

# Solar Wind Around Pluto

## SWAP

PRINCIPAL INVESTIGATOR  
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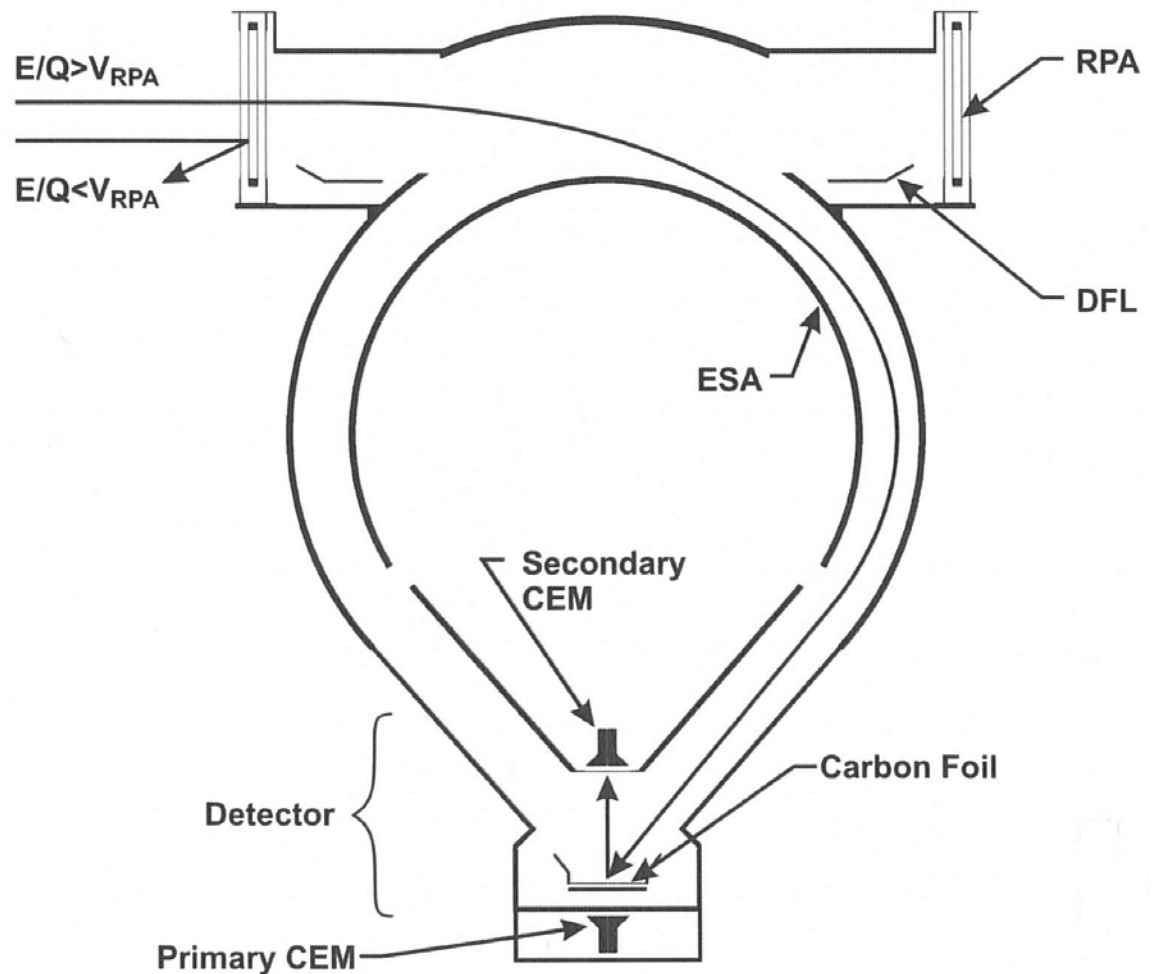
DESCRIPTION  
Low Energy Plasma Instrument

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

## RAW Data Sets:

nh-x-swap-2-kemcruise1-v2.0

nh-x-swap-2-kem1-v1.0

## CALIBRATED Data Sets:

nh-x-swap-3-kemcruise1-v2.0

nh-x-swap-3-kem1-v1.0

# New Horizons SWAP Data Set Evaluation Tools

Staging and Plotting -

Machine: Dell Precision T3400

Operating System: Fedora 27 linux

Data Processing -

Machine: Sun Ultra-350

Operating System: Sun Solaris OS 5.9

Staging and Minor Diagnostics -

Machine: MacBook Pro

Operating System: OS X El Capitan 10.11.6

VM Windows 7 Pro

Machine: Dell PowerEdge 2900

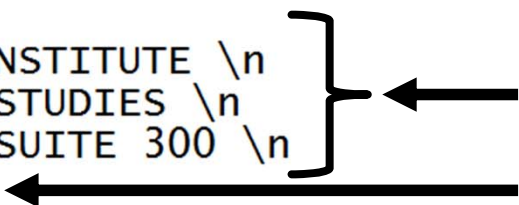
Operating System: CentOS 5.11 linux

# Documentation Evaluation

# All Data Sets in the Top Level Directory voldesc.cat

Extra characters “\n” need to be deleted:

OBJECT	= DATA_PRODUCER
INSTITUTION_NAME	= "SOUTHWEST RESEARCH INSTITUTE"
FACILITY_NAME	= "SOUTHWEST RESEARCH INSTITUTE"
FULL_NAME	= "JILLIAN REDFERN"
ADDRESS_TEXT	= "SOUTHWEST RESEARCH INSTITUTE \n DEPARTMENT OF SPACE STUDIES \n 1050 WALNUT STREET, SUITE 300 \n BOULDER, CO 80302\n USA"
END_OBJECT	= DATA_PRODUCER



# All Data Sets – catalog files

All catalog files look good.

# All Data Sets in the document Directory docinfo.txt

		SWAP data
	+-->*.PNG	Data summary plotted images
	+-->DATA_SUMMARY.LBL	Data summary PDS label
	+-->SEQ_SWAP_KEMCRUISE1.TAB	Sequence summary table
	+-->SEQ_SWAP_KEMCRUISE1.TAB	Label for sequence summary table; please read the label for more detail

↑

Should have  
LBL extension

# All Data Sets in the document Directory

## swap\_cal.pdf – 1 of 2

(also in swap\_ssr.pdf)

Formula for RPA Voltage as a function of Azimuth Angle  
Fixed from last review, but could still use some adjustment.

$$\begin{aligned} f &= \cos^2(2\alpha), \alpha \leq 4.0 \\ f &= \cos^2(3.5\alpha - 20) - 0.03, 4.0 < \alpha \leq 10 \\ f &= \cos^2(5.5\alpha - 65) - 0.085, \alpha > 10 \end{aligned} \tag{2}$$

Hard to read – could use some spacing after the commas, like what's done in the instrument paper [MCCOMASETAL2008].

$$\begin{aligned} f &= \cos^2(2\alpha), \quad \alpha \leq 4.0, \\ f &= \cos^2(3.5\alpha - 20) - 0.03, \quad 4.0 < \alpha \leq 10, \\ f &= \cos^2(5.5\alpha - 65) - 0.085, \quad \alpha > 10. \end{aligned} \tag{2}$$




# All Data Sets in the document Directory

## swap\_cal.pdf – 2 of 2

Added text suggested from last review:

“Say something like: the instrument paper is included in the document directory in the file swap\_ssr.pdf.”

of the calibration data is discussed in the SWAP instrument paper, the instrument paper is included in the document directory in the file swap\_ssr.pdf. We refer to some figures in the instrument paper, and provide some further details necessary to work with our data.

This is great, but the rest of the document has references like  (see Figure 31 of [MCCOMASETAL2008]).

Link the swap\_ssr.pdf file with the reference [MCCOMASETAL2008]:

“... in the file swap\_ssr.pdf (referenced as [MCCOMASETAL2008]).”

OR

“We refer to some figures in the instrument paper (using reference [MCCOMASETAL2008],...”

# All Data Sets – Typos Found

- Document Directory
  - soc\_inst\_icd.lbl – Instument -> Instrument
  - nh\_met2utc.lbl – thoughout -> throughout
  - data\_summary\_plots/data\_summary.lbl – documents's -> document's
- Calib Directory
  - background\_009\_dac\*.lbl files – background -> background
  - esa\_rpa\_\*\_energy\_binsf\*.lbl files – responsiblity -> responsibility
- Data Directories
  - nh-x-swap-2-kem\*/data/\*/\*0x586\_eng.lbl files – wspacecraft -> spacecraft
  - nh-x-swap-3-kem\*/data/\*/\*sci.lbl files – measuremnt -> measurement  
(Several occurrences each label file)

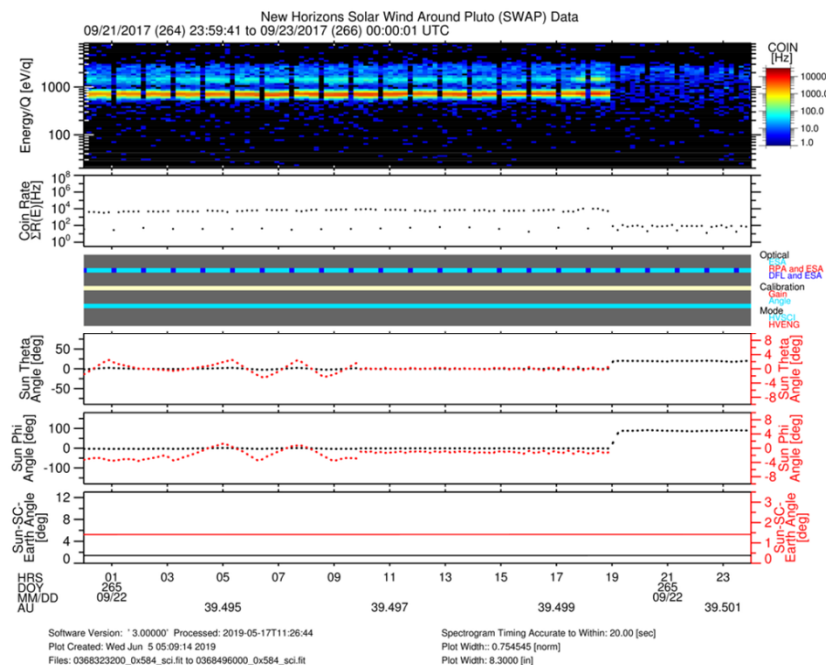
All Data Sets in the  
document/data\_summary\_plots Directory  
data\_summary.tbl

Confusing description of data summary plots – there are six panels, but only five panels considered plots?

Each document contains a graphic comprising text plus five plots. The text describes the coverage of the data. The five plots are as follows:

- 1) Coincidence (COIN) spectrogram of the rates in counts/sample
- 2) The total coincidence rates in a coarse scan
- 3) A color-coded indication of operating parameter settings
- 4 and 5) The Sun theta and phi angles in spacecraft coordinates
- 6) Either the Jupiter-to-Spacecraft distance in  $R_j$ , or the Sun-Spacecraft-Earth angle, as labeled.

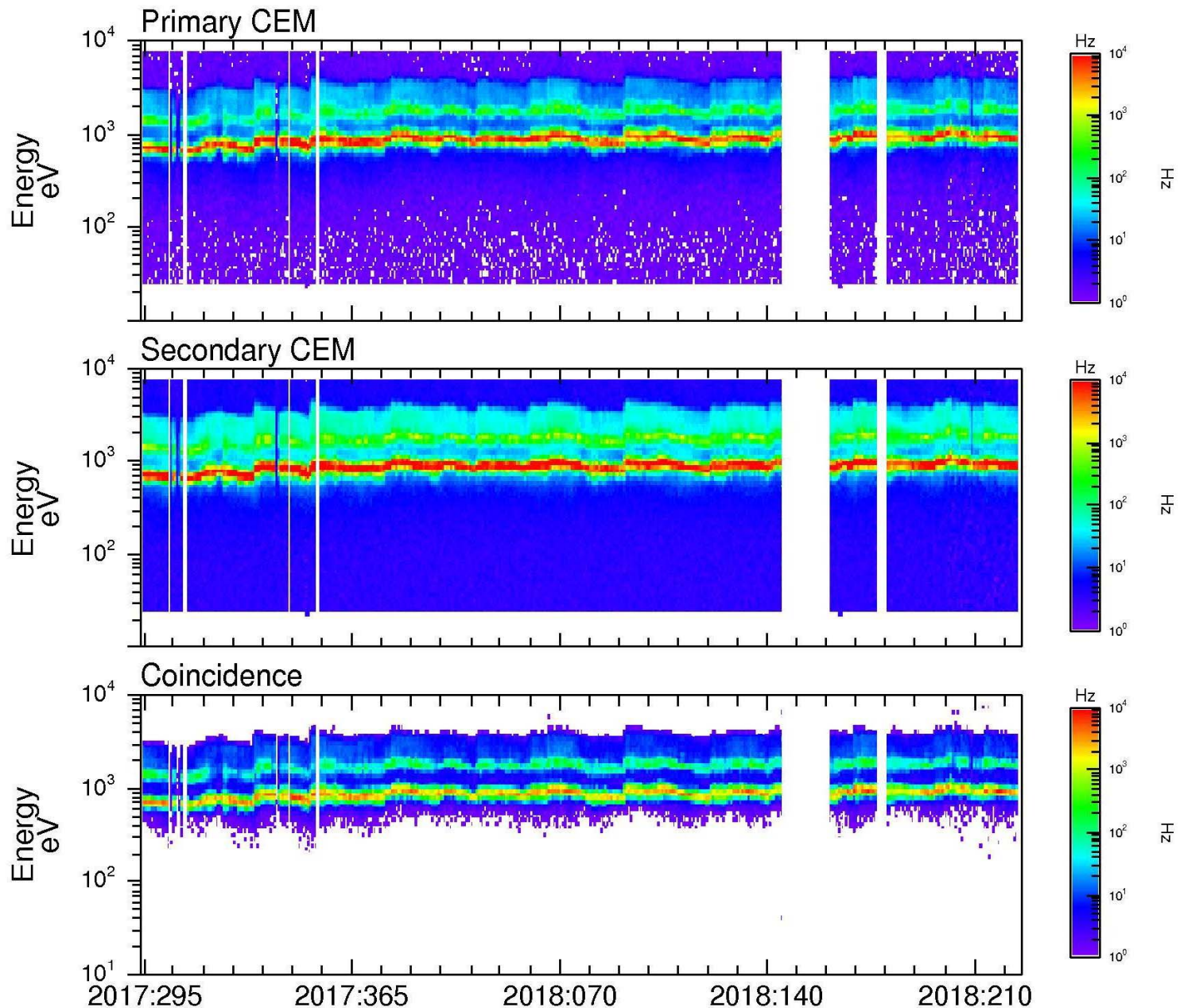
See the SWAP section of the New Horizons SOC to Instrument Pipeline ICD (Interface Control Document) for a more detailed explanation of these plots. The ICD is included in the document section of the original version of this data set.



Could not find more detailed explanation of summary plots in soc\_inst\_icd.pdf at first – Figures 14-11 and 14-12 of the ICD are such plots with detailed science descriptions. Maybe refer to these directly in the data\_summary.lbl as good examples of these plots?

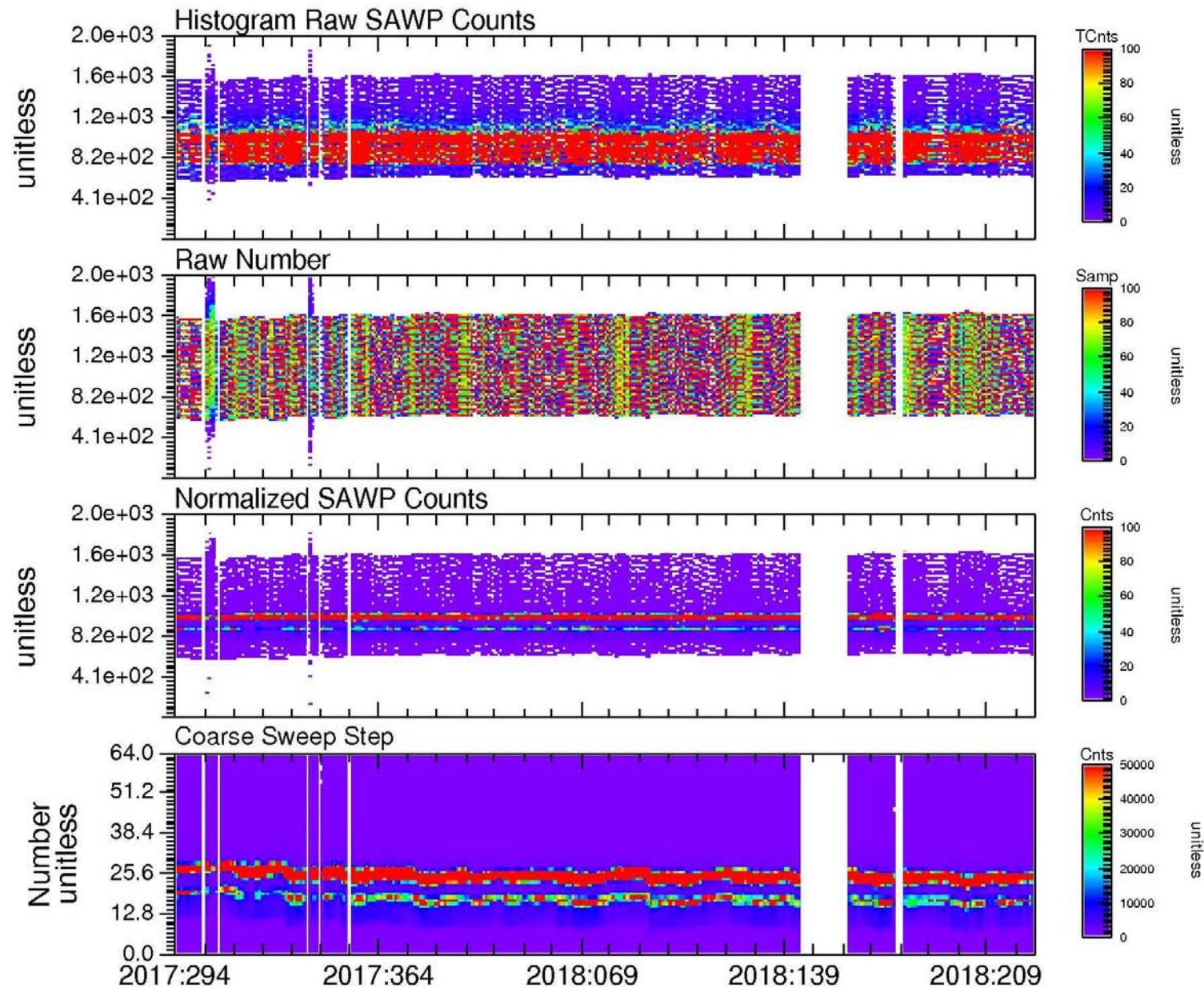
# SWAP Data Evaluation

# nh-x-swap-3-kemcruise1-v2.0/data Science Data (0x584)



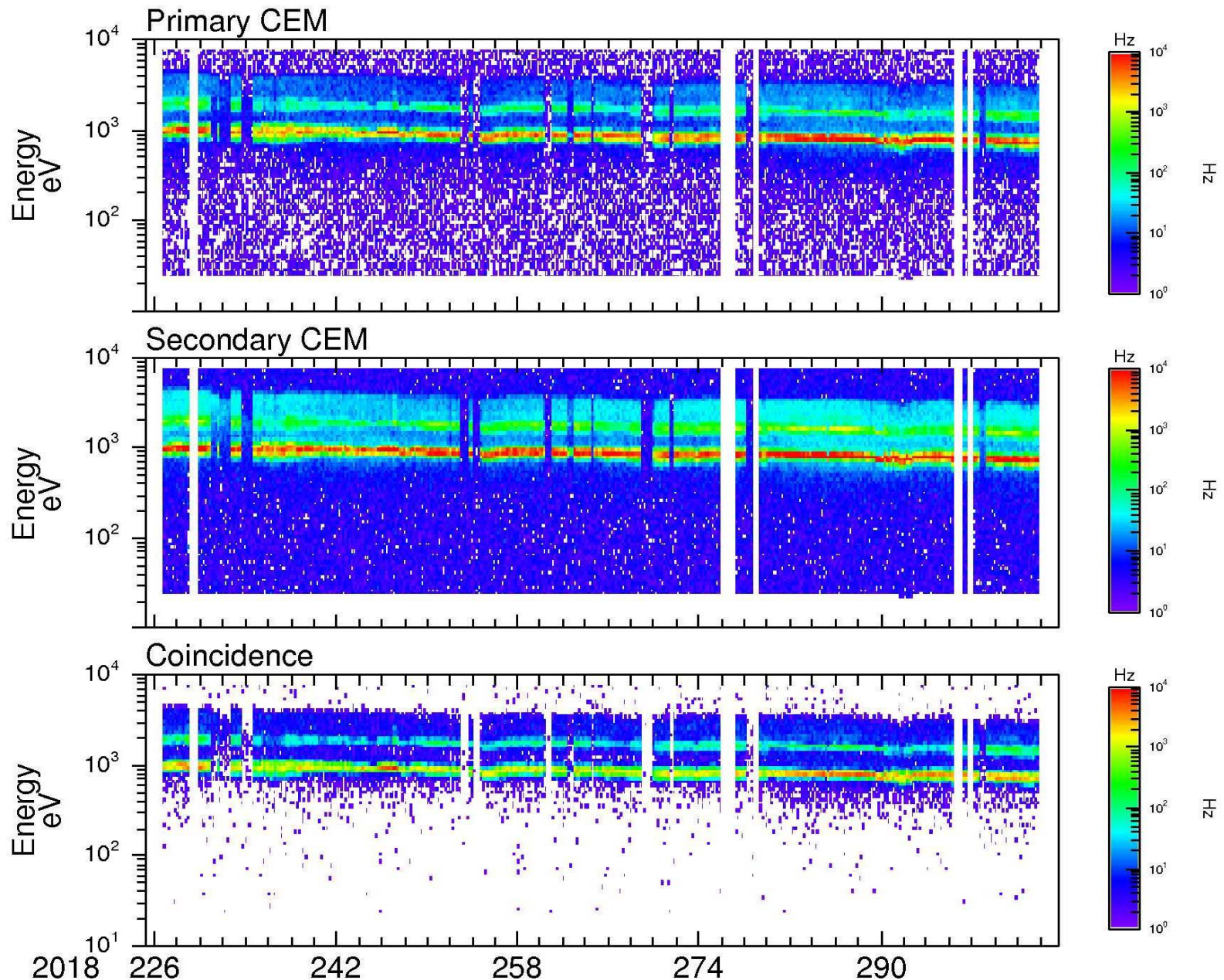


# nh-x-swap-3-kemcruise1-v2.0/data Histogram Data (0x586)



# nh-x-swap-3-kem1-v1.0/data

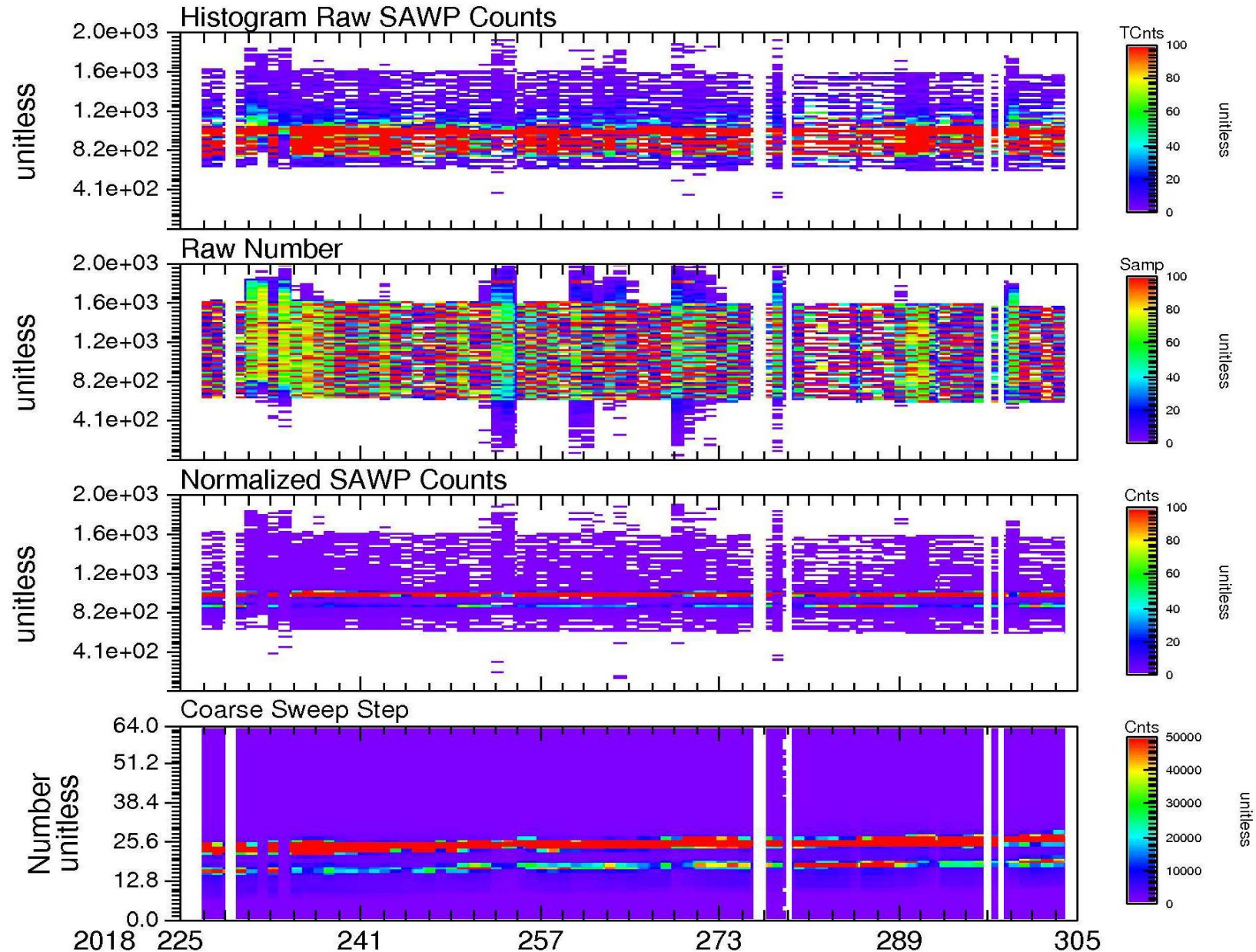
## Science Data (0x584)





# nh-x-swap-3-kem1-v1.0/data

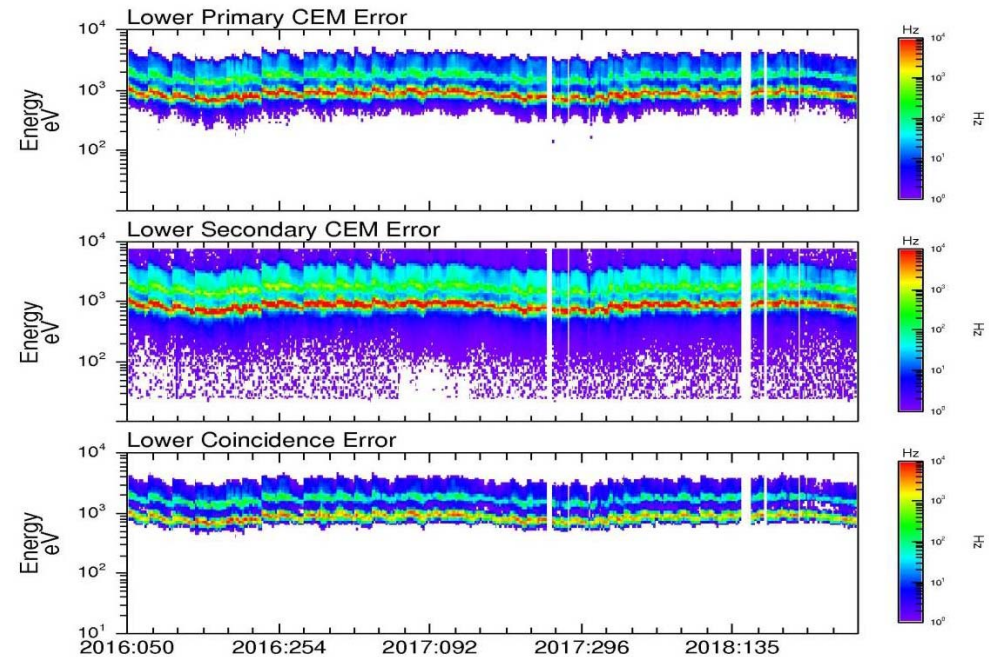
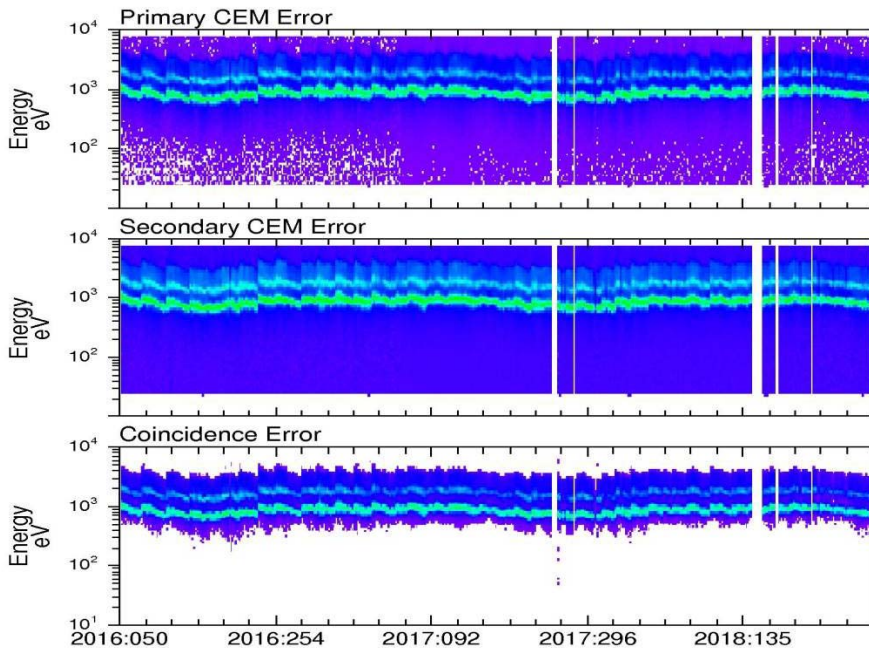
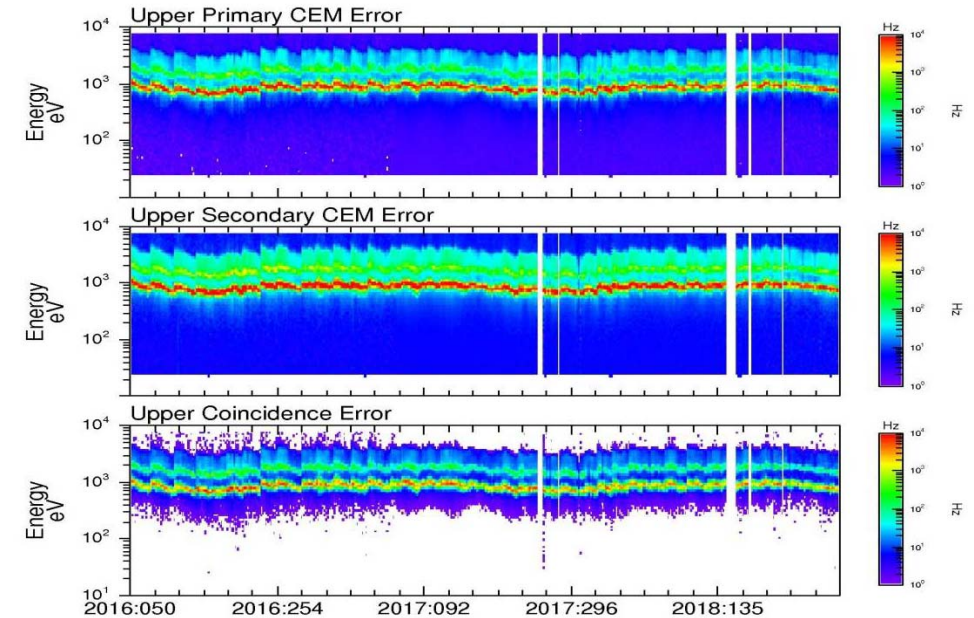
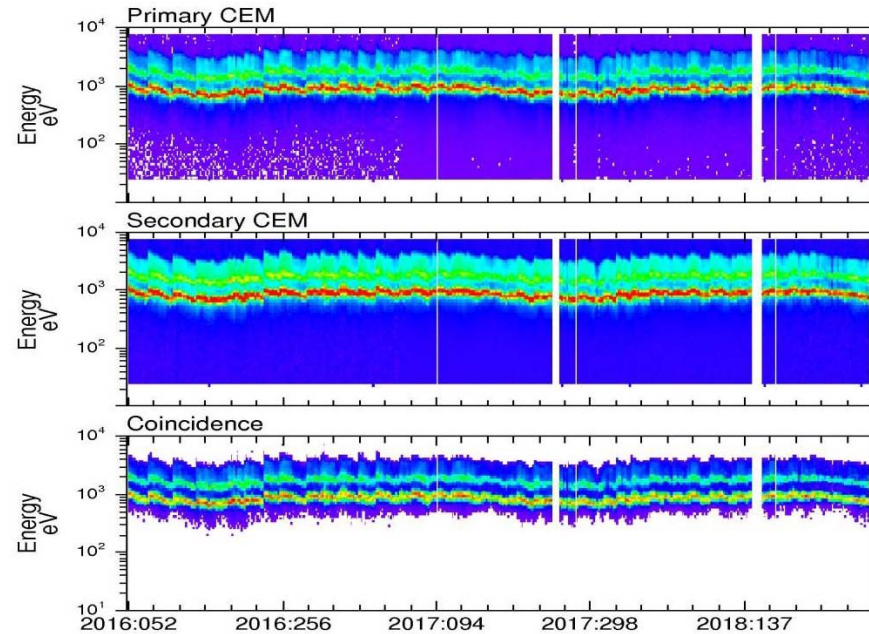
## Histogram Data (0x586)





# All nh-x-swap-3-kem\*/data

## Science and Error Data (0x584)



nh-x-swap-2-kemcruise1-v2.0/data  
nh-x-swap-2-kem1-v1.0/data

Since the SWAP data formats and calibration files have not changed from previous reviews and the SWAP level 2 (raw) data are the same formats as the SWAP level 3 (calibrated) data, only the level 3 data were processed and plotted for this review.

# SWAP Review Summary

All SWAP data sets are in very good shape and, in my opinion, ready for public consumption. However, there are some minor issues/clarifications (indicated in this review) that should be addressed before release.