

Calibration of FY-4A GIIRS L0 data and comparisons to CrIS



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GIIRS schedule, c/o NSMC/CMA

		FY-4A	FY-4B	FY-4C	MTG IRS
Spectral range (cm ⁻¹)	LWIR	700 - 1130	680 - 1130	650 - 1130	700-1210
	MWIR	1650 -2250	1650 -2250	1650 –2250	1600-2175
Spectral resolution (cm ⁻¹)	L	0.8(0.625)	0.8	0.625	0.625
	М	1.6(0.625)	0.8	0.625	0.625
Sensitivity mW/m ² sr cm ⁻²	L	0.5-1.1	0.5	0.3	0.2-0.3K
	М	0.1-0.14	0.1	0.06	@280K
Spatial resolution (Km)		16	16	4-8	4
Planned Launch		2016	2018	2020	2020
Status		R&D	Op.	Op.	R&D
Name		GIIRS 💳	→ GIIRS+	→GIIRS++	
32x4 detector array					e Compatible

GIIRS LO processing by UW-SSEC

- 2.5 hours of preliminary FY-4A GIIRS L1B data received from CMA last summer (20170302 05:58 to 08:15 UTC)
 - Assessments showed relatively large spectral and radiometric artifacts, and unclear on what processing was done, and how, to calibrate the data
- Subsequently received the corresponding LO data, and developed software to read and calibrate the LO data
- Radiometric Calibration
 - Calibration of Earth view data uses adjacent Blackbody & Space views.
 - Predicted Blackbody radiance is Planck radiance at reported BB temperatures (from HTWD text files) for true wavenumber scale
 - Detector nonlinearity correction developed and included.
- Spectral Calibration
 - Spectral calibration is performed separately in LW and M/SW bands based on spectral shifts relative to CrIS
 - Self apodization corrections for square off-axis detectors and Max OPD corrections developed and included
- Geolocation is taken from the CMA L1 product files

Overall Summary

- Calibration of limited FY-4A GIIRS L0 data, and limited comparsons with CrIS, suggest that the R&D "tech demo" has been successful.
- We are anticipating access to more L1B data in the next month or so, and hopefully also more L0 data.



900 cm⁻¹ calibrated Radiance, Imaginary part



Spectral shifts from CrIS match detector geometry



Spectral shifts from CrIS match detector geometry



Noise Performance from CMA L1

Noise Equivalent Radiance (NEdN) for all 128 detectors



Noise performance is quite good for all detectors (normal 16 scan, 22 sec dwell)

Comparisons to CrIS based on matching observations (distance, times, view angles, and scene variability)











