

GERB-2 Indian Ocean Processing Update

RMI

Johan Moreels, Edward Baudrez, Nicolas Clerboux, Alessandro Ipe

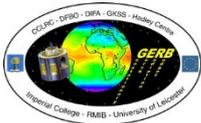
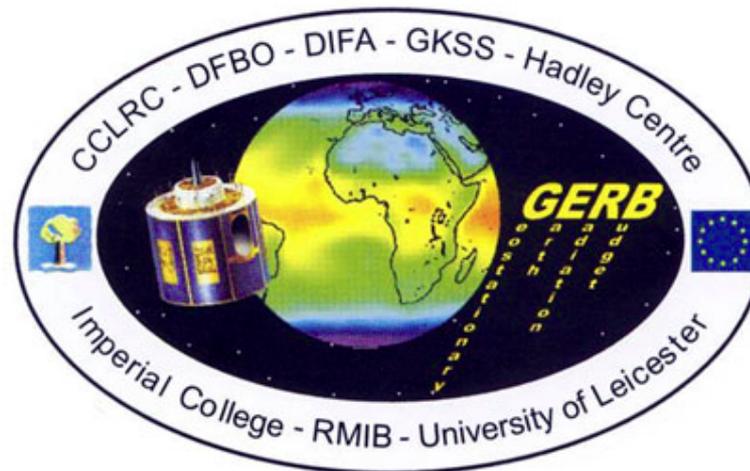
ICL

James Rufus

2018 Earth Radiation Budget Workshop, 10 – 13 Aug, Boulder

email: gerb@oma.be

web pages : <http://gerb.oma.be>

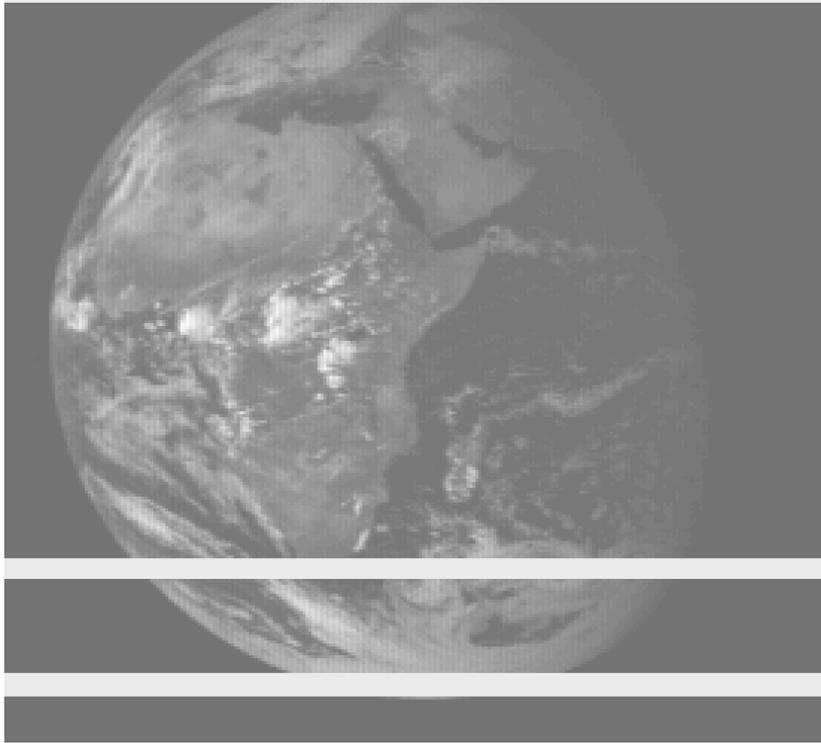


GERB-2 History

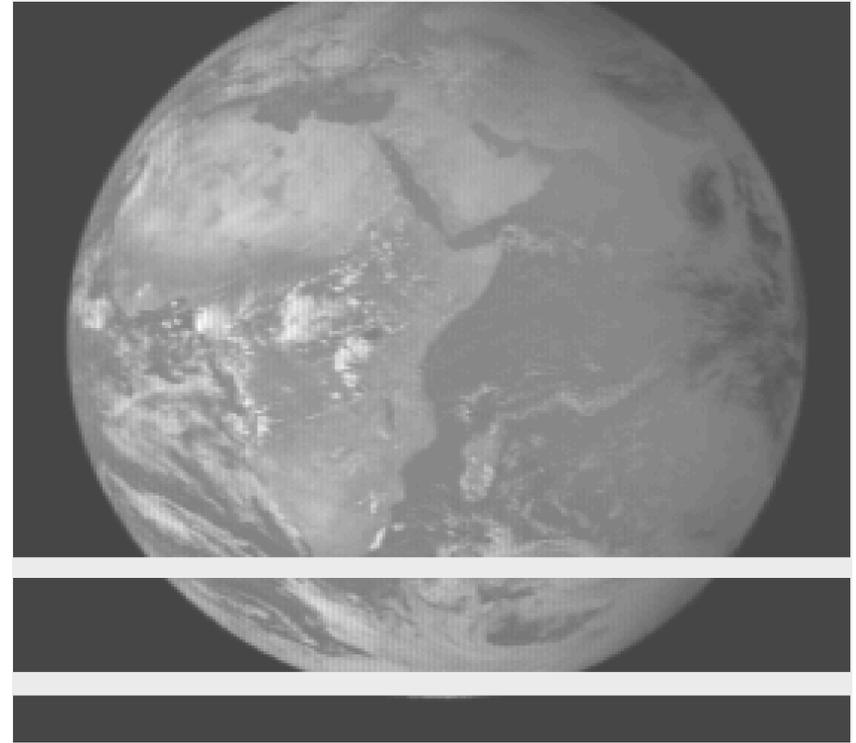
- Meteosat-8 (MSG-1) launched 2002-08-28
- GERB-2 commissioning started Jan-2003
- Started normal operations Feb-2004
- Apr-2007 GERB-1 becomes primary instrument
- May-2007 parallel operation of GERB-1&2 ceased
- Move of MSG-1 to Indian ocean (41.5 E) Jul-2016 -> Sep-2016
[MSG-1 moves to Indian ocean](#)
- Operation GERB-2 over Indian Ocean started 2016-10-26

First GERB-2 image over Indian Ocean

2016-10-26 11:56 UTC (~14:42 local time)

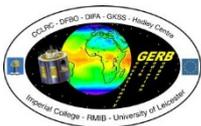


SW



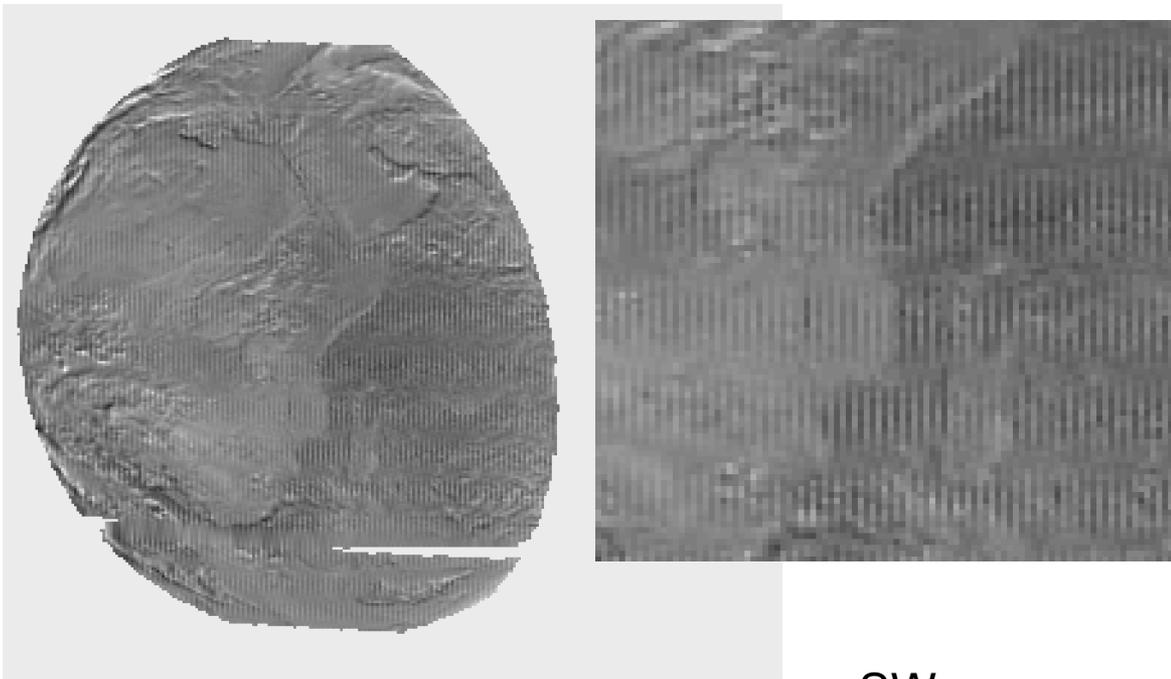
TW

Aging problems



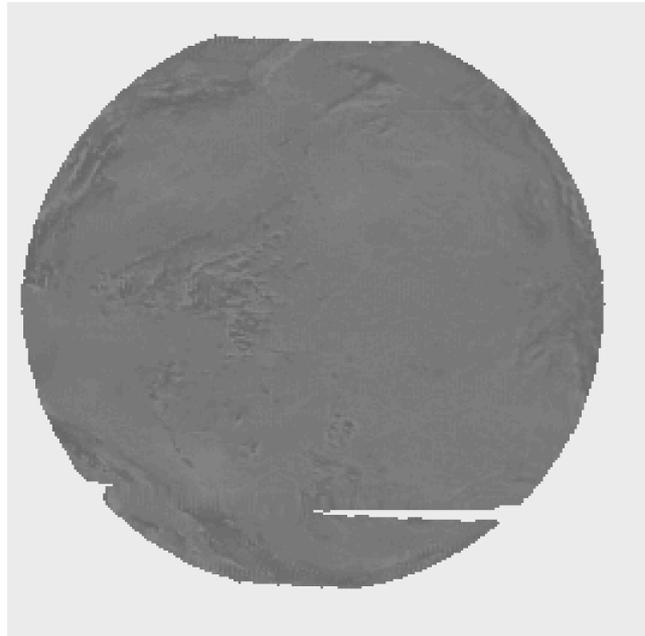
GERB-2 aging problems(1)

- Sensors with reduced output (see previous figures)
->masked out
- Asymmetric aging of the de-spin mirror faces,
wavelength dependent (present in SW and not in LW)



SW

GERB-2 aging problems(2)



LW

- Similar asymmetric mirror response for GERB-3
 - Different origin (parking position (GERB-2), technical problem (GERB-3))
 - Same correction method used

GERB-2 aging problems(3)

- Noise on the Earth Sensor Unit (ESU) timing (TSOL jitter). Affects data taken from mid February to mid August.

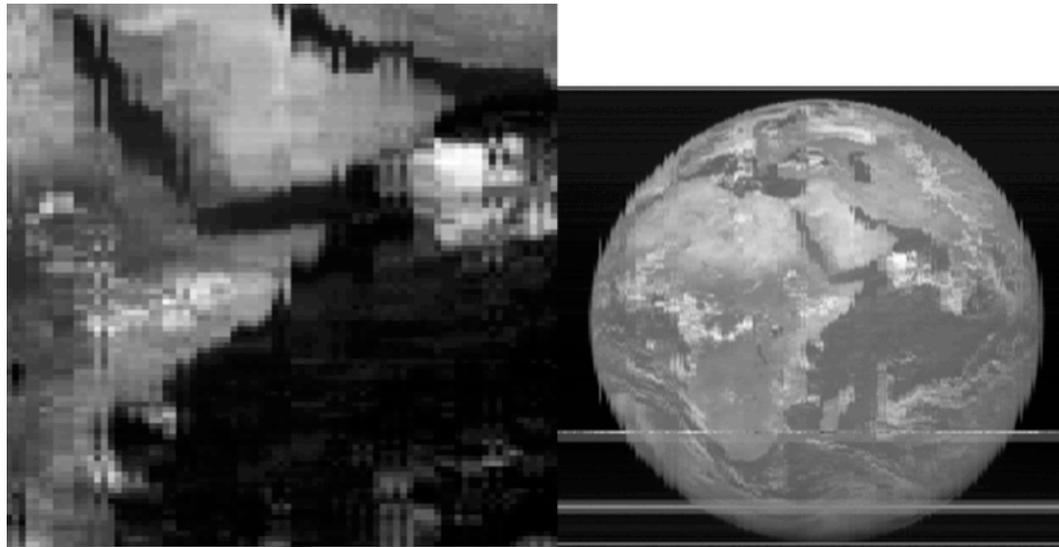
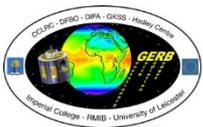


Image: J. Rufus (ICL)

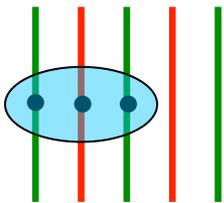
Problem handling



Correcting mirror face difference

- Difference is wavelength dependent: larger at shorter wavelengths
 - SEVIRI lacks blue and UV channels
 - Use SEVIRI to evaluate correction
- Determine correction factor in function of reflectivity:

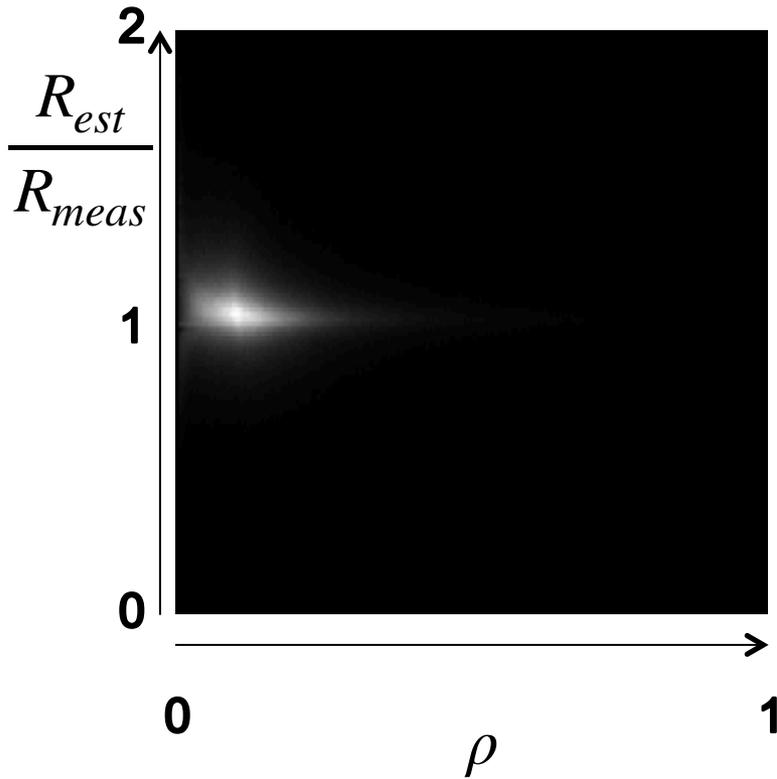
$$\rho_{SW} = \frac{L_{SW} d^2}{L_{sun} \cos \theta_{ZA}}$$



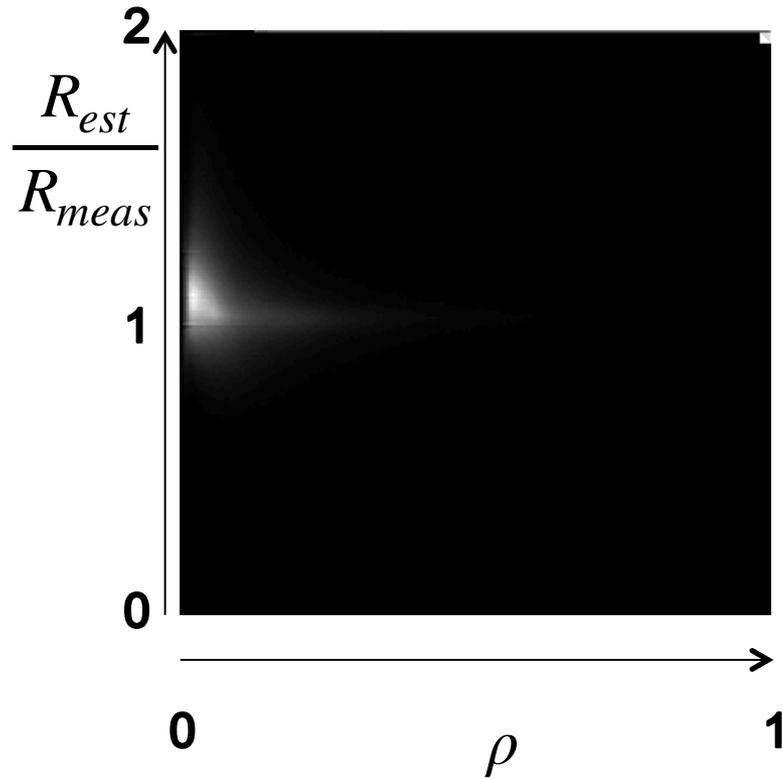
$$R_{est}(k) = \frac{R_{meas}(k-1) + R_{meas}(k+1)}{2}$$

Correcting mirror face difference

Land scenes



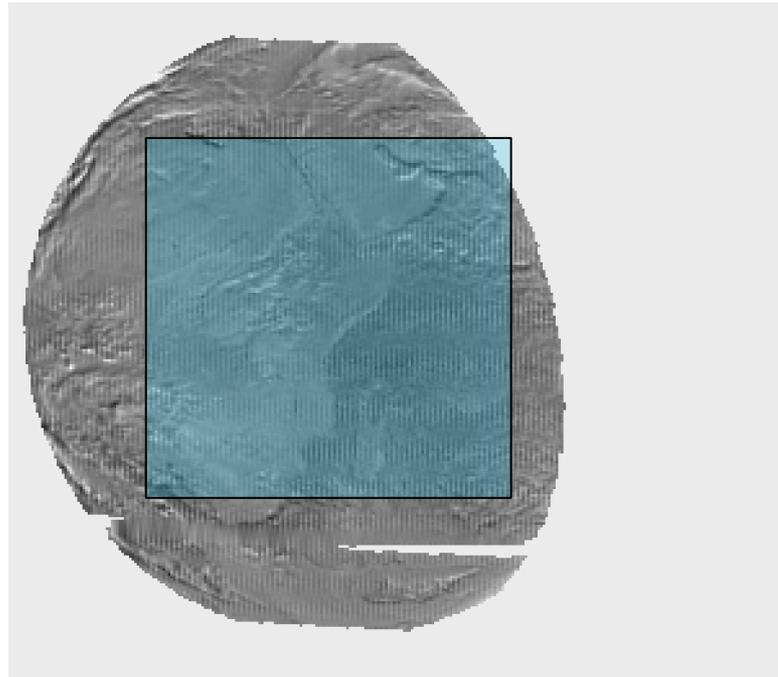
Ocean



- Need separate correction for ocean and land scenes

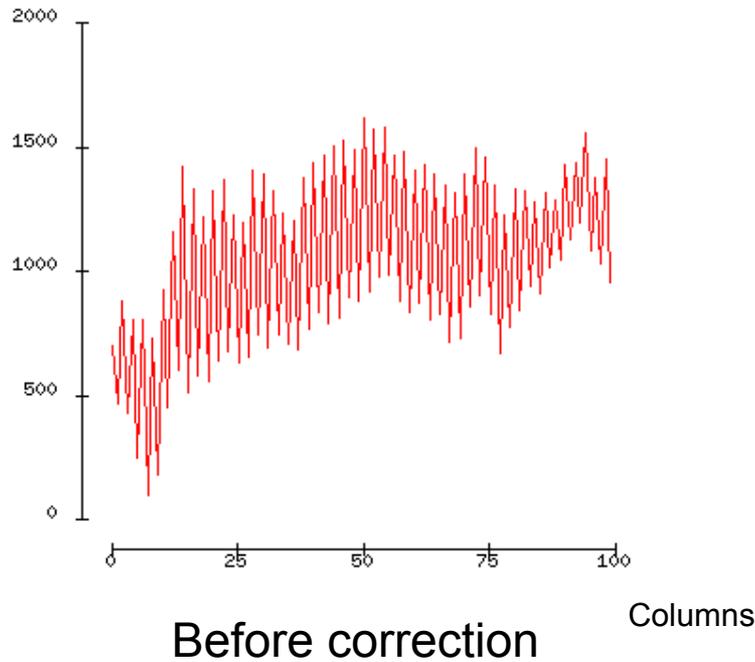
Correcting mirror face difference

- Comparison between GERB and GERB-like (SEVIRI)
- Sum correction factors of 100 vertical pixels (central region) for each column

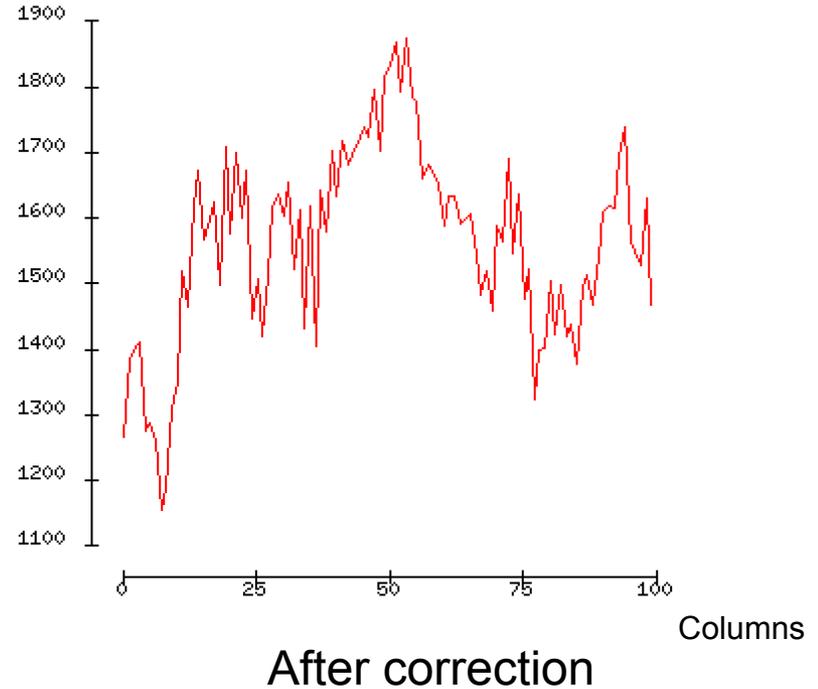


Correcting mirror face difference

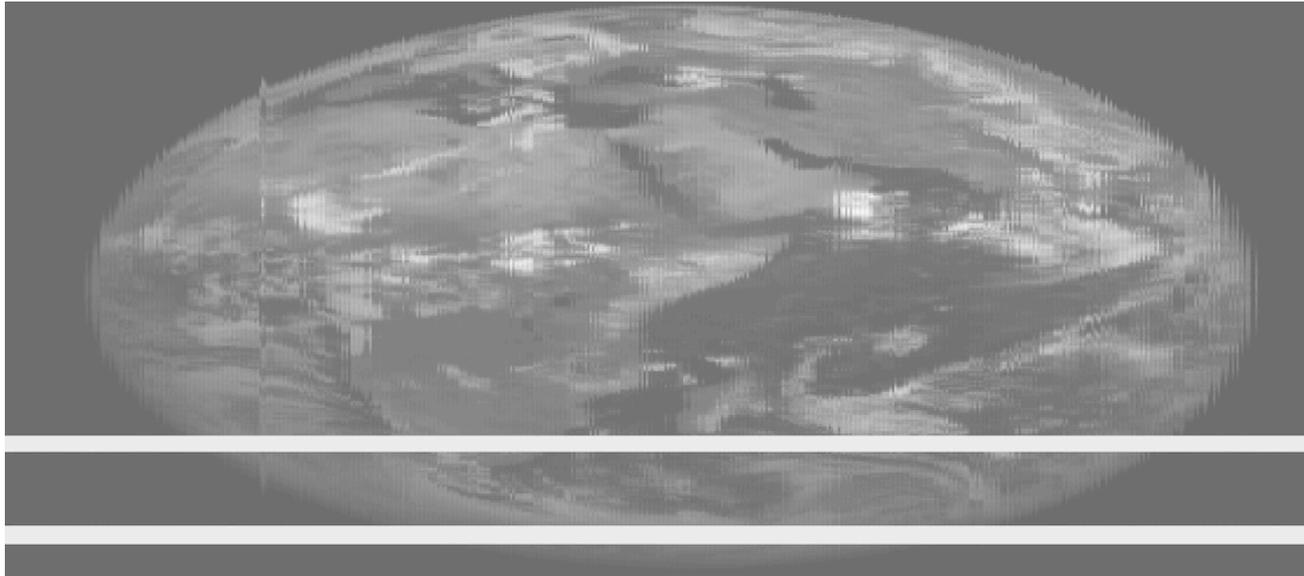
* 0.005 + 1.0



* 0.005 + 1.0



Correcting TSOL jitter



- Avoiding mirror face problem -> double length scan. Normal 282 columns -> 564 columns
- Split image into 2, each containing only columns taken by the same mirror face

Correcting TSOL jitter



Sequentially acquired
(one mirror side only)

Evenly spaced

Inaccurate pointing

Random acquisition

Repositioned

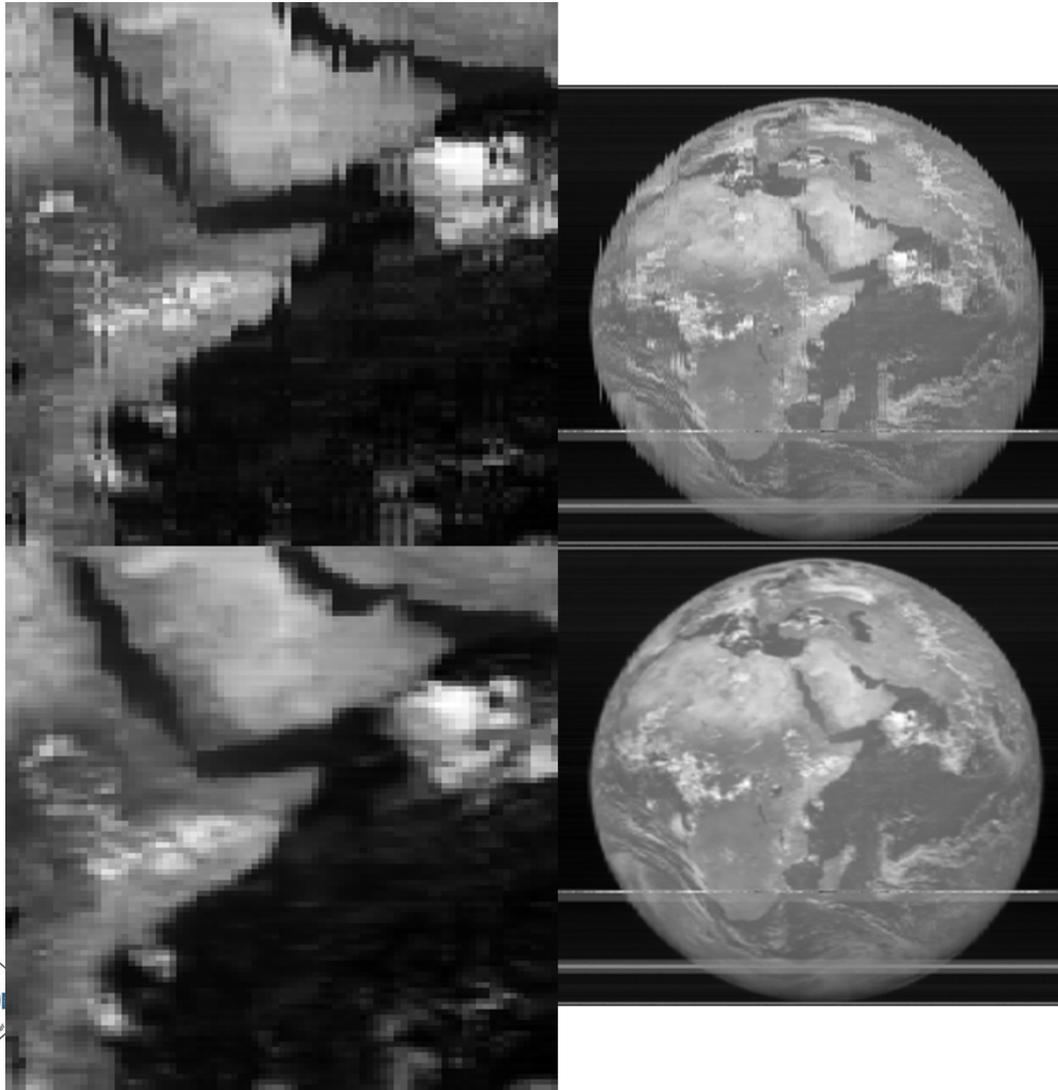
Accurate location

No acquisition time

Regularly gridded

Correcting TSOL jitter

- Noise on the Earth Sensor Unit (ESU)

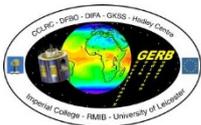


Summary

- GERB-3 data is handled by the regular RGP chain with mirror face correction
- GERB-2 IODC data is handled by the regular RGP chain but ...
- GERB-2 has aging problems
 - Different mirror face response can be handled
 - Bad column location can be handled separately for each mirror face
- Still (considerable?) work to be done to include column corrections in the RGP chain

Thank you for your attention!

Questions?



RMIB GERB Processing (RGP) Overview

RGP Inputs

- GERB level 1.5 from RAL
- SEVIRI level 1.5 from EUM

RGP main steps

- LW separation
- Unfiltering
- Scene identification
- Angular Dependency Models
- Various spatial and temp. processing
 - to combine GERB and SEVIRI
 - tuning of the GERB geolocation
 - resolution enhancement

RGP outputs

- Level 2 solar and thermal fluxes at TOA, in 3 formats:
 - ARG: Averaged Rectified Geolocated (45km, 17', no correction of PSF)
 - BARG : Binned Averaged Rectified Geolocated (45km, 15', PSF corrected)
 - HR : High Resolution (9km, 15', PSF corrected)

