Validation of SWA Science Files (First Delivery November 2020)

Summary

Level 2 Files

Blocking delivery:

- EAS Unit Confusion (most important)

Could live with this time with but better if it's fixed:

- Extra (0) timetag in EAS burst mode files
- PAS Moments: RTN pressure tensor and temperature vector failed creation
- PAS Moments: Pressure tensors reformatted as a real tensor
- PAS Moments: REPRESENTATION_N metadata etc.
- Missing QUALITY_FLAG in all PAS data

Everything else can wait for subsequent deliveries

solo_L2_swa-pas-vdf_20200708_V01.cdf

Missing Mandatory Variables

- QUALITY_FLAG
- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- Data_product
- SOOP_TYPE
- OBS_ID
- LEVEL

Attributes of Main Data Variables

VDF

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing

Comments:

- Consider setting SCALETYP for the energy table to logarthmic
- Consider setting unsampled AZ/EL/EN bins to FILLVAL rather than zero so users know the difference between no counts and unsampled parts of phase space - particularly important if the peak tracking algorithm misses a quick change in the VDF

Recommendation

Publish now, fix for subsequent deliveries (including redelivery of this one - missing quality flag is important.

solo_L2_swa-pas-eflux_20200708_V01.cdf

Missing Mandatory Variables

- QUALITY_FLAG

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- Data_product
- SOOP_TYPE
- OBS_ID
- LEVEL

Attributes of Main Data Variables

eflux

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- SCALEMIN/SCALEMAX Missing

Comments:

- Consider setting SCALETYP for the energy table to logarthmic
- Consider setting unsampled Energy bins to FILLVAL rather than zero so users know the difference between no counts and unsampled parts of phase space - particularly important if the peak tracking algorithm misses a quick change in the VDF

solo_L2_swa-pas-grnd-mom_20200708_V01.cdf

Missing Mandatory Variables

- QUALITY_FLAG
- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- Data_product
- SOOP_TYPE
- OBS_ID
- LEVEL

Attributes of Main Data Variables

N

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing

V_SRF

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing
- REPRESENTATION_1 Missing
- TENSOR_ORDER Missing

V_RTN

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing
- REPRESENTATION_1 Missing
- TENSOR_ORDER Missing

P_SRF

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing
- REPRESENTATION_1 Missing
- TENSOR_ORDER Missing

P_RTN

- DISPLAY_TYPE Missing
- SI_CONVERSION Missing
- COORDINATE_SYSTEM Missing
- SCALEMIN/SCALEMAX Missing
- REPRESENTATION_1 Missing
- TENSOR_ORDER Missing

Possible Processing Errors:

The P_RTN and TxTyTz_RTN variables only contain FILLVALs. Is this expected?

Comments

Pressure tensors P_RTN, P_SRF only have six components, not 9. Are 1D and not formated as a matrix. Impossible to know from metadata which component is which. Is this documented anywhere? It's not in the DPDD. Is there a reason the whole tensor isn't produced and represented correctly for the ground moments? Pressure can't be used at the moment.

solo_L2_swa-eas1-NM3D-def_20201002T111854-20201002T235854_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_Data

- FIELDNAM refers to phase space density
- CATDEC refers to phase space density
- UNITS is in differential particle flux
- LABLAXIS refers to differential energy flux

This should be made consistent and correct (the data look like they're in DEF, but I can't be sure).

- SI_CONVERSION looks like a placeholder 1>1

Comments

Strictly speaking NM3D in the filename should be lower case

solo_L2_swa-eas1-NM3D-dnf_20201002T111854-20201002T235854_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_Data

- FIELDNAM refers to phase space density
- CATDEC refers to phase space density
- UNITS is in differential energy flux
- LABLAXIS refers to differential number flux

This should be made consistent and correct.

- SI_CONVERSION looks like a placeholder 1>1

Comments

Strictly speaking NM3D in the filename should be lower case

solo_L2_swa-eas1-NM3D-psd_20201002T111854-20201002T235854_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_Data

- FIELDNAM refers to phase space density
- CATDESC refers to phase space density
- UNITS is in phase space density albeit with a missing 6.
- LABLAXIS refers to phase space density

This should be made consistent and correct.

- SI_CONVERSION looks like a placeholder 1>1

Comments

Strictly speaking NM3D in the filename should be lower case

solo_L2_swa-eas-pad-def_20201002T213741-20201002T214740_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_BM_Data

- UNITS is differential number flux, filename implies differential energy flux
- LABLAXIS is differential number flux, filename imples differential energy flux

This should be made consistent and correct. **I can't tell for sure from the data which is correct.**

- SI_CONVERSION looks like a placeholder 1>1

Processing Error

First time tag is 1707-09-22 12:11:33.961

solo_L2_swa-eas-pad-dnf_20201002T213741-20201002T214740_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_BM_Data

- UNITS is differential energy flux, filename implies differential number flux
- LABLAXIS is differential number flux

This should be made consistent and correct. **I can't tell for sure from the data which is correct.**

- SI_CONVERSION looks like a placeholder 1>1

Processing Error

First time tag is 1707-09-22 12:11:33.961

solo_L2_swa-eas-pad-psd_20201002T213741-20201002T214740_V01.cdf

Missing Mandatory Variable

- QUALITY_BITMASK

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_BM_Data

- SI_CONVERSION looks like a placeholder 1>1

Processing Error

First time tag is 1707-09-22 12:11:33.961

solo_L2_swa-eas1-SS-def_20201002T111942-20201002T235942_V01.cdf

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_SS_Data

- FIELDNAM refers to phase space density
- CATDEC refers to phase space density
- UNITS is in differential particle flux
- LABLAXIS refers to differential energy flux

This should be made consistent and correct. **Imposible to tell from the data what the units actually are.**

- SI_CONVERSION looks like a placeholder 1>1

Comments:

strictly speaking SS should be lower case

solo_L2_swa-eas1-SS-dnf_20201002T111942-20201002T235942_V01.cdf

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_SS_Data

- FIELDNAM refers to phase space density
- CATDEC refers to phase space density
- UNITS is in differential energy flux
- LABLAXIS refers to differential number flux

This should be made consistent and correct. **Imposible to tell from the data what the units actually are.**

- SI_CONVERSION looks like a placeholder 1>1

Comments:

strictly speaking SS should be lower case

solo_L2_swa-eas1-SS-psd_20201002T111942-20201002T235942_V01.cdf

Missing Global Attributes

- Acknowledgement
- SOOP_TYPE
- OBS_ID

Attributes of Main Data Variable SWA_EAS1_SS_Data

- SI_CONVERSION looks like a placeholder 1>1

Comments:

strictly speaking SS should be lower case

Conclusion on EAS unit stuff:

- Assuming filenames are correct, it looks like the values of the UNITS attribute for def and dnf fields are the wrong way round (I'd also put in eV/eV explicitly in the def one - more obvious what's going on, then).

- I'd also update FIELDNAM and CATDESC to either correctly reflect the units in the file (for NM3D and SS), or change it so it doesn't contract other info in the metadata regardless of units.

Assuming the EAS2 files are the same as the EAS 1 files.