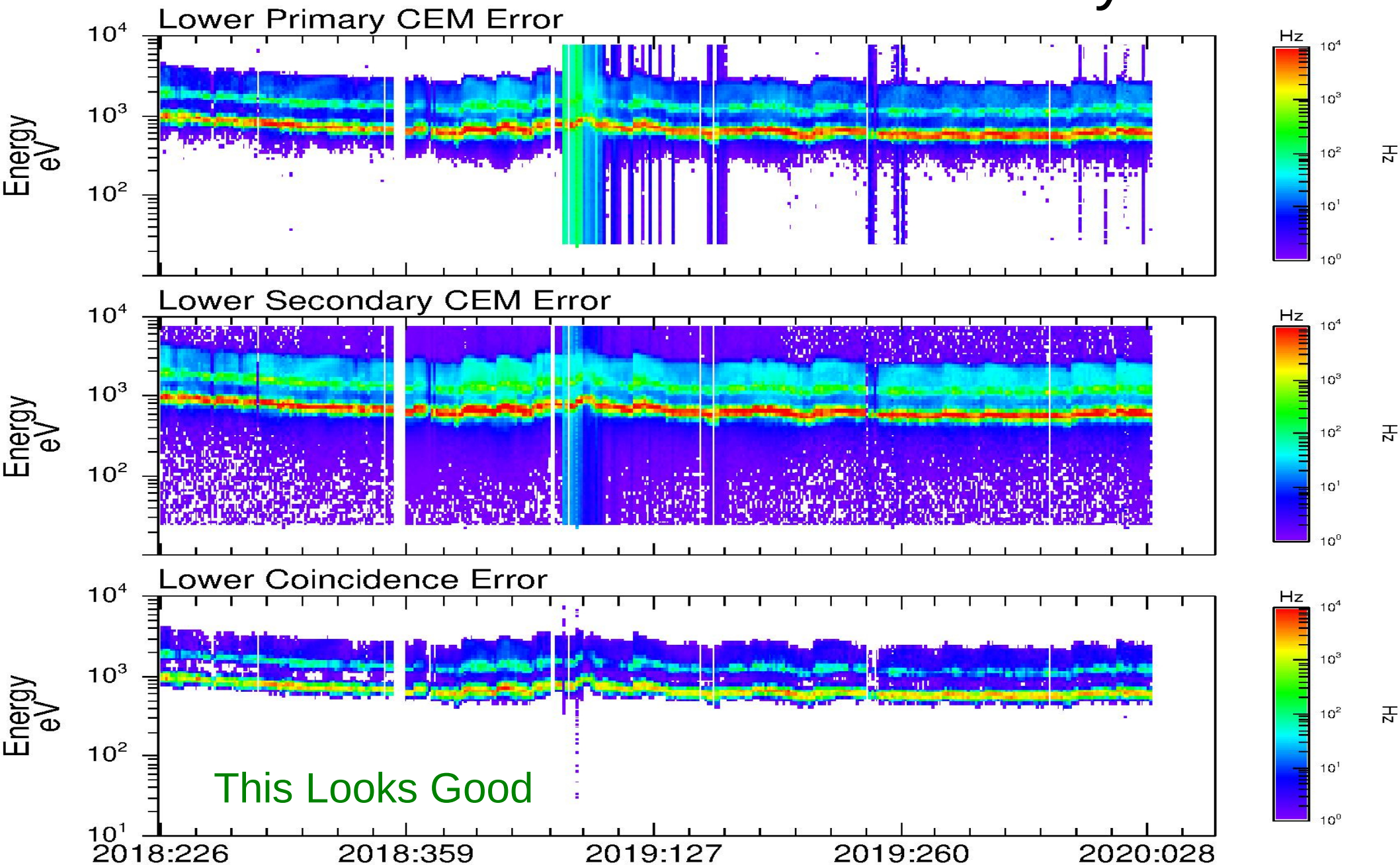
30



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

Absolute Minimum Uncertainty

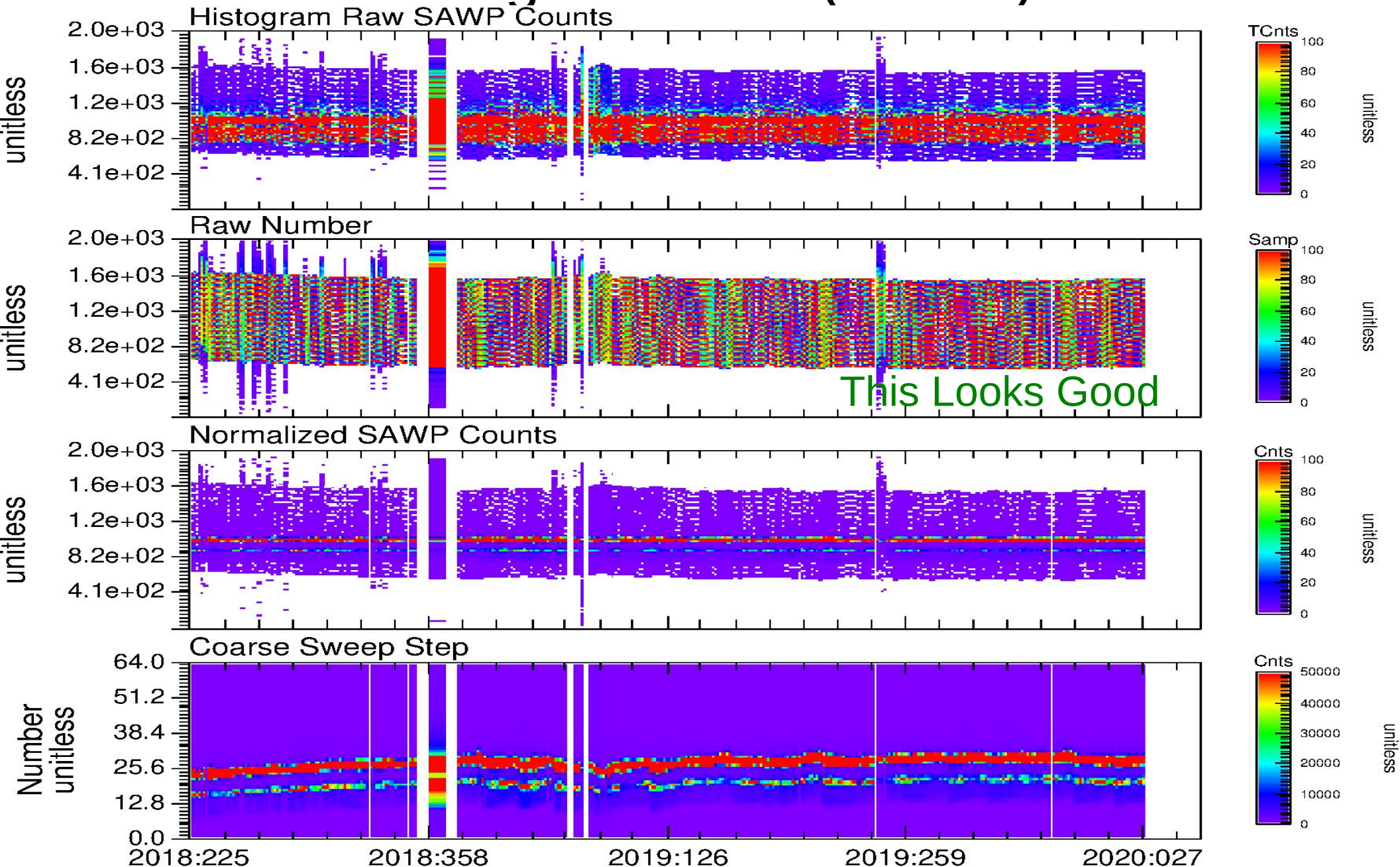
31



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

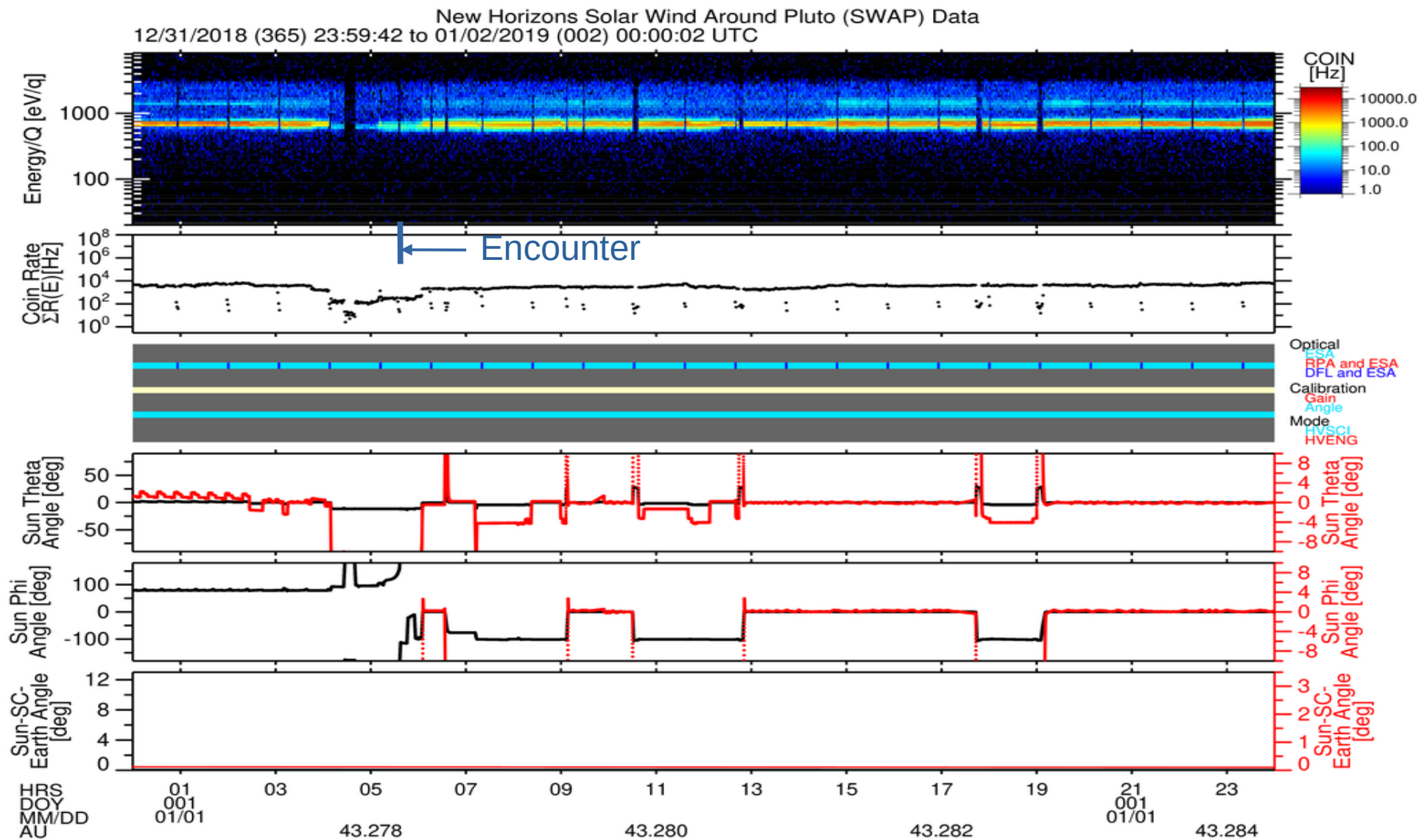
Histogram Data (0x586)

32

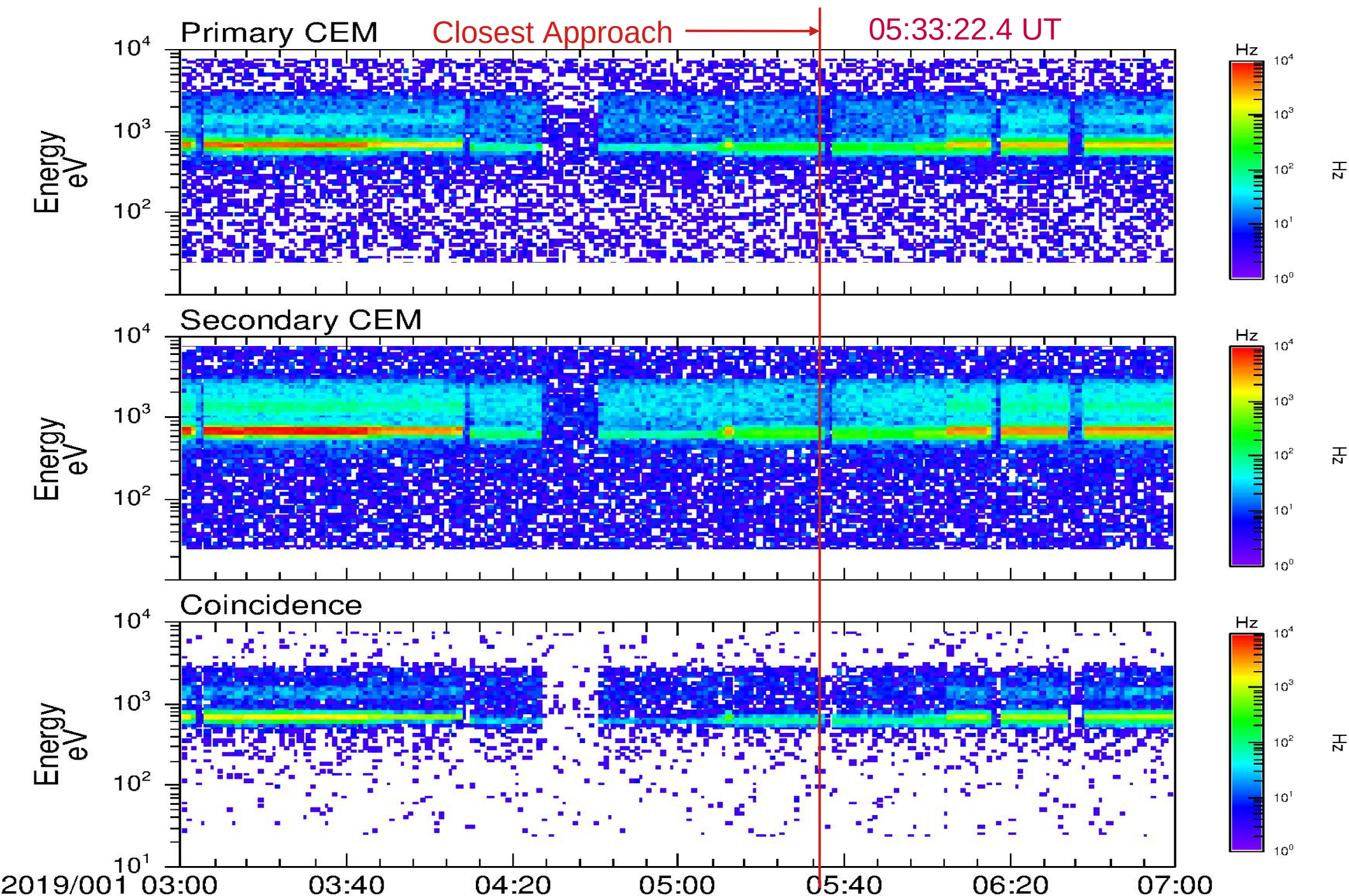


swap_001day_201812312359.png

Arrokoth Encounter



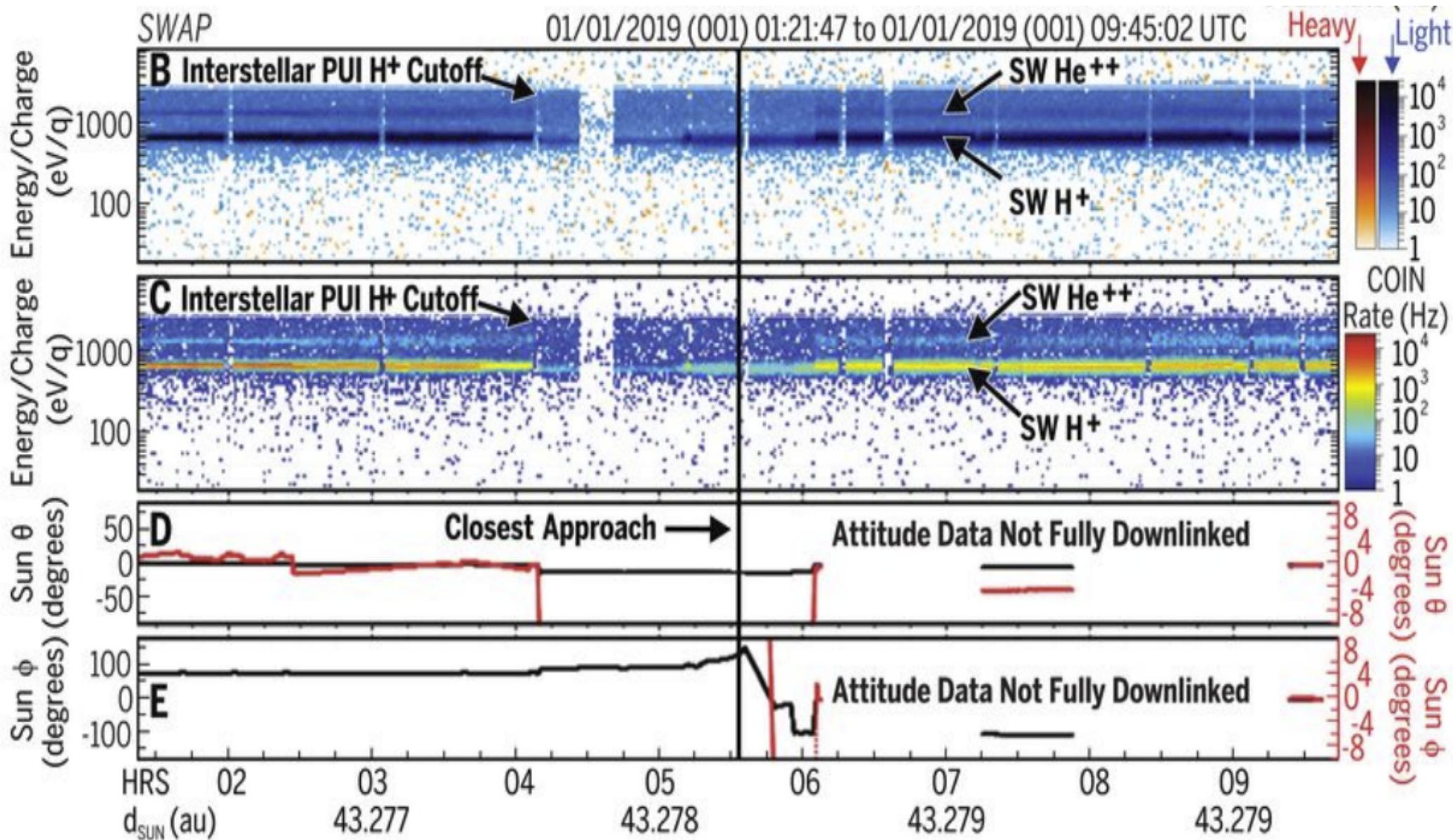
Close-up of Arrokoth Encounter



Stern, S. A., et al., Initial results from the New Horizons exploration of 2014 MU69, a small Kuiper Belt object, Science 364, 2019.
DOI: 10.1126/science.aaw9771

35

Closest Approach

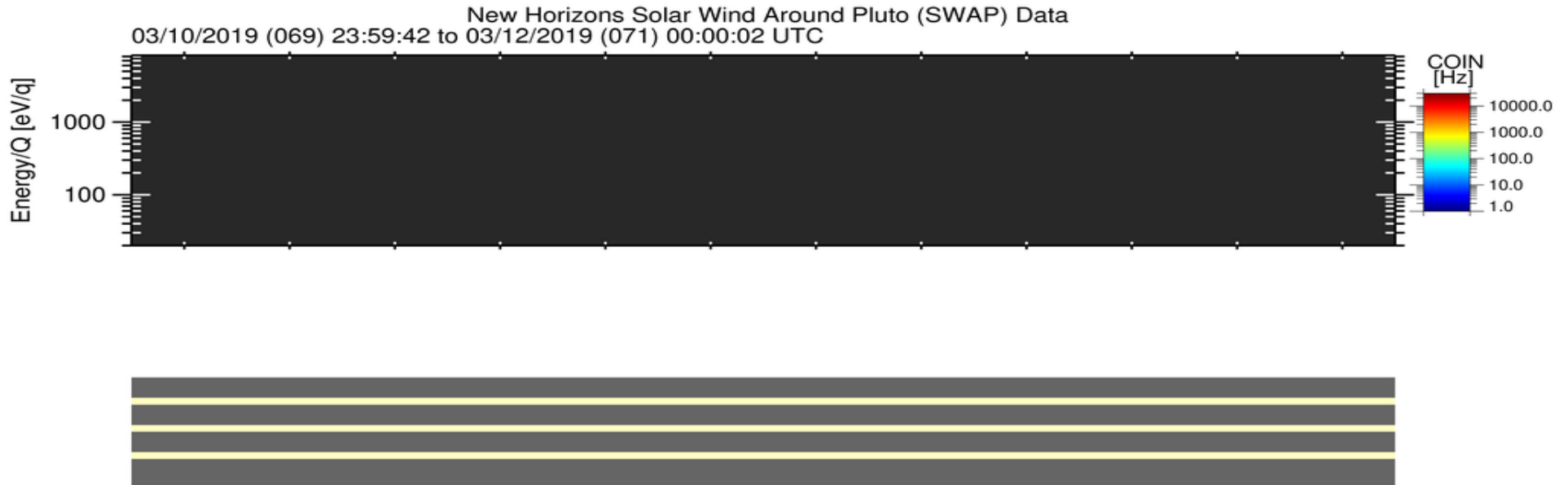


Certification

These *SWAP* data are certifiable.

BACK-UP SLIDES

nh-a-swap-2-kem1-v3.0/document nh-a-swap-3-kem1-v3.0/document data_summary_plots/swap_001day_201903102359.png



I still do not like having plots like this in the archive. This looks like the plotting package software failed where you really want to convey that there is no data for the time frame covered by the plot. Empty plot frames with the words “no data” are much better because you see right away that the reason for the empty frame is that there was no data to plot and it was not due to a failure in the plotting software.

HRS
DOY
MM/DD
AU

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

GOOD

nh-a-swap-2-kem1-v4.0
nh-a-swap-3-kem1-v4.0
voldesc.cat

Level 2

```
The nominal start and stop times for the  
KEM1 VERSION 4.0  
mission phase are  
2018-08-14T18:08:02.000  
and  
2020-04-29T18:08:01.000
```

Level 3

```
The nominal start and stop times for the  
KEM1 VERSION 4.0  
mission phase are  
2018-08-14T20:43:46.000  
and  
2020-03-01T12:49:05.000
```

Just to Note, the Raw Level 2 times for this data set are different from the Calibrated data set times. At the last review, it was decided that the voldesc.cat file can show different times. These times agree with the dataset.cat file under each level.

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

GOOD

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

GOOD

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

Minor edits sent to PDS

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

Minor edits sent to PDS

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

GOOD

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

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
docinfo.txt

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
codmac_level_definitions.lbl
codmac_level_definitions.pdf

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
lunineetal1995.lbl & lunineetal1995.pdf

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
nh_fov.lbl & nh_fov.png

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
nh_met2utc.tbl & nh_met2utc.tab

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
nh_mission_trajectory.tbl

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
swap_ssr.lbl & swap_ssr.pdf

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
swap_cal.tbl & swap_cal.pdf

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
soc_inst_icd.lbl

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
nh_swap_v200_ti.txt

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
payload_ssr.lbl & payload_ssr.pdf

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
quat_axyz_instr_to_j2k.lbl
quat_axyz_instr_to_j2k.asc

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
seq_swap_kem1.lbl & seq_swap_kem1.tab

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/trajinfo.txt

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj.fmt

GOOD

nh-a-swap-2-kem1-v4.0/document
nh-a-swap-3-kem1-v4.0/document
traj/traj_2006_2021_1d.tbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
calinfo.txt

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
rpa_shape.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
esa_shape.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
fov_mask_2d.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
background_009_dac.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
background_009_dac_jup.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
list_energy_files.lbl & list_energy_files.tab

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
esa_rpa_v16_energy_binsf_new.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
esa_rpa_v18_energy_binsf_new.lbl

GOOD

nh-a-swap-2-kem1-v4.0/calib
nh-a-swap-3-kem1-v4.0/calib
esa_rpa_v19_energy_binsf_new2.lbl

GOOD

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

GOOD

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

GOOD

nh-a-swap-2-kem1-v4.0/index
nh-a-swap-3-kem1-v4.0/index
slimindx.tbl & slimindx.tab

GOOD

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

GOOD