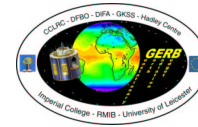


RMIB GERB Processing status

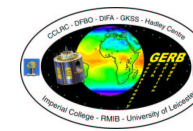
Steven Dewitte

May 14, 2003

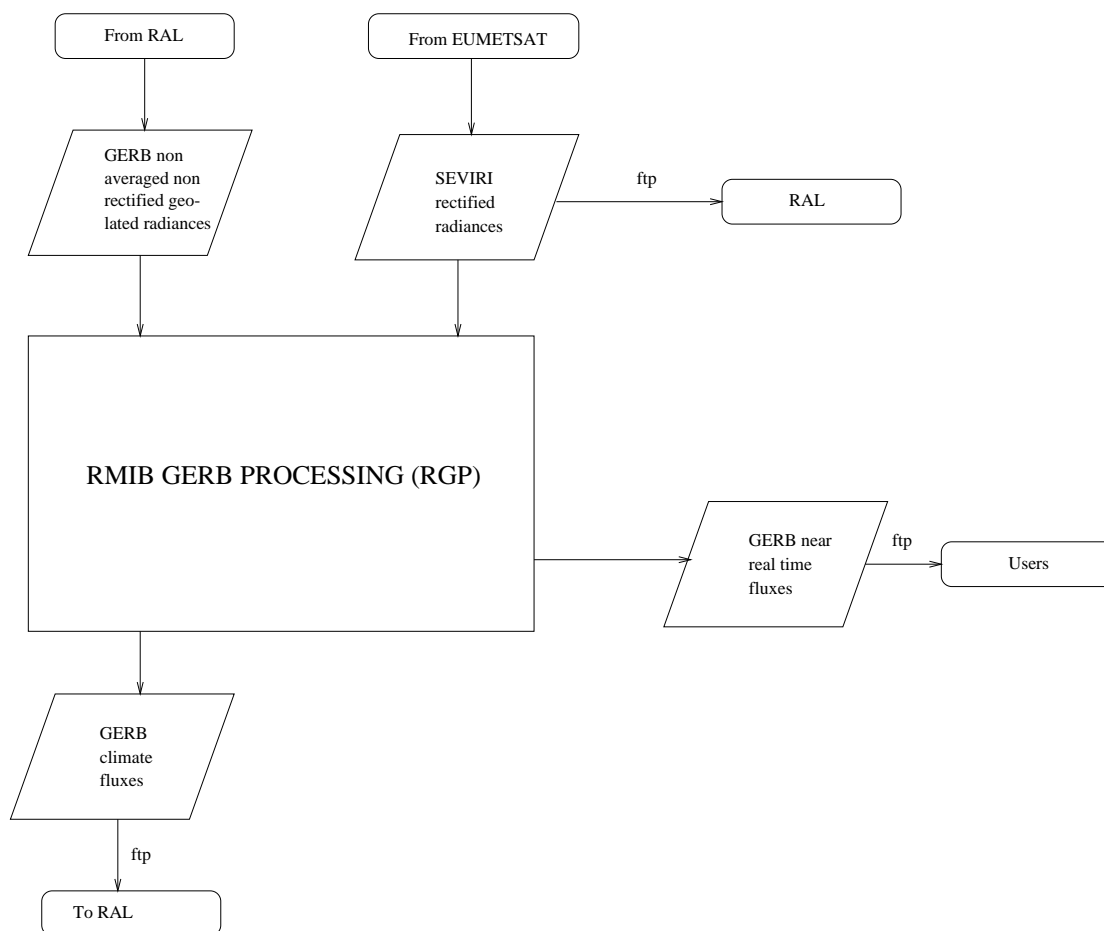


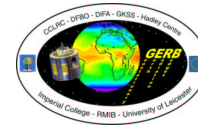
Overview

- RGP Inputs/Outputs
- Processing methodology
- Software status
- Hardware status
- Image sequences
- Unfiltered radiance validation
- Conclusions



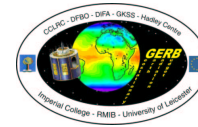
RGP Inputs/Outputs





Inputs

1. Non Averaged Non Rectified Geolocated (NANRG) GERB filtered radiances: from RAL, trough internet connection.
2. imager, currently: METEOSAT rectified images, from EUMETSAT, disseminated trough PDUS system, received at RMIB.
3. in progress: SEVIRI level 1.5 rectified images: from EUMETSAT, disseminated trough LRIT/HRIT system, received at RMIB.



Outputs

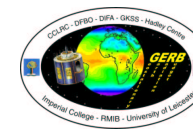
SEVIRI header to RAL.

Unfiltered radiances and fluxes in three formats:

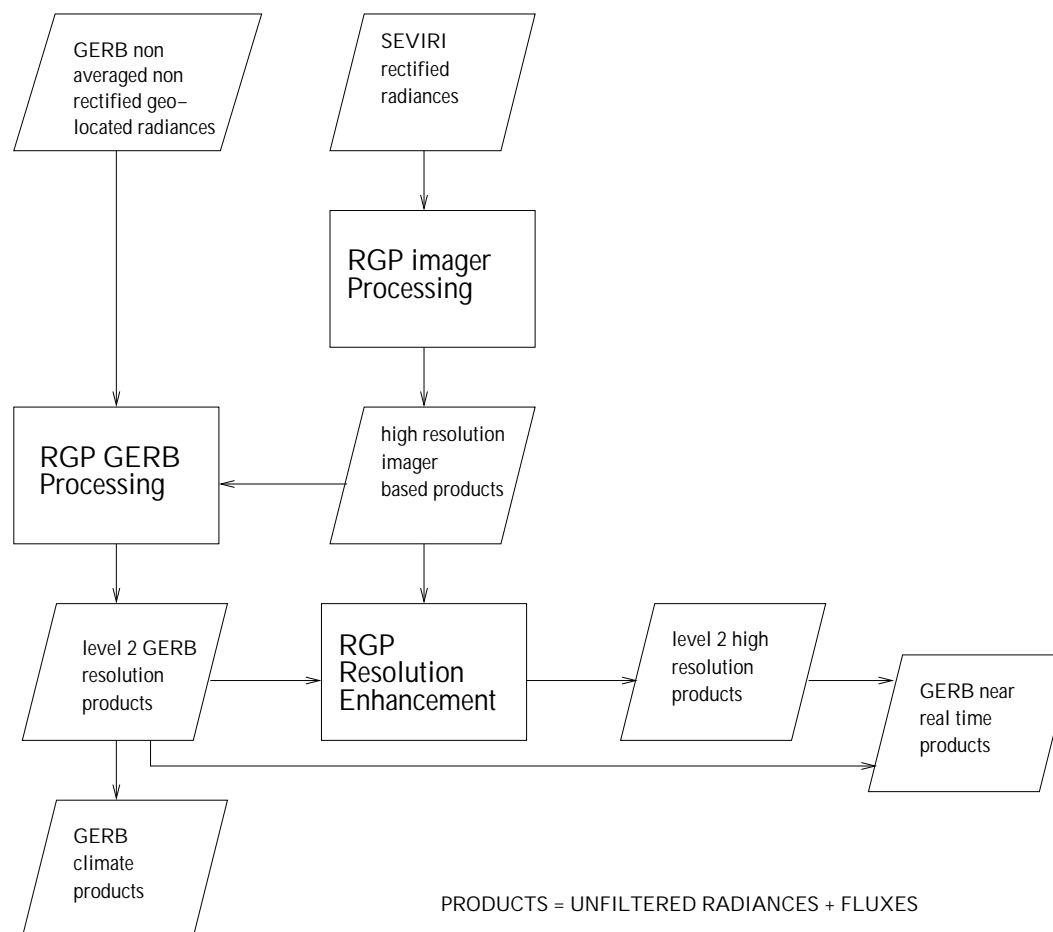
1. to be archived at RAL : ARG (Averaged Rectified Geolocated), average of three consecutive GERB footprints

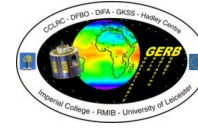
2. Near-real time products available on ROLLS server:
 - BARG (Binned Average Rectified Geolocated): exact 50 km average and exact fifteen minutes average

 - SHI (Standard High Resolution Image): exact 3x3 imager pixel flux, easy for use with imager cloud products



Division in subsystems





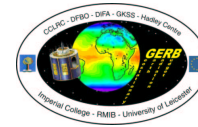
Processing methodology

$$L_{LW,GERB}^f = L_{TOT,GERB}^f - A * L_{SW,GERB}^f \quad (1)$$

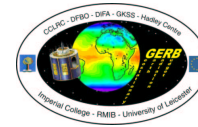
$$L_{GERB/imager}^{uf} = \frac{L_{imager}^{uf} L_{GERB}^f}{L_{imager}^f} \quad (2)$$

$$F_{GERB/imager} = \frac{F_{imager} L_{GERB}^f}{L_{imager}^f} = \frac{F_{imager}}{L_{imager}^{uf}} L_{GERB/imager}^{uf} \quad (3)$$

- Imager Processing: derive L_{imager}^f , L_{imager}^{uf} , F_{imager} at 3x3 imager pixel resolution
- GERB Processing: convert L_{imager}^f , L_{imager}^{uf} , F_{imager} to GERB resolution and derive $L_{GERB/imager}^{uf}$, $F_{GERB/imager}$ at GERB resolution

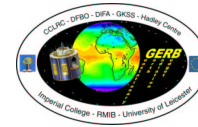


- Resolution Enhancement: derive $L_{GERB/imager}^{uf}$, $F_{GERB/imager}$ at 3x3 imager pixel resolution



Data customisations

1. ARG: averaging 3 consecutive GERB scans, rectification and collection auxiliary data in HDF file
2. BARG: averaging exact 50 km box, averaging exact 15 minutes, and collection auxiliary data in HDF file
3. SHI: 15 minute averaging of $\frac{L_{GERB/SEVIRI}^{uf}}{L_{imager}^{uf}}$, $\frac{F_{GERB/SEVIRI}}{L_{imager}^{uf}}$, multiplication with L_{imager}^{uf} at imager resolution and collection auxiliary data in HDF file



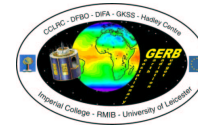
Software Status

Ready

- the complete operational system is running (28/4-9/5/2003)
- NANRG direct unfiltering (without imager) for validation purpose

In progress

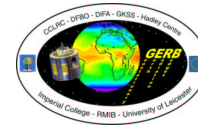
- validation of RGP unfiltering using CERES spectral radiance curves database
- GGSPS geolocation validation by RGP
- validation of GERB unfiltered radiances by comparison with CERES



- validation of our optical depth retrievals using Meteosat-7 and CERES
- communication test with RAL (10 days)

Future

- Validation of GERB processing (needs a good geolocation)
- Transition from METEOSAT to SEVIRI imager
- Obtain NS smear for dynamical PSF calculation
- Validation of RGP fluxes by comparison with CERES



Hardware Status

Ready

optical fibre network between SEVIRI acquisition station and the main computer for GERB processing nearly finished

In progress

- main computer backup installation
- new antenna and PC card for SEVIRI acquisition ordered

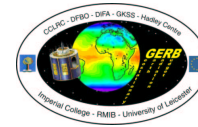
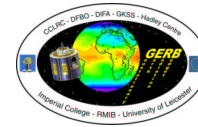


Image sequences

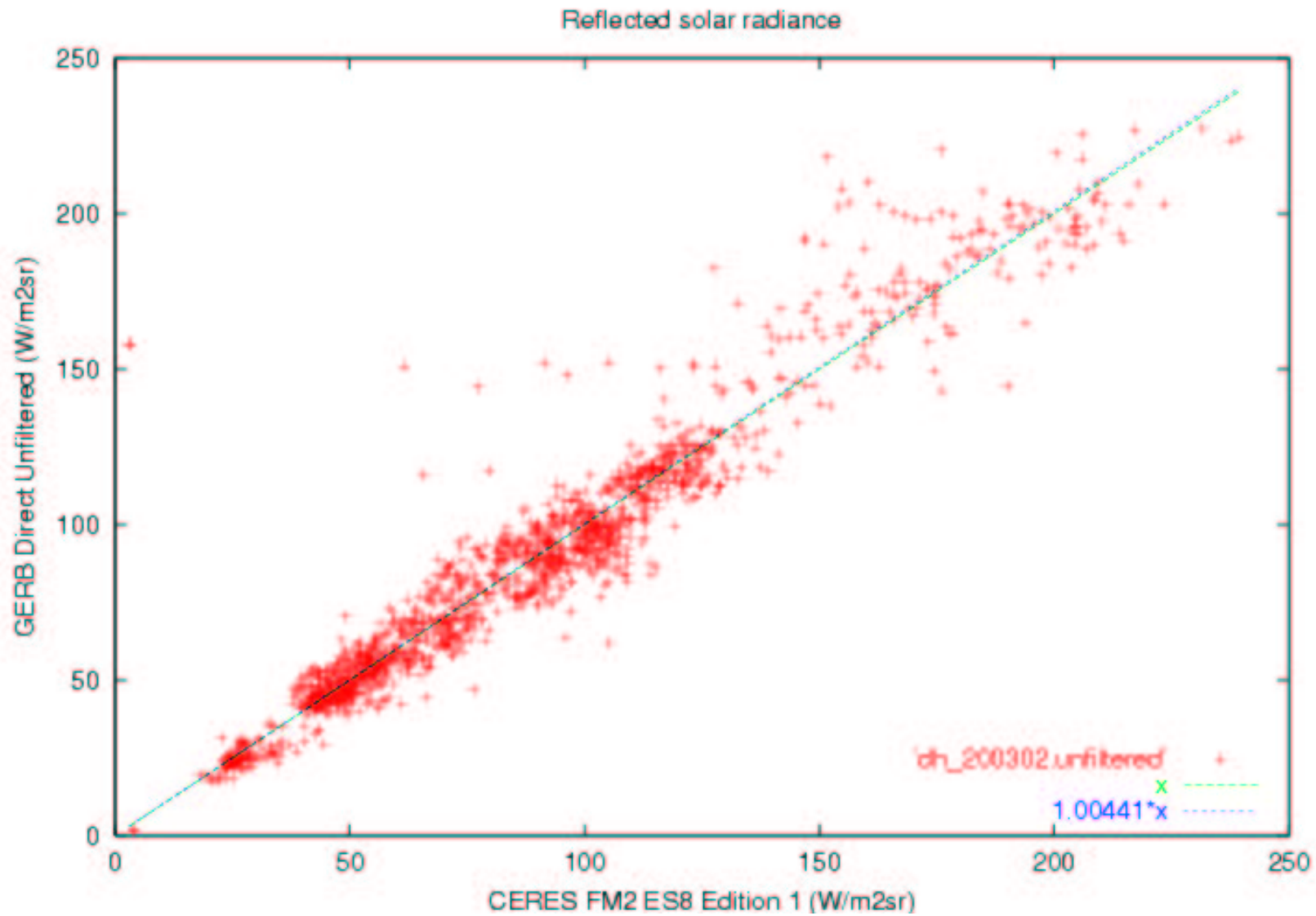
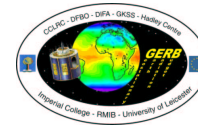
Example input-output Gerb processing 29/4/2003

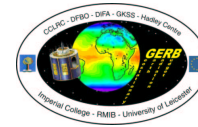
- NANRG filtered radiance input: shortwave and total
- ARG unfiltered radiance output: solar and thermal
- GERB/METEOSAT ratios: shortwave and longwave



Unfiltered radiance validation: reflected solar

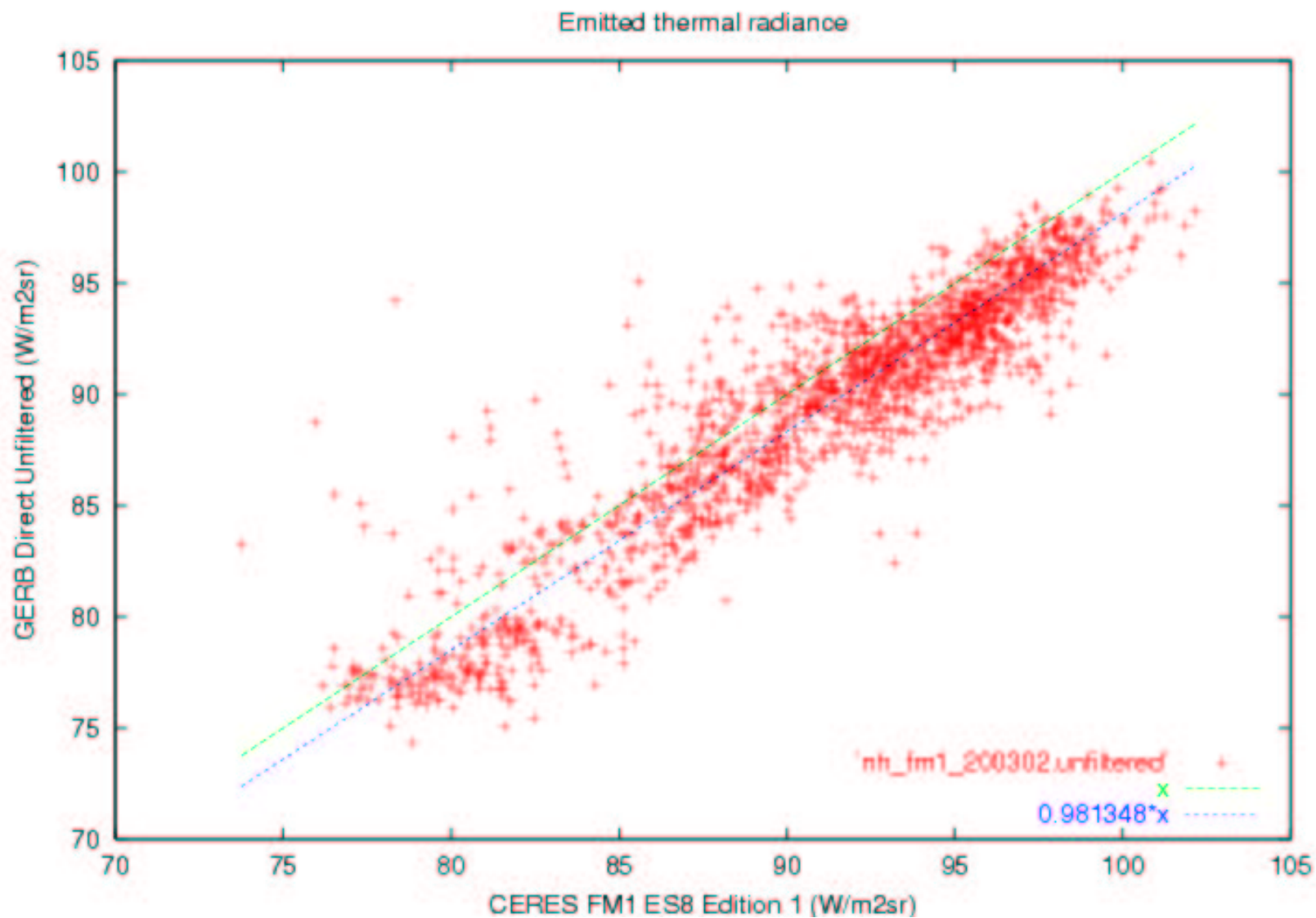
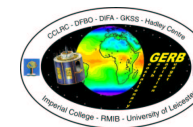
- GERB direct unfiltering: no imager used
- neglect thermal contribution to sw radiance (mean: 0.2 W/m²sr)
- comparison with CERES FM2 in rotating azimuth scan mode
- selection of homogenous GERB scenes: relative max-min < 0.2 over 5x5 GERB pixels

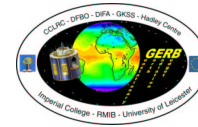




Unfiltered radiance validation: emitted thermal

- GERB direct unfiltering: no imager used
- used at night: total = long wave
- comparison with CERES FM1 in crosstrack scan mode
- selection of homogenous GERB scenes: relative max-min < 0.05 over 5x5 GERB pixels

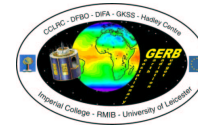




Discussion

The difference of 2 % is larger than the allowed 2×0.5 %. This can be due to

- calibration of filtered radiance
- knowledge of spectral response
- database of spectral distributions (difference between GERB and CERES databases ≤ 0.2 %)



Conclusions

- The GERB/imager is very sensitive to geolocation: stability coastlines, jump geolocation (29 April 2003).
- A better geolocation is needed for the derivation and validation of the SHI and BARG products.
- Thermal radiances can be affected by a stray light problem around midnight (April-May).
- The reflected solar radiance seems to have the required accuracy.
- For the emitted thermal radiance, GERB is currently 2 % lower than CERES.