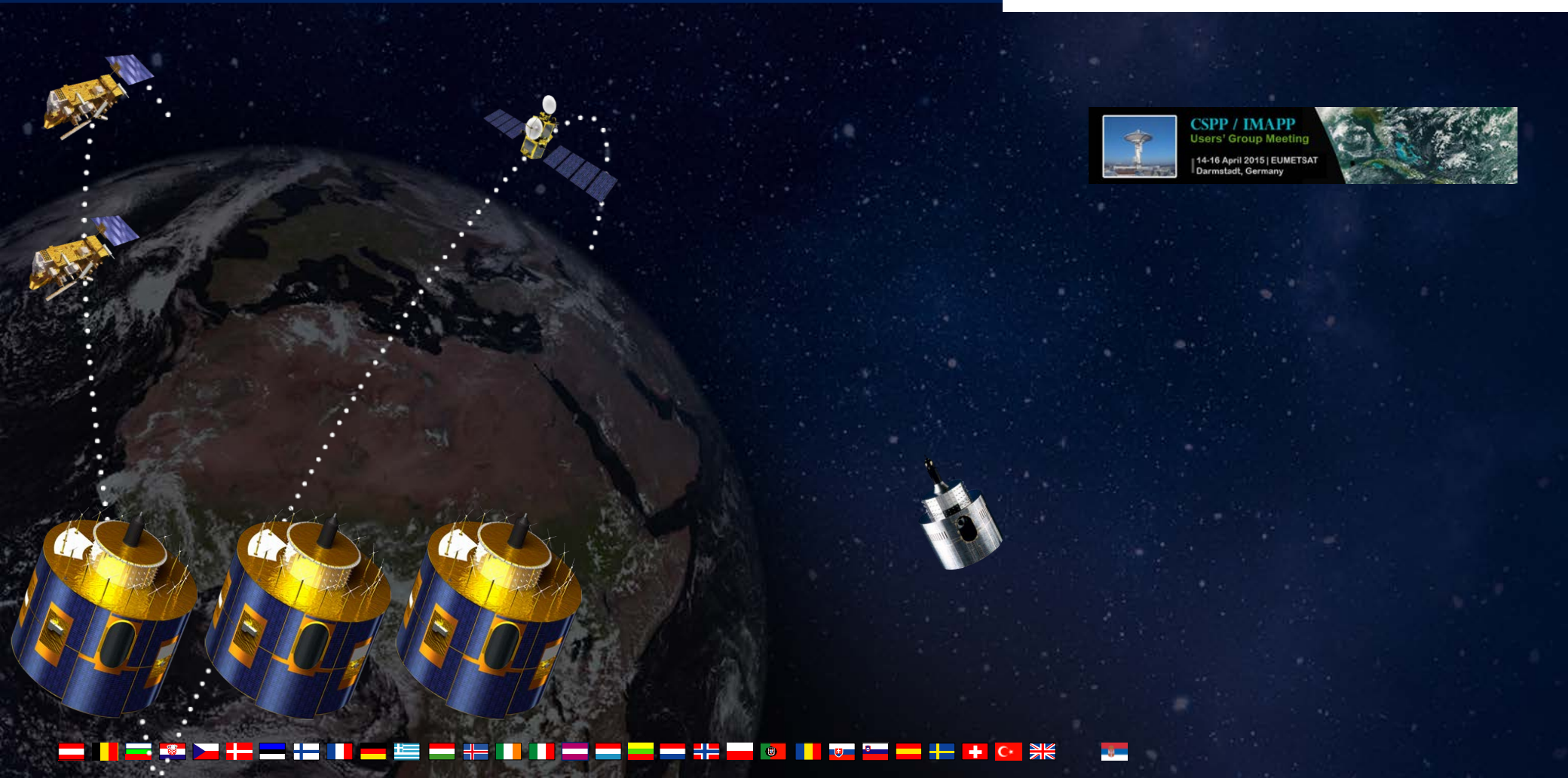
COMPARISON OF LOCAL CSPP VIIRS SDRS WITH GLOBAL NOAA PRODUCTS FOR VALIDATION AND MONITORING OF THE EARS-VIIRS SERVICE

STEPHAN ZINKE

EUMETSAT



TOC

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  - Product Validation Approach
  - Product Validation Results
  - Summary, Conclusion
- Operational Monitoring
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- Discussion/Questions

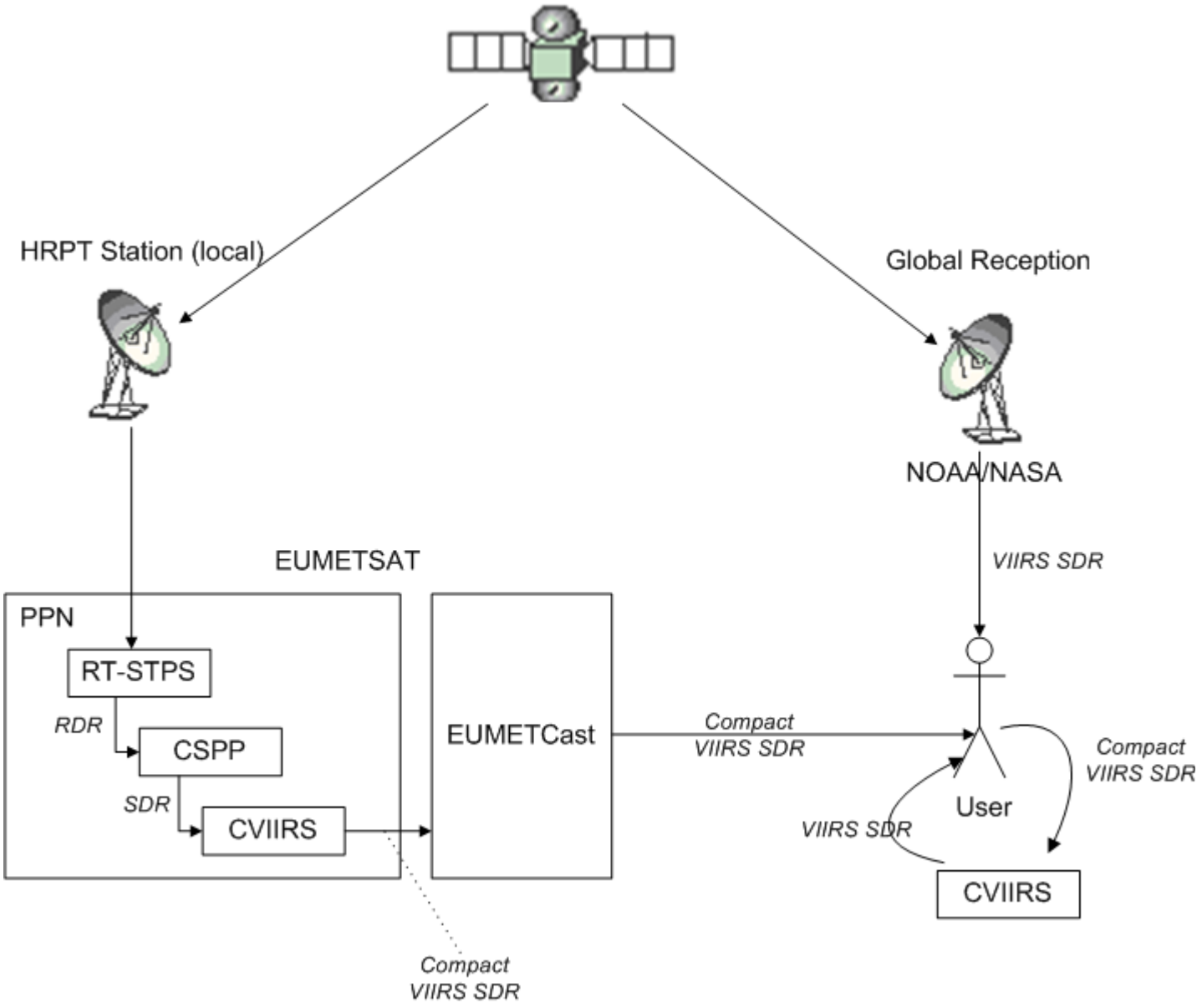
Product Validation

EARS-VIIRS Products

- 5 high resolution Imagery bands (I01-I05)
- 16 medium resolution Imagery bands (M01-M16)
- Day/Night Band
- Geolocation Information (GMODO, GMTCO, etc.)

- L0: Raw Data Records (RDR)
- L1: Sensor Data Records (SDR)
- L2: Environmental Data Records (EDR)

EARS-VIIRS processing chain



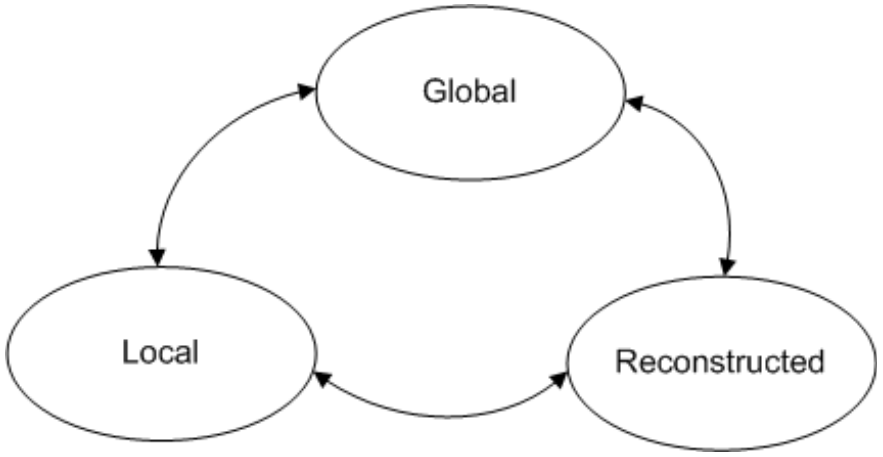
CVIIRS Highlights

Limited dissemination bandwidth in EUMETCast:

- Reduction of the data size with the objective to retain the information from the original SDR data sets as much as possible
- Conversion of all Floating Point values (32 bit) to unsigned 16 bit Integers
- Removal of Reflectances and Brightness Temperatures
- Geolocation data reduction by using a tie-point grid
- Details: Compact VIIRS SDR Product Format User Guide (EUM/TSS/DOC/13/708025)

Product Validation Approach

- Data Format Validation
- Data Content Validation



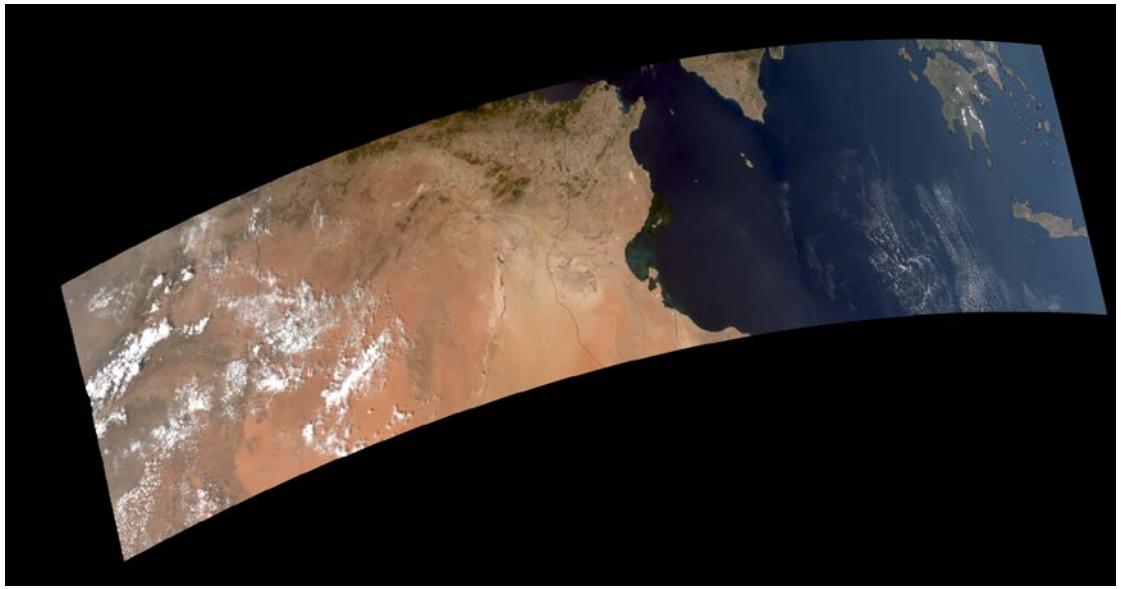
1. Comparison of the structure, metadata and data content of the locally received files before compression (local set) with the corresponding files after re-construction from the compressed format (reconstructed set).
2. Comparison of the structure, metadata and data content of the reconstructed locally received files (reconstructed set) with their global counterparts (global set).
3. As any difference between the local files before compression and the global counterparts would lead to differences in 2. above, a comparison of the structure, metadata and data content of the locally received files (local set) with their global counterparts (global set) was provided as well.

Product Validation Approach, cnt'd

- Limitation: focus on consistency between the products from the EARS-VIIRS service and the global products provided by NOAA; no validation of the accuracy of the product calibration

Product Validation Approach, cnt'd

- One granule (85.6s) over northern Africa and over the Mediterranean
- 27/08/2014 at 12:30:59
- Locally received at Lannion
- GMODO File (Geolocation)
- 16 M-Band Files SVM01..SVM16



Structure/Format Comparison

The differences in data structures are obtained by a tool – developed by EUMETSAT:

- Walks through the hierarchy of two HDF5 files,
- dumps the content to text, and
- compares the text with each other.

Example: Output Comparison Tool, Structure

```
    @Distributor:String, length = 5:[esppnoaa]¶
    @Mission_Name:String, length = 4:[NPP]¶
    @N_Dataset_Source:String, length = 5:[all-noaa]¶
    @N_GEO_Ref:String, length = 789:[GMTCODO_npp_d20140827_t1230590_e1232231_b14672_c20140829091406170406_espp_dev121131144644_noaa_ops.h5]¶
    @N_HDF_Creation_Date:String, length = 9:[20140829]¶
    @N_HDF_Creation_Time:String, length = 15:[091407.521651121131.144644Z]¶
    @Platform_Short_Name:String, length = 4:[NPP]¶
    All_Data  -->¶
        VIIRS-M1-SDR_All  -->¶
            ModeGran  -->8-bit unsigned characinteger:dims(1)¶
            ModeScan  -->8-bit unsigned characinteger:dims(48)¶
            NumberOfBadChecksums  -->32-bit integer:dims(48)¶
            NumberOfDiscardedPkts  -->32-bit integer:dims(48)¶
            NumberOfMissingPkts  -->32-bit integer:dims(48)¶
            NumberOfScans  -->32-bit integer:dims(1)¶
            PadByte1  -->8-bit unsigned characinteger:dims(3)¶
            QF1_VIIRSMBANDSDR  -->8-bit unsigned characinteger:dims(768:3200)¶
            QF2_SCAN_SDR  -->8-bit unsigned characinteger:dims(48)¶
            QF3_SCAN_RDR  -->8-bit unsigned characinteger:dims(48)¶
            QF4_SCAN_SDR  -->8-bit unsigned characinteger:dims(768)¶
            QF5_GRAN_BADDETECTOR  -->8-bit unsigned characinteger:dims(16)¶
            Radiance  -->16-bit unsigned integer:dims(768:3200)¶
            RadianceFactors  -->32-bit floating-point:dims(2)¶
            Reflectance  -->16-bit unsigned integer:dims(768:3200)¶
            ReflectanceFactors  -->32-bit floating-point:dims(2)¶
    Data_Products  -->¶
        VIIRS-M1-SDR  -->¶
            @Instrument_Short_Name:String, length = 6:[VIIRS]¶
            @N_Collection_Short_Name:String, length = 13:[VIIRS-M1-SDR]¶
```

Example: Output Comparison Tool, Structure

```
    @Distributor:String, length = 5:[espparch]¶
    @Mission_Name:String, length = 4:[NPP]¶
    @N_Dataset_Source:String, length = 5:[all-noaa]¶
    @N_GEO_Ref:String, length = 789:[GMTCODO_npp_d20140827_t1230590_e1232231_b14672_c20140829091406170406_espp_dev121131144644 noaa ops.h5]¶
    @N_HDF_Creation_Date:String, length = 9:[20140829]¶
    @N_HDF_Creation_Time:String, length = 15:[091407.521651121131.144644Z]¶
    @Platform_Short_Name:String, length = 4:[NPP]¶
    All_Data  -->¶
        VIIRS-M1-SDR_All  -->¶
            ModeGran  -->8-bit unsigned characinteger:dims(1)¶
            ModeScan  -->8-bit unsigned characinteger:dims(48)¶
            NumberOfBadChecksums  -->32-bit integer:dims(48)¶
            NumberOfDiscardedPkts  -->32-bit integer:dims(48)¶
            NumberOfMissingPkts  -->32-bit integer:dims(48)¶
            NumberOfScans  -->32-bit integer:dims(1)¶
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            QF1_VIIRSMBANDSDR  -->8-bit unsigned characinteger:dims(768:3200)¶
            QF2_SCAN_SDR  -->8-bit unsigned characinteger:dims(48)¶
            QF3_SCAN_RDR  -->8-bit unsigned characinteger:dims(48)¶
            QF4_SCAN_SDR  -->8-bit unsigned characinteger:dims(768)¶
            QF5_GRAN_BADDETECTOR  -->8-bit unsigned characinteger:dims(16)¶
            Radiance  -->16-bit unsigned integer:dims(768:3200)¶
            RadianceFactors  -->32-bit floating-point:dims(2)¶
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            ReflectanceFactors  -->32-bit floating-point:dims(2)¶
    Data_Products  -->¶
        VIIRS-M1-SDR  -->¶
            @Instrument_Short_Name:String, length = 6:[VIIRS]¶
            @N_Collection_Short_Name:String, length = 13:[VIIRS-M1-SDR]¶
```

Product Format Validation: Results

- Because two different processing packages are used, differences are expected for the metadata like @Distributor, @N_Dataset_Source, @N_Algorithm_Version, @N_Software_Version.
- Dynamically created and used attributes are expected to be different in the two files:@N_HDF_Creation_Time, @N_Reference_ID, @N_Input_Prod.
- Some unexpected differences between the local and global products were communicated to the provider of the local processing package and satisfactorily explained.
- The only differences introduced by the EARS-VIIRS compacting tool (CVIIRS) are related to the dynamic creation of attributes.

Data Content Comparison

The differences in data contents are obtained by a tool – developed by EUMETSAT:

- Walks through the hierarchy of two HDF5 files,
- Collects statistical values for each data array by
  - subtracting each array element in the 2nd file from the corresponding array element in the 1st file;
  - statistics are thus built over the arrays of differences.
  - Fill values are not considered for the statistics, i.e. are masked.

Example: Output Comparison Tool, Data Content

Parameter	n (diff)	n (abs)	n (fill)	n (fill abs)	min	max	avg	stddev	rmse
/All_Data/VIIRS-M1-SDR_All/ModeGran	0	1	0	0	0.0	0.0	0.0	Not defined	0.0
ModeGran_n_night	0								
ModeGran_n_day	0								
ModeGran_n_mixed	0								
ModeGran_n_fill	0								
/All_Data/VIIRS-M1-SDR_All/ModeScan	0	48	0	0	0.0	0.0	0.0	0.0	0.0
ModeScan_n_night	0								
ModeScan_n_day	0								
ModeScan_n_fill	0								
/All_Data/VIIRS-M1-SDR_All/NumberOfBadChecksums	0	48	0	0	0.0	0.0	0.0	0.0	0.0
/All_Data/VIIRS-M1-SDR_All/NumberOfDiscardedPkts	0	48	0	0	0.0	0.0	0.0	0.0	0.0
/All_Data/VIIRS-M1-SDR_All/NumberOfMissingPkts	0	48	0	0	0.0	3.0	0.0625	0.4330127018922193	0.4330127018922193
/All_Data/VIIRS-M1-SDR_All/NumberOfScans	0	1	0	0	0.0	0.0	0.0	Not defined	0.0
NumberOfScans	0								
/All_Data/VIIRS-M1-SDR_All/PadByte1	0	3	0	0	0.0	0.0	0.0	0.0	0.0
PadByte1_1	0								
PadByte1_2	0								
PadByte1_3	0								
/All_Data/VIIRS-M1-SDR_All/QF1_VIIRSMBANDSDR	0	2457600	0	0	0.0	18.0	0.060928955078125	1.045401374973039	1.047175213483577
QF1_VIIRSMBANDSDR_n_quality_good	-8299								
QF1_VIIRSMBANDSDR_n_quality_poor	-21								
QF1_VIIRSMBANDSDR_n_quality_noCalibration	8320								
QF1_VIIRSMBANDSDR_n_saturated_none	0								
QF1_VIIRSMBANDSDR_n_saturated_some	0								
QF3_GRAN_BADDETECTOR_n_badDetectorTrue	0								
/All_Data/VIIRS-M1-SDR_All/Radiance	-8320	2132864	8320	324736	-1.0	1.0	4.688531476924924E-6	0.00399261725100684 2	0.00399261906792330 3
/All_Data/VIIRS-M1-SDR_All/RadianceFactors	0	2	0	0	0.0	0.0	0.0	0.0	0.0
RadianceFactors_1	0.0								
RadianceFactors_2	0.0								
/All_Data/VIIRS-M1-SDR_All/Radiance_real	0	2132864	0	324736	-0.0112762451171875	0.0112762451171875	5.282252832012203E-8	4.4981417888756 46E-5	4.4981438358638 63E-5
/All_Data/VIIRS-M1-SDR_All/Reflectance	-8320	2132864	8320	324736	-1.0	1.0	-1.640986016923723E-5	0.012901266456554782	0.012901273868530766
/All_Data/VIIRS-M1-SDR_All/ReflectanceFactors	0	2	0	0	0.0	0.0	0.0	0.0	0.0
ReflectanceFactors_1	0.0								
ReflectanceFactors_2	0.0								
/All_Data/VIIRS-M1-SDR_All/Reflectance_real	0	2132864	0	324736	-2.4437904357910156E-5	2.4437904357910156E-5	-4.0072217572030847E-10	3.150032264681497E-7	3.150034075152453E-7

Example: Output Comparison Tool, Data Content

Parameter	n (diff)	n (abs)	n (fill)	n (fill abs)	min	max	avg	stddev	rmse
/All_Data/VIIRS-M1-SDR_All/ModeGran	0	1	0	0	0.0	0.0	0.0	Not defined	0.0
ModeGran_n_night	0								
ModeGran_n_day	0								
ModeGran_n_mixed	0								
ModeGran_n_fill	0								
/All_Data/VIIRS-M1-SDR_All/ModeScan	0	48	0	0	0.0	0.0	0.0	0.0	0.0
ModeScan_n_night	0								
ModeScan_n_day	0								
ModeScan_n_fill	0								
/All_Data/VIIRS-M1-SDR_All/NumberOfBadChecksums	0	48	0	0	0.0	0.0	0.0	0.0	0.0
/All_Data/VIIRS-M1-SDR_All/NumberOfDiscardedPkts	0	48	0	0	0.0	0.0	0.0	0.0	0.0
/All_Data/VIIRS-M1-SDR_All/NumberOfMissingPkts	0	48	0	0	0.0	3.0	0.0625	0.4330127018922193	0.4330127018922193
/All_Data/VIIRS-M1-SDR_All/NumberOfScans	0	1	0	0	0.0	0.0	0.0	Not defined	0.0
NumberOfScans	0								
/All_Data/VIIRS-M1-SDR_All/PadByte1	0	3	0	0	0.0	0.0	0.0	0.0	0.0
PadByte1_1	0								
PadByte1_2	0								
PadByte1_3	0								
/All_Data/VIIRS-M1-SDR_All/QF1_VIIRSMBANDSDR	0	2457600	0	0	0.0	18.0	0.060928955078125	1.045401374973039	1.047175213483577
QF1_VIIRSMBANDSDR_n_quality_good	-8299								
QF1_VIIRSMBANDSDR_n_quality_poor	-21								
QF1_VIIRSMBANDSDR_n_quality_noCalibration	8320								
QF1_VIIRSMBANDSDR_n_saturated_none	0								
QF1_VIIRSMBANDSDR_n_saturated_some	0								
QF1_GRAN_BADDETECTOR_n_badDetectorTrue	0								
/All_Data/VIIRS-M1-SDR_All/Radiance	-8320	2132864	8320	324736	-1.0	1.0	4.688531476924924E-6	0.003992617251006842	0.003992619067923303
/All_Data/VIIRS-M1-SDR_All/RadianceFactors	0	2	0	0	0.0	0.0	0.0	0.0	0.0
RadianceFactors_1	0.0								
RadianceFactors_2	0.0								
/All_Data/VIIRS-M1-SDR_All/Radiance_real	0	2132864	0	324736	-0.0112762451171875	0.0112762451171875	5.282252832012203E-8	4.4981417888875646E-5	4.498143835863863E-5
/All_Data/VIIRS-M1-SDR_All/Reflectance	-8320	2132864	8320	324736	-1.0	1.0	-1.6409860169237235E-5	0.012901266456554782	0.012901273868530766
/All_Data/VIIRS-M1-SDR_All/ReflectanceFactors	0	2	0	0	0.0	0.0	0.0	0.0	0.0
ReflectanceFactors_1	0.0								
ReflectanceFactors_2	0.0								
/All_Data/VIIRS-M1-SDR_All/Reflectance_real	0	2132864	0	324736	-2.4437904357910156E-5	2.4437904357910156E-5	-4.0072217572030847E-10	3.150032264681497E-7	3.150034075152453E-7

Product Validation Results, Content

- Data Content Comparison:
  - The data of local and global products match almost perfectly.
  - The radiance data of local and reconstructed products are identical (for original integer bands) or nearly identical (for original floating point bands).
  - CVIIRS Reconstructed Reflectances and Brightness Temperatures well within Instrument SNR/NEDT.

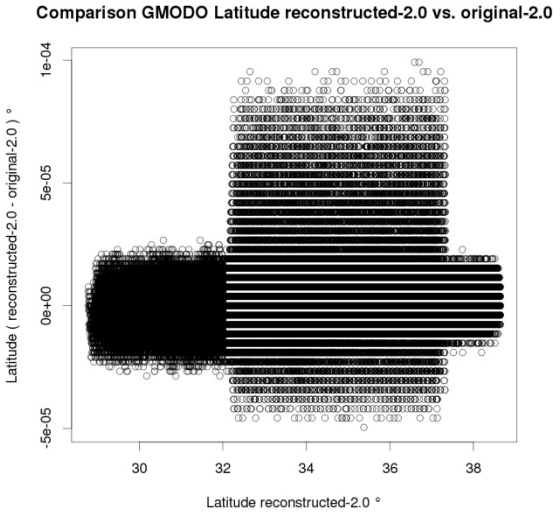
$$SNR_{L_{Theoretical}} = \frac{avg_{L_{local}}}{rmse_{L_{local}}}$$

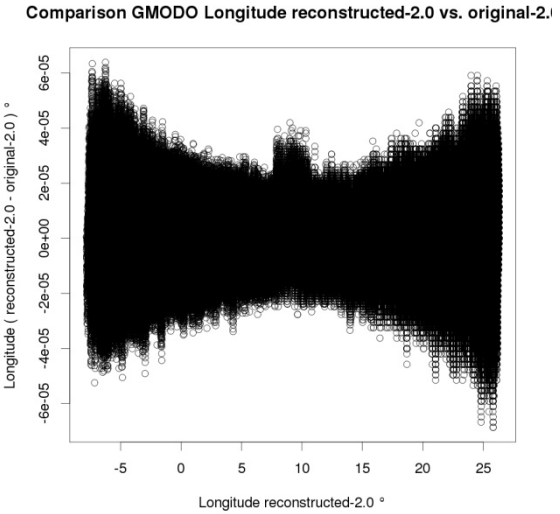
Channel	SNR/NEDT specified	SNR/NEDT calculated	
1	316	3017	
2	409	1578	
3	414	3401	
4	315	11201	
5	360	3489	
6	199	2770	*
7	340	7600	
8	74	27821	
9	83	326	
10	342	14912	
11	10	13718	
12	0.396	0.01067	
13	0.423	0.01326	
14	0.091	0.00146	
15	0.07	0.002894	
16	0.072	0.001772	

*** Channel 6 ambiguity, see next slide(s)**

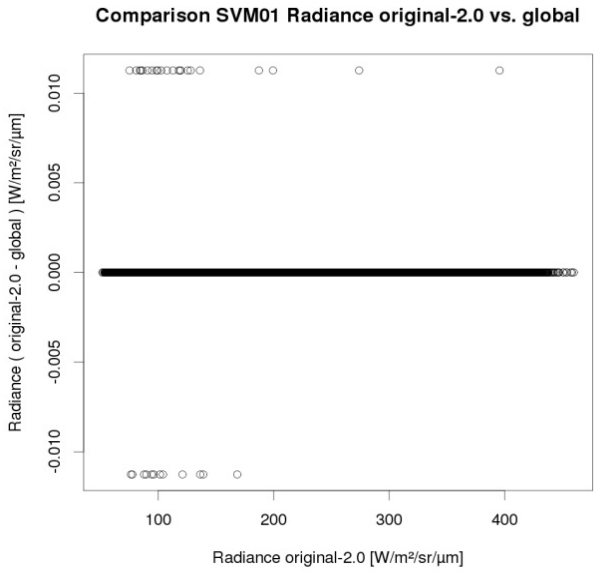
Product Validation Results, Content, cnt'd

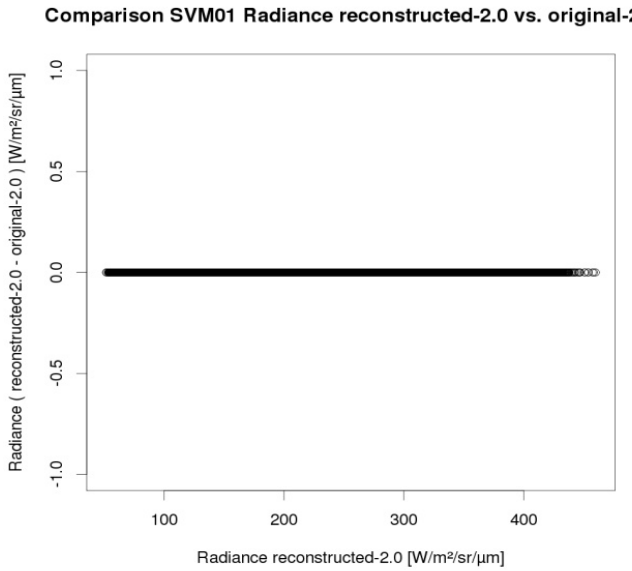
- Data Content Comparison/GMODO:
  - The data of local and global products match almost perfectly.
  - The data of local and reconstructed products match very good for the Latitude/Longitude information (lat differences of **~ 0.7 m** and lon differences of **~ 1 m** positional accuracy for the region under observation; compared to lat differences of **~ 0.001 m** and lon differences of **~ 0.001** m positional accuracy for the region under observation in the local vs. global product). This is well within the orbit and attitude determination accuracy.
  - The data of local and reconstructed products match good (**RMSE < 0.0009 °)** for the angular information in Satellite-/Solar - Azimuth/Zenith Angles.

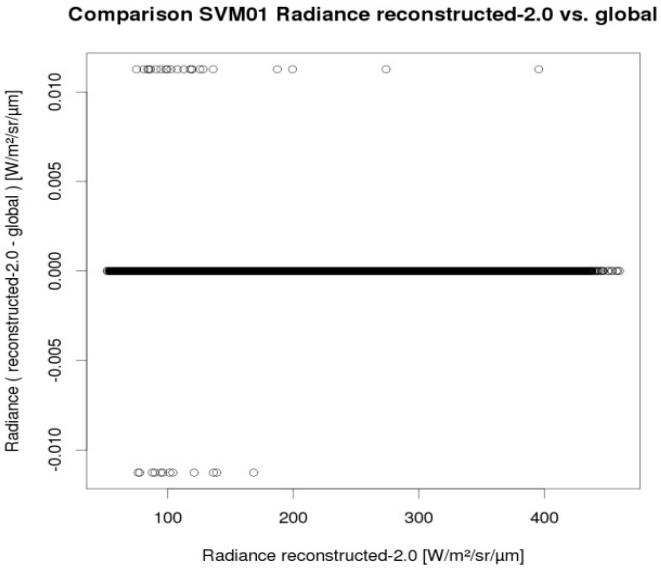


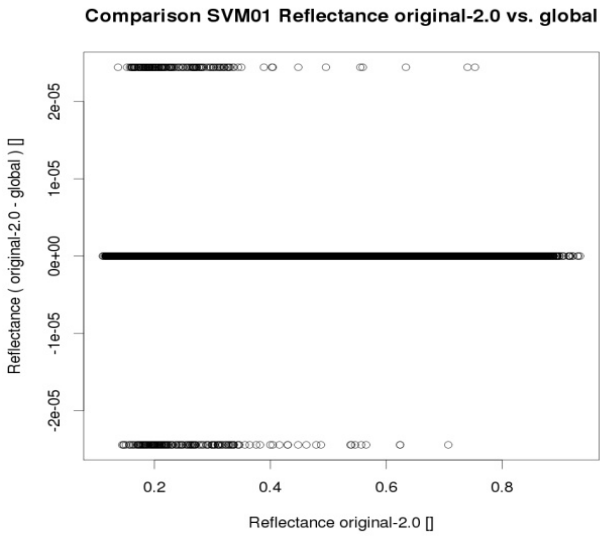


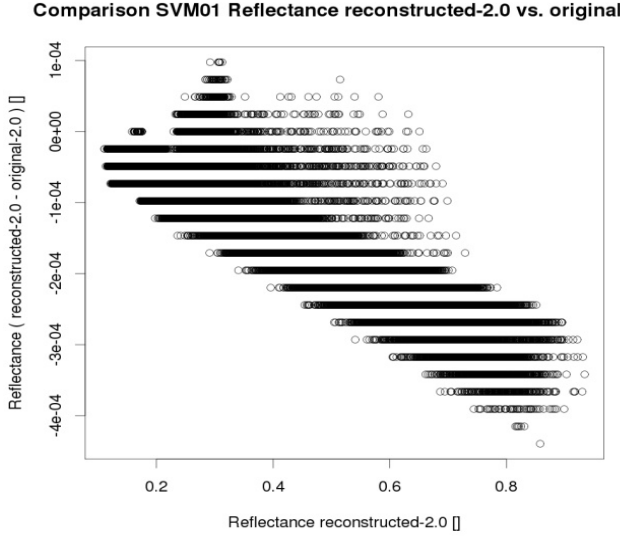
Product Validation Results, Content, cnt'd

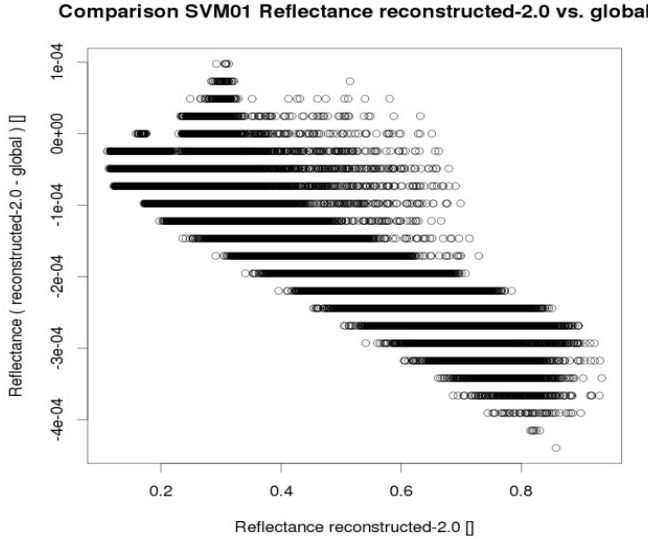












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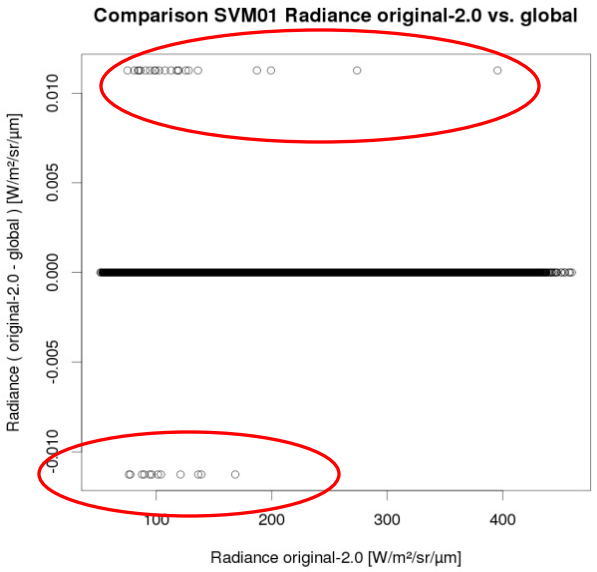
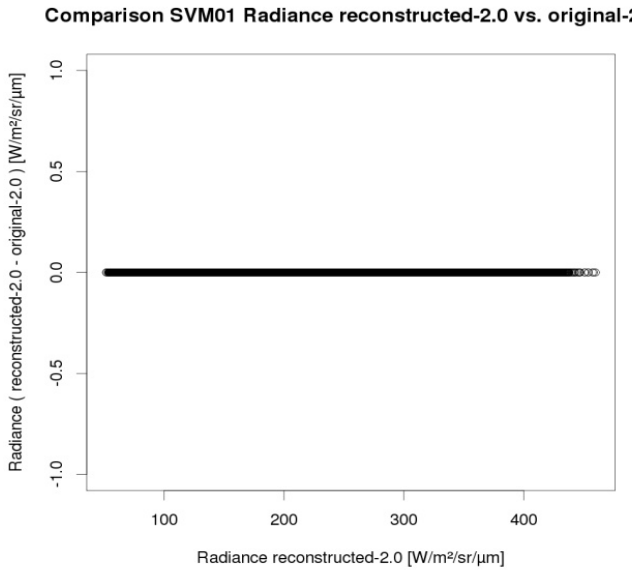
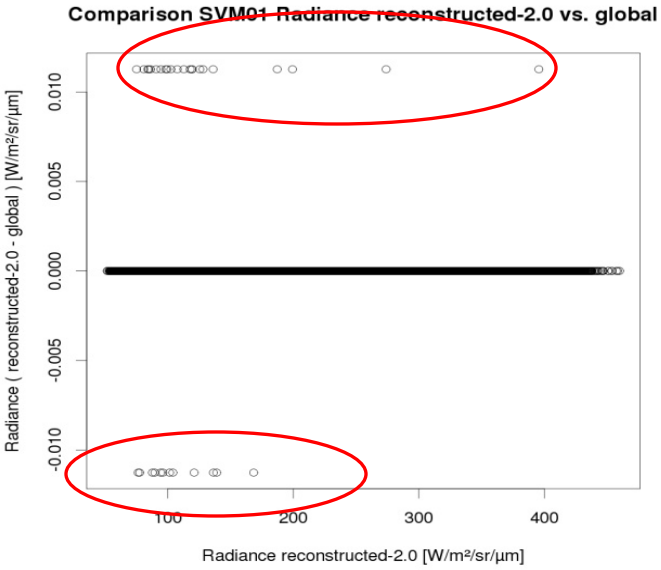
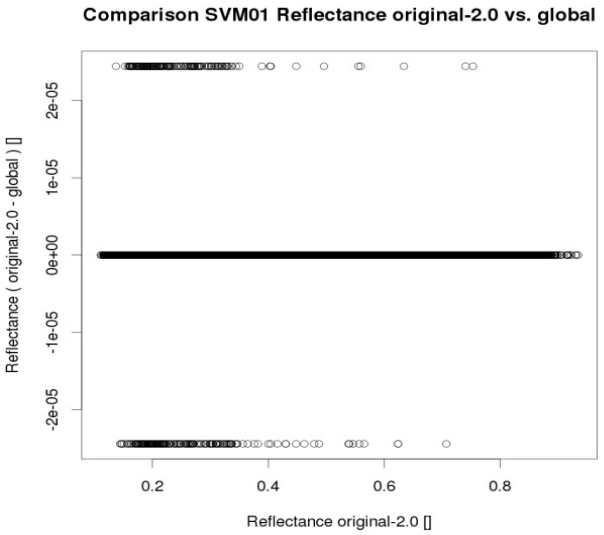
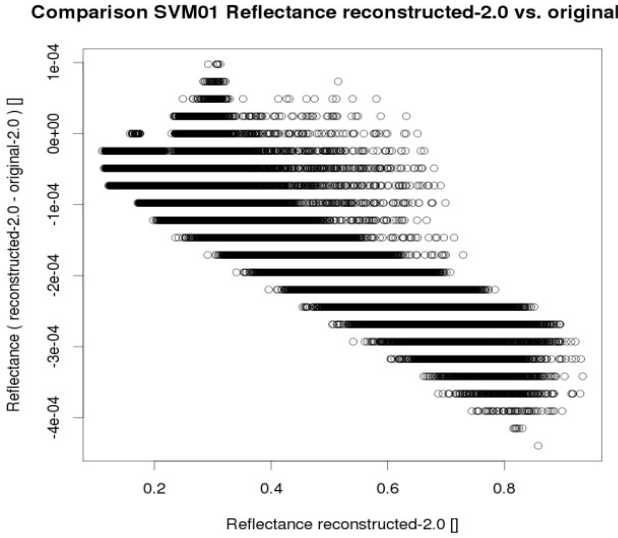
Product Validation Results, Content, cnt'd

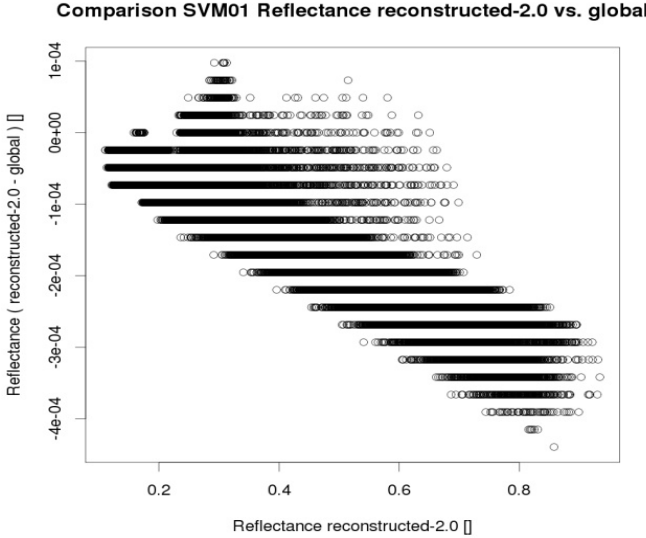












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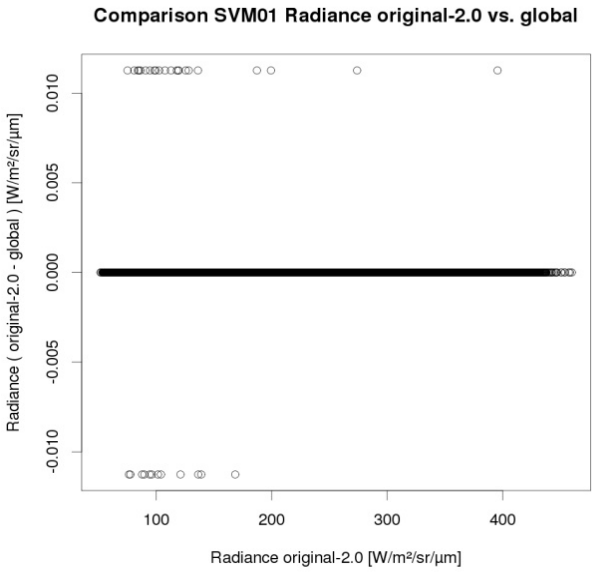
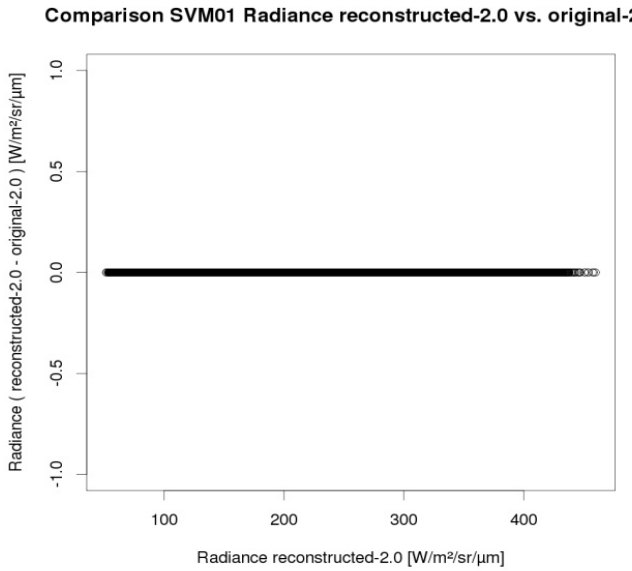
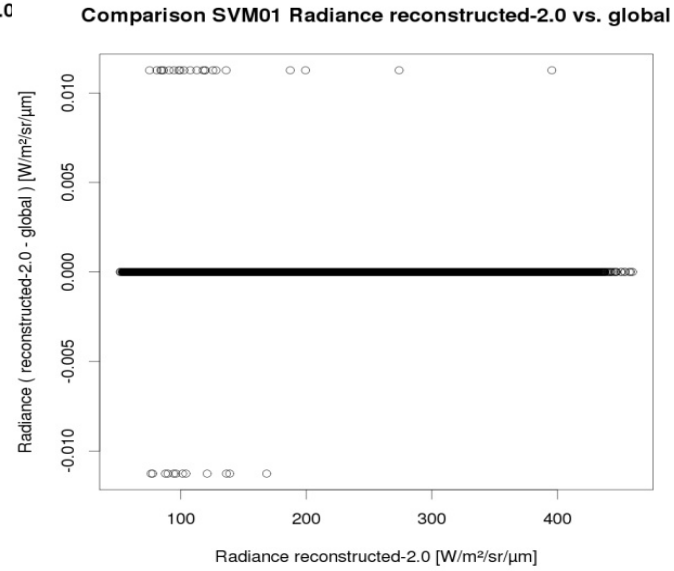
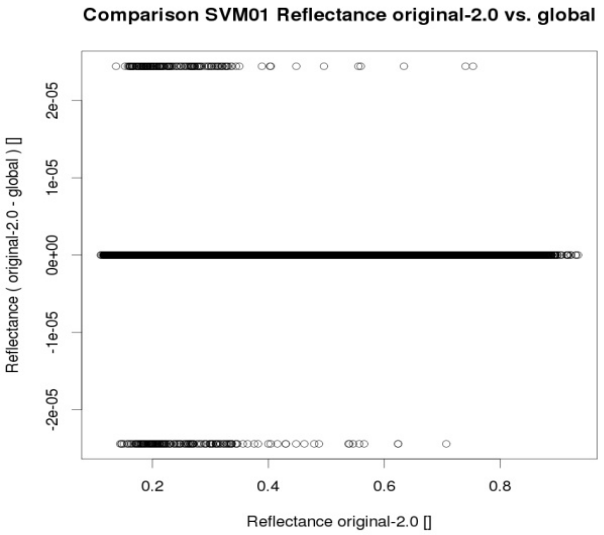
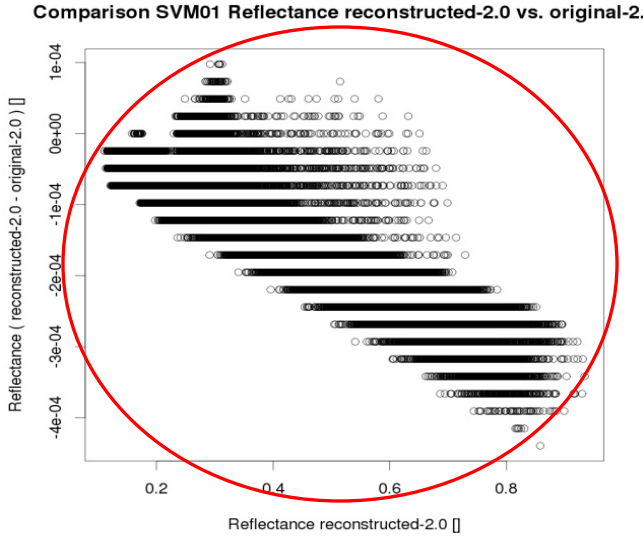
Product Validation Results, Content, cnt'd

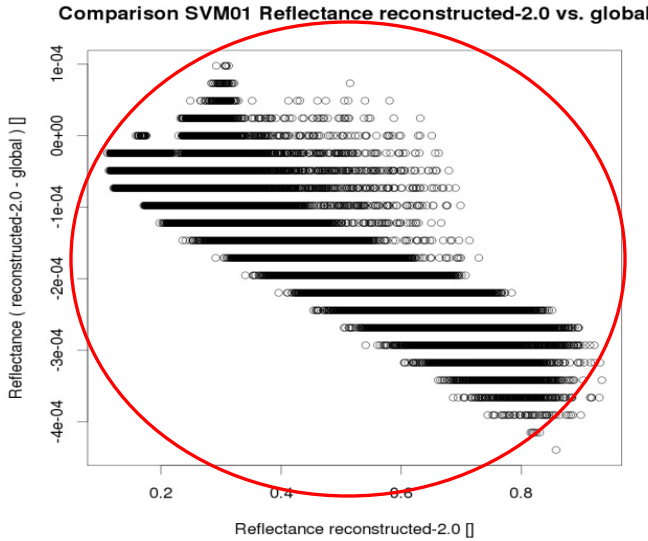








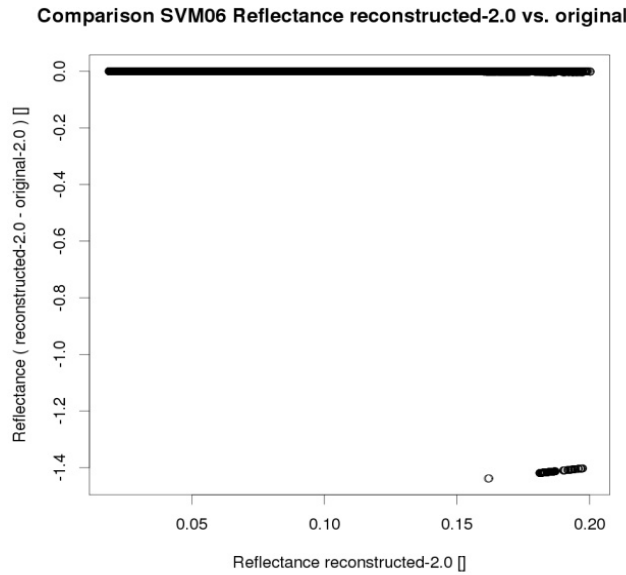


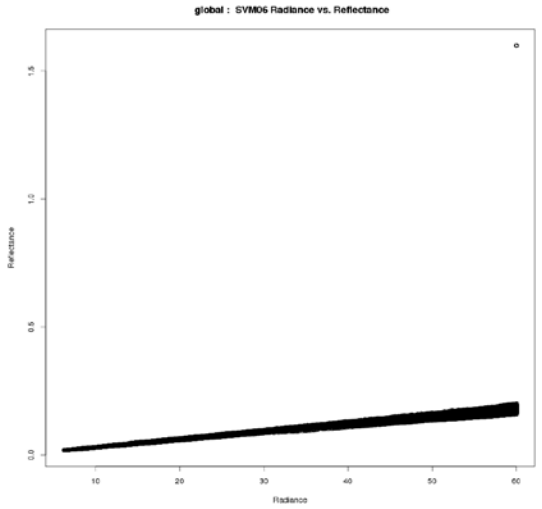


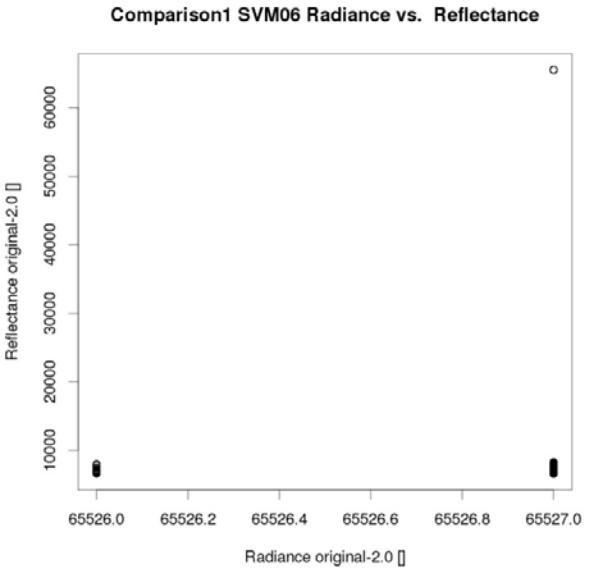
EUMETSAT

Product Validation Results, Content, cnt'd

- Channel 6 issue:



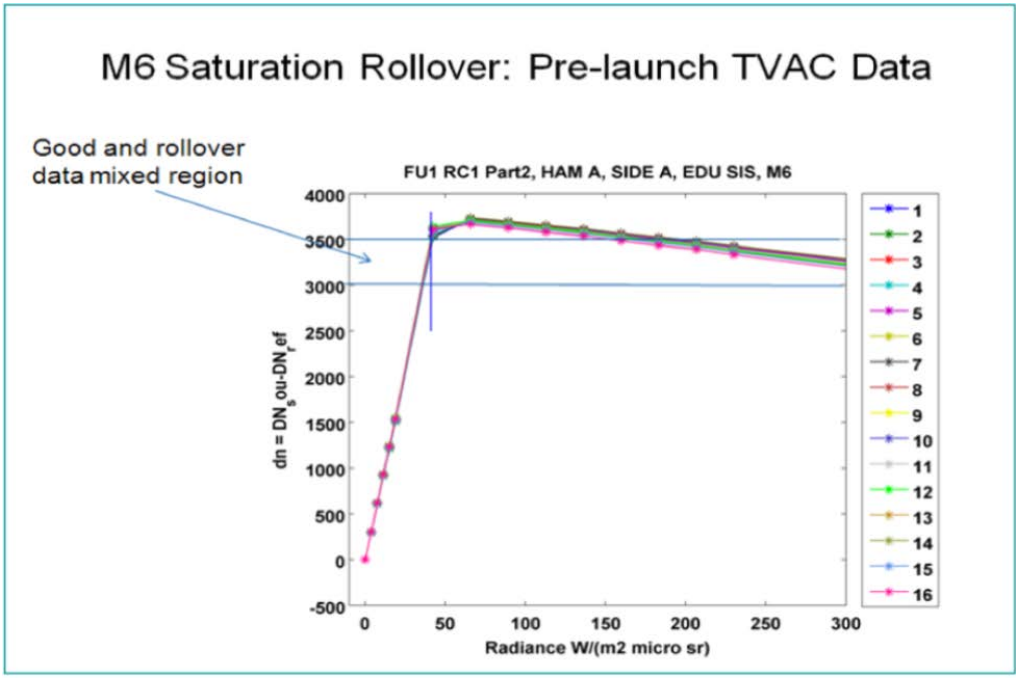




- The ambiguity cannot be reconstructed by the deterministic algorithm of the CVIIRS tool.
- Ambiguous values are flagged, though, via quality flags (e.g. saturated or radiance out of range).

Channel 6 issue

"SVM06 has some unique challenges on S-NPP. There is "saturation rollover" occurring, meaning that as the observations meet and exceed saturation, the digital count values actually go down, leading to ambiguous counts to radiance occurring.

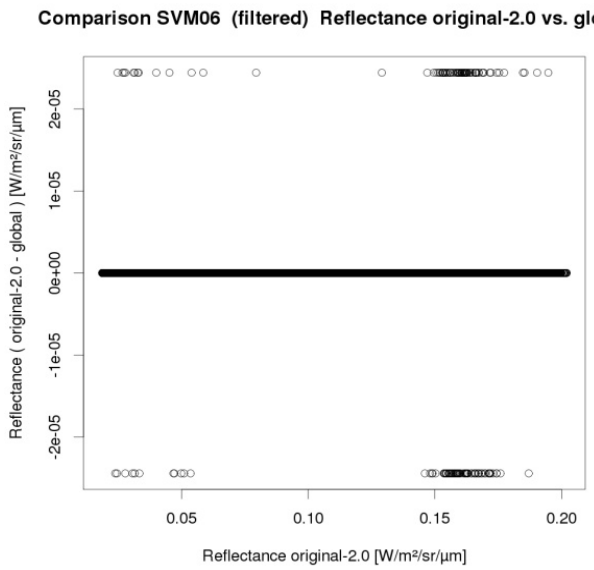


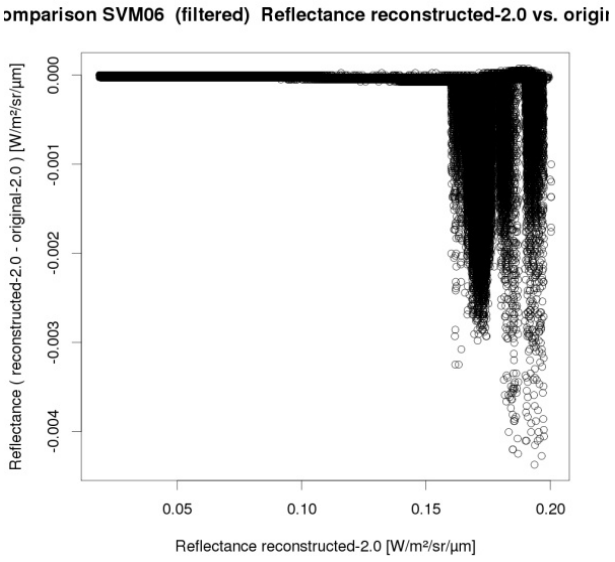
This ambiguity begins when you reach radiance values of 41 W/(m2/ster/micron). It is our understanding that you should be able to identify these cases when the SDR QF1 flag = 65 (1000001) – Radiance data out of range."

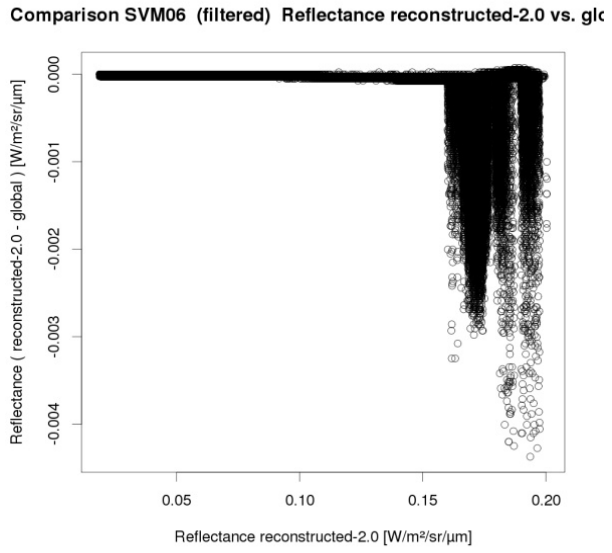
Channel 6 issue

- Reflectances differences if filtering out the extreme reflectances.
- Disregarding the ambiguity of reflectance values, the reconstruction of the reflectances data of the reconstructed product are, compared to the local data, well within the specified instrument SNR of 199.
- For the analysed data set an additional theoretical SNR of 2770 can be calculated, which is introduced by the compacting and decompacting process of the CVIIRS tool.
- The observed differences are insignificant

$$SNR_{R_{Theoretical}} = \frac{avg_{R_{local}}}{rmse_{R_{local}}} = \frac{0.110987}{4.00599 * 10^{-5}} = 2770$$

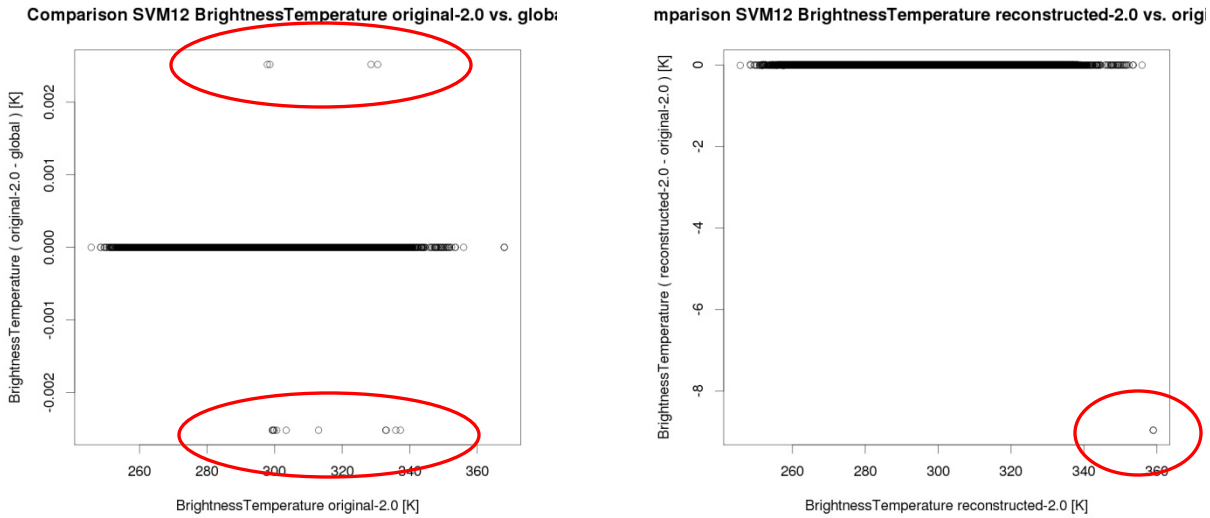






Product Validation Results, Content, cnt'd

- Channel 12 issue:



- For reconstructed values at the high end of the dynamic range (e.g. 65527) the error in the reconstructed values is significantly higher than average.
- The reason is the chosen fixed conversion factors which are determined by theoretical analysis rather than analysing the present values.
- Those values are flagged, though, as being saturated.

Summary of the Product Validation

- **Format check**
  - **HDF5 structure comparable / nearly identical to original product**
    - The observed differences in structure of the product result mainly from the differences between local and global products, i.e. caused by the two different processing packages.
    - While the products resulting out of the local and global processing are not identical, the observed differences do not preclude from using the local products.
    - The only differences introduced by the EARS-VIIRS compacting tool (CVIIRS) are related to the dynamic creation of attributes.
- **Contents check**
  - **Lossy compression 3x better than SNR/NEDT**
    - The data of local and global products match nearly perfectly.
    - The radiance data of local and reconstructed products are either identical or well within the specified instrument SNRs.
    - The differences are explained by the conversion of the original 32bit floating point to an internal representation as 16bit unsigned integer within the compact format, and converting back to 32bit floating point.
    - The reconstructed reflectance data of the reconstructed product are, compared to the local data, well within the specified instrument SNRs or NEDTs.
- **Issues**
  - **All Issues explained by CSPP provider (SSEC).**

Summary of the Product Validation, cnt'd

- **Geolocation data check**
  - **Geopositional accuracy 3x better than orbit and attitude determination accuracy**
    - The geolocation data of local and global products match nearly perfectly.
    - The data of local and reconstructed products match very good for the Latitude/Longitude information (lat differences of ~ 0.7 m and lon differences of ~ 1 m positional accuracy for the region under observation; compared to lat differences of ~ 0.001 m and lon differences of ~ 0.001 m positional accuracy for the region under observation in the local vs. global product).
    - The data of local and reconstructed products match good (RMSE < 0.0009 °) for the angular information in Satellite-/Solar- Azimuth/Zenith Angles.
    - The Height values are not stored in the compact format and thus cannot be reconstructed.
      - Intentionally left out based on discussions with users and as defined in the Compact VIIRS SDR Product Format User Guide, but may be considered to be included later if relevant.
    - The SatelliteRange values are not stored in the compact format and thus cannot be reconstructed.
      - Intentionally left out based on discussions with users and as defined in the Compact VIIRS SDR Product Format User Guide, but may be considered to be included later if relevant.

Operational Monitoring

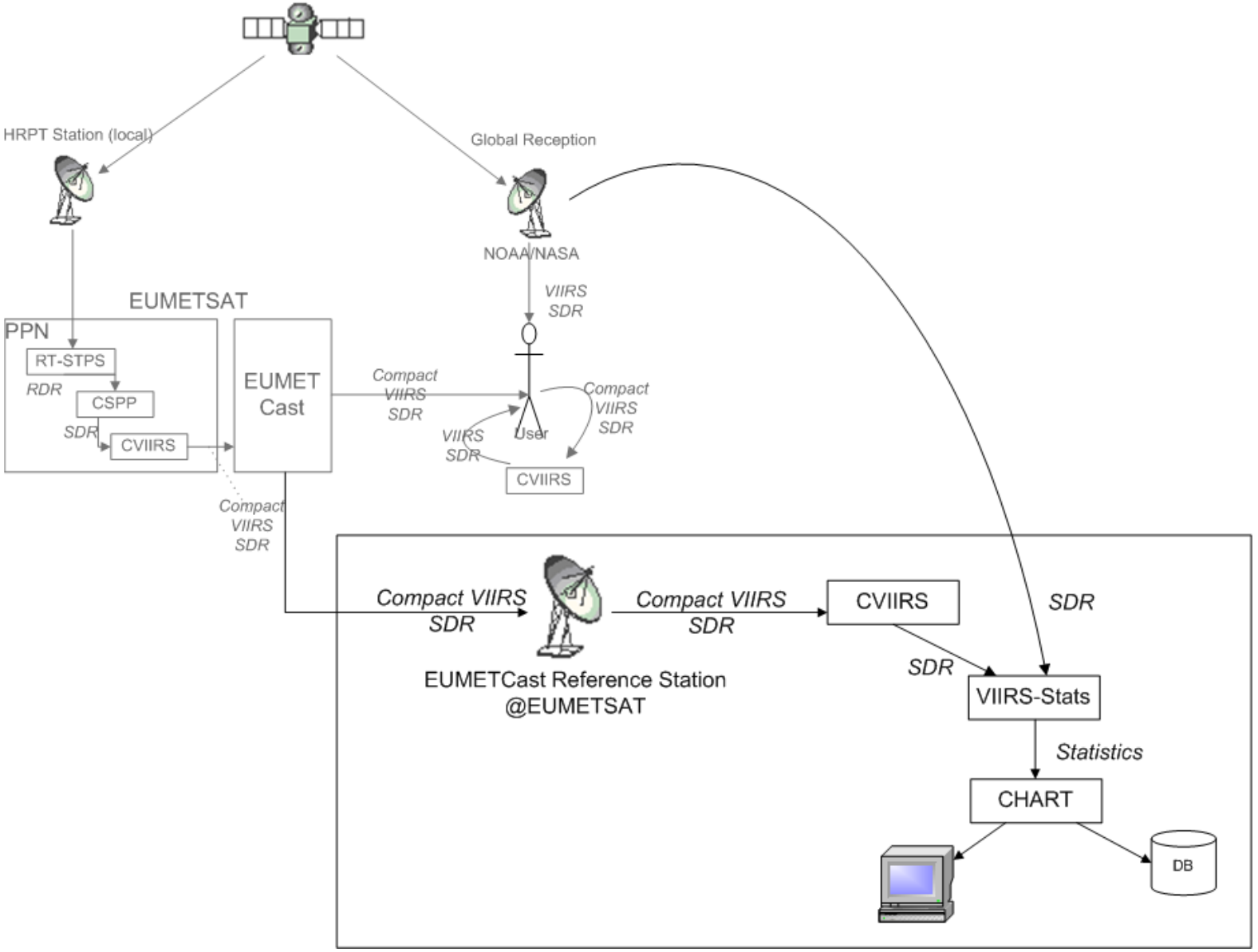
Operational Monitoring, online

- Online monitoring via GEMS and SMART, cf. presentation of Ester Rojo “Operational implementation of Suomi NPP regional services at EUMETSAT”

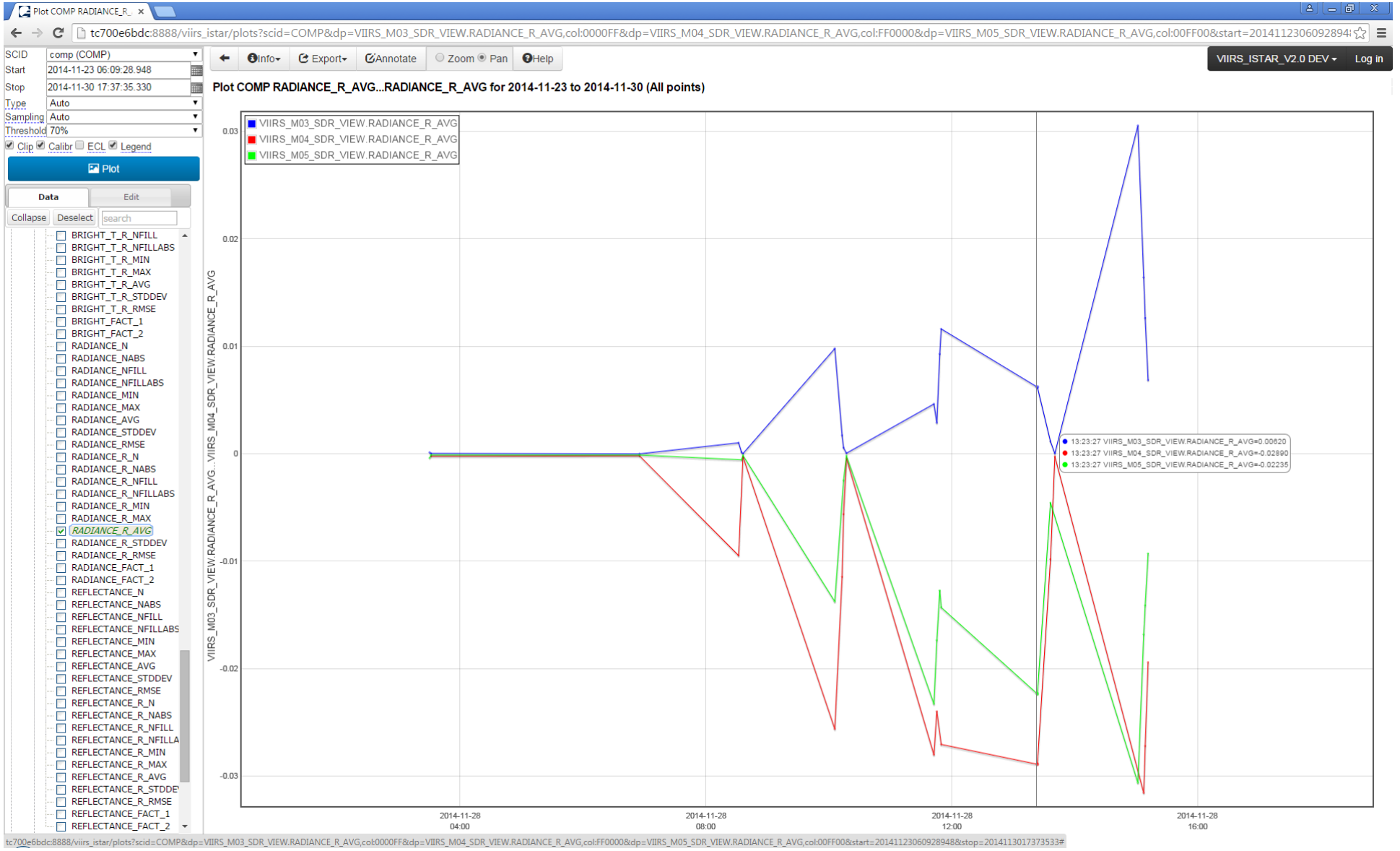
Operational Monitoring, offline

- Offline Monitoring
  - CHART/MPSTAR
  - Prototypically implemented
  - Operational comparison of local vs. global products, based on statistics

Offline Monitoring, Architecture



Offline Monitoring, Example (CHART)



Questions

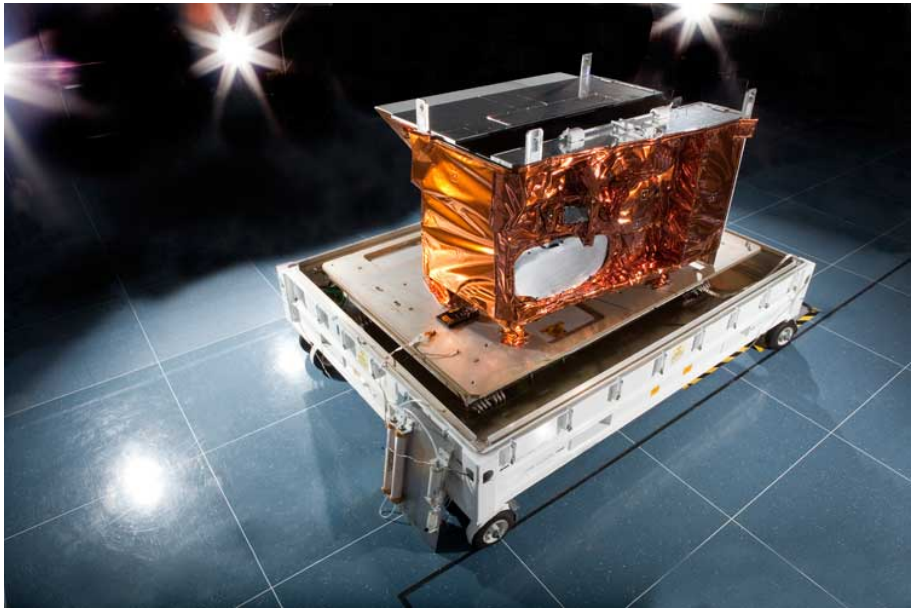
Questions?

Backup Slides

VIIRS Overview

- VIIRS: Visible Infrared Imaging Radiometer Suite
- Instrument on-board Suomi NPP, launched 28/10/2011
- Scanning radiometer, visible and infrared bands

Instrument Specifications		
Spectral Bands		
	Visible/Near IR:	9 plus day/night pan band
	Mid-Wave IR:	8
	Long-Wave IR:	4
Imaging Optics:		19.1 cm aperture, 114 cm focal length
Orbit Average Power:		200 Watts
Weight:		275 kg
Data Acquisition Parameters:		
	Scanned Swath:	±56°, 3000 km
	Horizontal Sample Interval on Ground:	<1.6 km @ end of scan
	Data Quantization:	12 bit –14 bit A/D converters for lower noise
	Data Rate:	10.5 Mbps (max.)

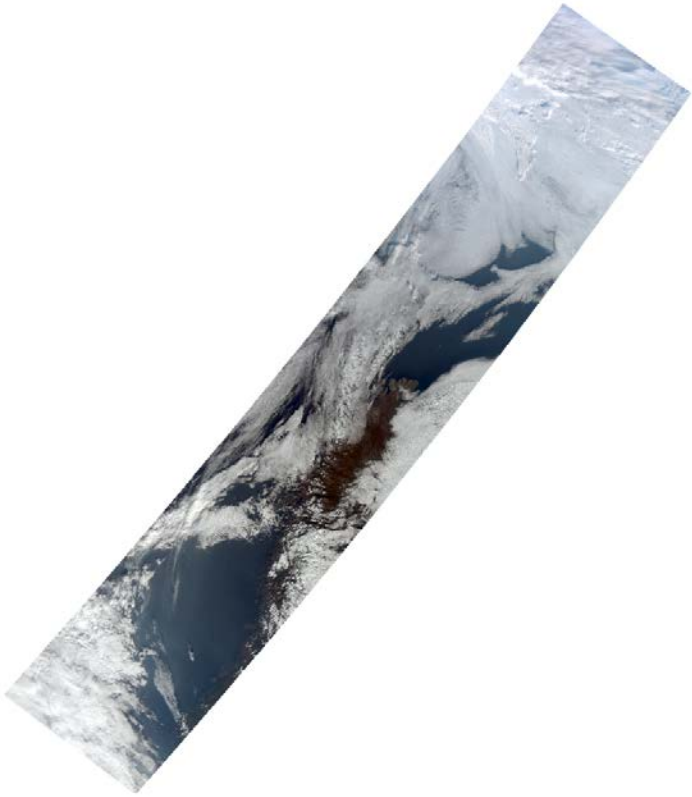


Example: Results SVMxx

Observations	Explanations
Because two different processing packages are used, differences are expected for the metadata like @Distributor, @N_Dataset_Source, @N_Algorithm_Version, @N_Software_Version.	
Dynamically created and used attributes like @N_HDF_Creation_Time, @N_Reference_ID, @N_Input_Prod are expected to be different in the two files.	
The local product references the GMTCO file as the @N_GEO_Ref, while the global product references the GMODO file	
Angle ranges and geographic positioning information exhibit differences in the accuracy of the values which are deemed insignificant (<0.1%).	*"The difference can be explained by the use of a different set of packing tools in the JPSS Algorithm Development Library (ADL) used by CSPP versus the Mx8.x IDPS code base.* *The science routines used by both are identical; it is only the packing and unpacking routines that are slightly different."*
@N_RSB_Index is 0 in the local product and 6 in the global product.	*"We cannot find a reason for the difference in this code, nor can we find what the "Auto Cal History Auxiliary file index" actually means. However, at this time, the RSB AutoCal is not implemented in CSPP or IDPS software. [...]"*
@N_NPOESS_Document_Ref references different documents/versions.	*"This is set as part of the ADL Raytheon code base, and is unlikely to be changed."*
Locally and globally auxiliary files are nearly identical, except for the Day/night-band straylight correction and RSBAUTOCAL-HISTORY	*"[...]* *The JPSS project is working on a way to update the calibration coefficients for the VIIRS reflectance bands for each orbit. This would take the form of an auxiliary file.[...] However, the VIIRS-RSBAUTOCAL-HISTORY-AUX is still a required input, although it is not used."*
@N_Processing_Domain is different in both using all lower-case or all upper-case letters.	*"This is set as part of the ADL Raytheon code base, and is unlikely to be changed."*

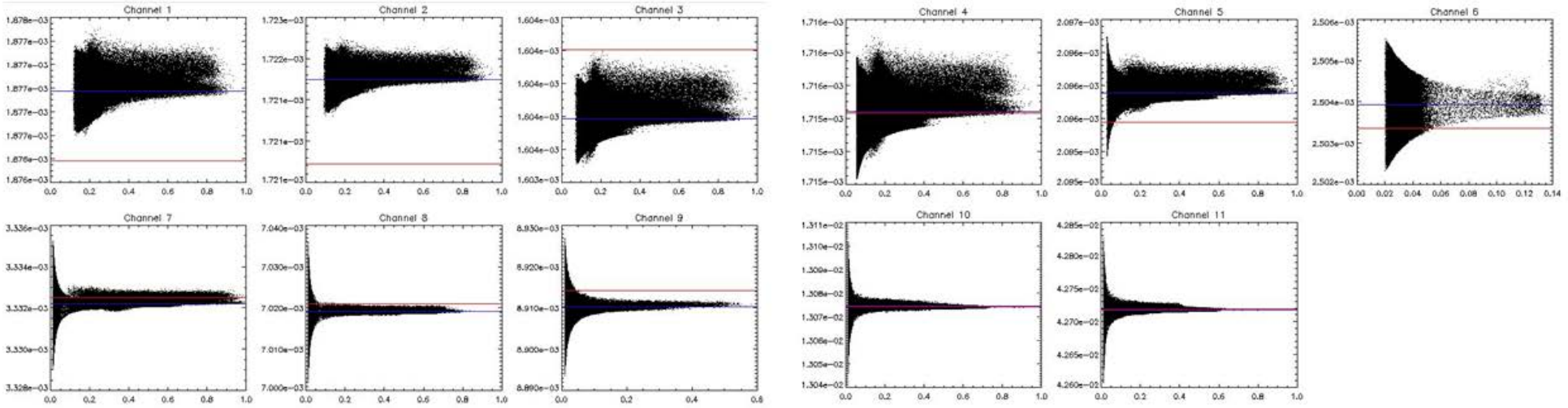
Product Validation Results, Content, cnt'd

- GMODO over the North pole:
  - The data of local and reconstructed products do not show any problems at the meridian and anti-meridian crossings; nor around the North/South Pole.

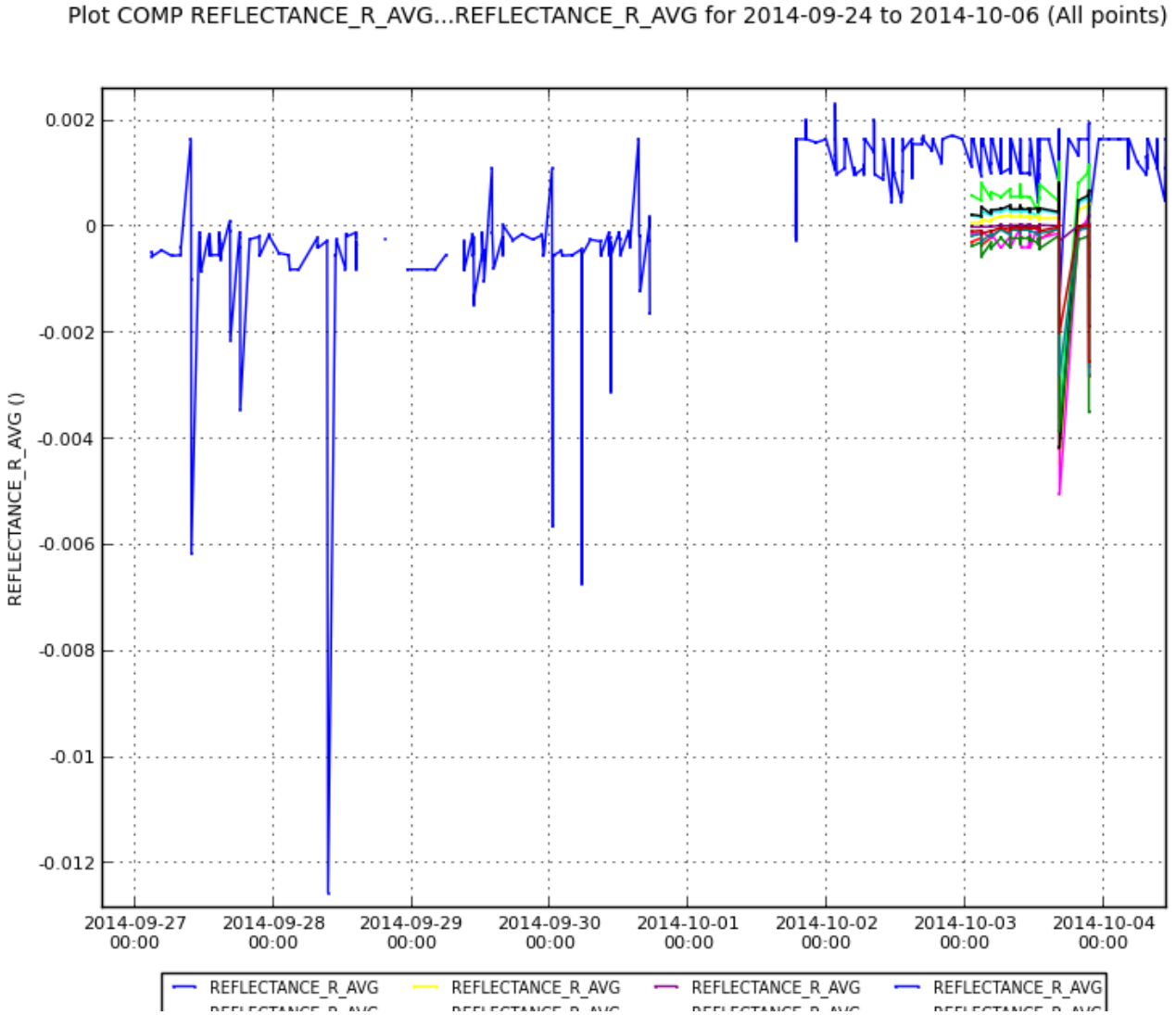


Product Validation Results, Content, cnt'd

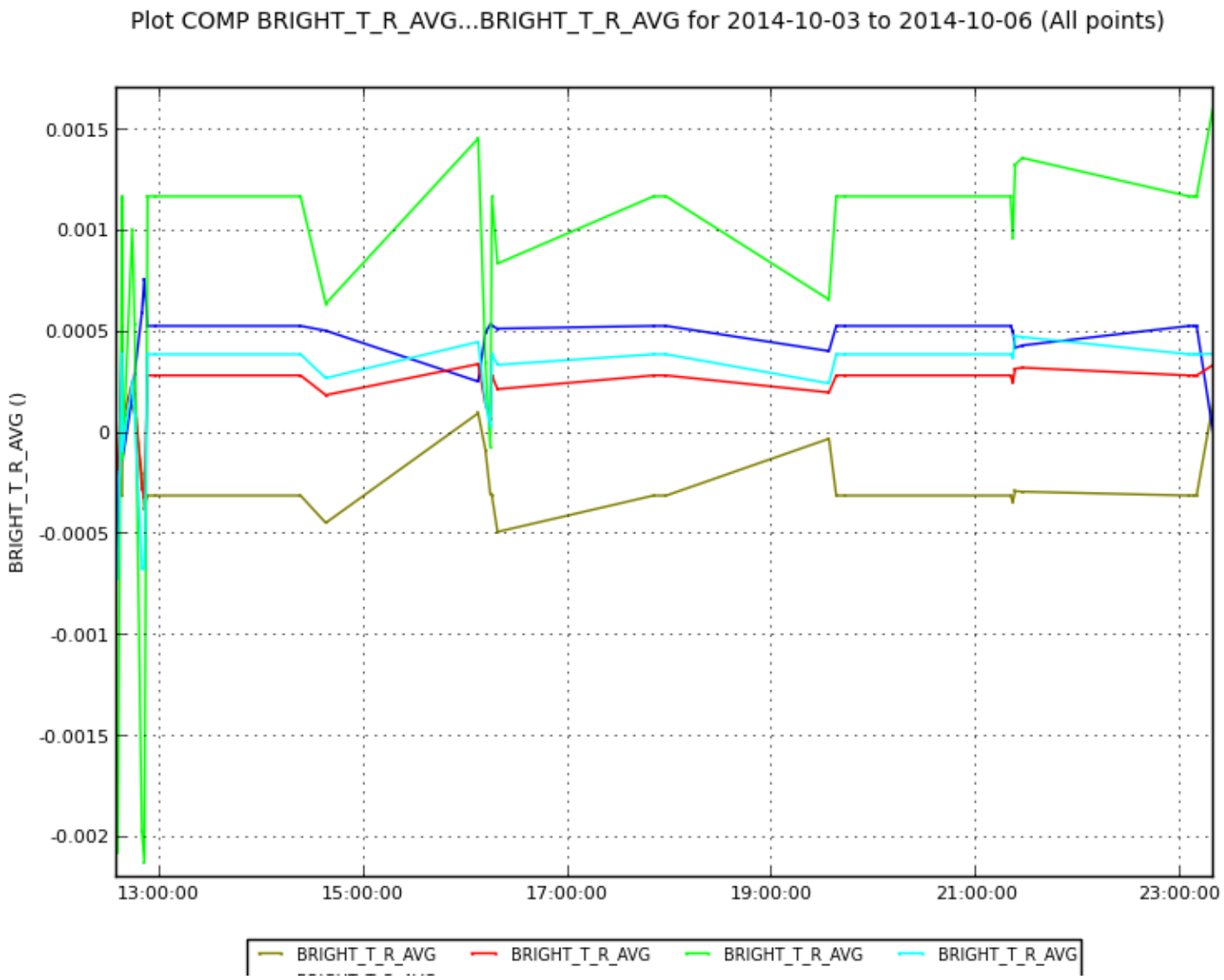
- Radiance-Reflection-Conversion Errors
  - Is it appropriate to use fixed conversion factors or shall they vary?
  - Are the factors which have been chosen in the compacting software consistent which the ones used CSPP and NDE?



Offline Monitoring: Examples



Offline Monitoring: Examples



Operational Monitoring, online

- GEMS/SMART

EARS-VIIRS is subject to 24/7 monitoring in „Realtime“ by the Duty Controllers using the EUMETSAT GEMS and SMART tools, example of GEMS Output:

EARS History

Timestamp	Facility	Host	Process	Sv	Event
15.075.01.25.42.938	EARS	apkss01	EFTS_PreProcessor	I	VIIRS2RDR: Received file /aapp/aappUsers/aappadm/npp/inputRTSTPS/VIIRS/npp_20150316_0121_012154_012453_17517_sva.hrd at: 15.075.01.25.35 GMT+00:00, size: 336715776 bytes.
15.075.01.26.40.811	EARS	apkss01	EFTS_PreProcessor	I	VIIRS2SDR: Received file /aapp/aappUsers/aappadm/npp/inputRDR/RNSCA-RVIRS_npp_d20150316_t0121181_e0125342_b00001_c20150316012637337000_all-_dev.h5_sva_17517 at: 15.075.01.26.37 GMT+00:00, size: 138449983 bytes.
15.075.01.28.27.868	EARS	apkss01	EFTS_PreProcessor	I	VIIRS2RDR: Received file /aapp/aappUsers/aappadm/npp/inputRTSTPS/VIIRS/npp_20150316_0121_012453_17517_sva.hrd at: 15.075.01.28.26 GMT+00:00, size: 673432576 bytes.
15.075.01.29.17.926	EARS	apkss01	EFTS_PreProcessor	I	CVIIRS: Received file /aapp/aappUsers/aappadm/npp/cviirs/in/proc_granules_d20150316_t0121191_e0122434_b17517 at: 15.075.01.29.15 GMT+00:00, size: 35 bytes.
15.075.01.29.20.110	EARS	apkss01	EFTS_PreProcessor	I	CVIIRS: Received file /aapp/aappUsers/aappadm/npp/cviirs/in/proc_granules_d20150316_t0122446_e0124088_b17517 at: 15.075.01.29.15 GMT+00:00, size: 35 bytes.
15.075.01.29.48.020	EARS	apkss01	EFTS_PreProcessor	I	VIIRSsegments: Received file /aapp/aappUsers/aappadm/npp/cviirs/cache/SVMC_npp_d20150316_t0121191_e0122434_b17517_c20150316012918249132_eum_ops.h5 at: 15.075.01.29.31 GMT+00:00, size: 119265736 bytes.