GERB Future Plans

Helen Brindley, Imperial College
Ed 1: BARG release & monthly averages

- Implementation of ‘fill values’ for missing ‘glint’ and ‘twilight’ fluxes and flag field to identify fill values
  - BARG release to include fill values
  - Required step to provide monthly averages – all sky directly derived from filled HR
  - Internal compression of HR – smaller unzipped product
  - Zero night-time SW fluxes
  - Other minor bug corrections
- SW clear sky field derived for ocean as part of filling, extend to enable clear sky monthly average
- Note that plan is also to release GERB HR (with additional cautions)
- DQ summaries and product descriptions required
Contribute GERB products to Obs4MIPs Project (optimise product uptake)

- In discussion with Obs4MIPs team (Waliser): will provide filled BARG at daily/monthly resolution; likely higher temporal resolution if possible within Obs4MIPs constraints

- Requires demand from modelling centres for higher res products (UKMO/Hadley Centre already supportive)

- Processing into required format will be led by RAL GERB team
Product development (priorities from GSAG)

Ed 2: Planned priority updates

- Calibration updates to unify and stabilise calibration through record (requires further studies)
- Aerosol over ocean correction planned implementation (requires testing)
- Improve ocean wind speed ADM selection to use ERA for reprocessing
- Move to effective radiance through record for consistency
- Updated LW radiance to flux developed, tested and awaiting implementation
LW ADM Development (Almudena Velazquez)

- Anisotropic Factors, $R(\theta)$ are estimated from theoretical simulated thermal radiances and fluxes based on ‘split-window’ approach

$$z_1 = BT_{10.8} \quad z_2 = BT_{12.0} - BT_{10.8} \quad a_i = f(\theta)$$

$$R(\theta) = a_0 + a_1 \cdot z_1 + a_2 \cdot z_2 + a_3 \cdot z_1^2 + a_4 \cdot z_1 \cdot z_2 + a_5 \cdot z_2^2$$

- Anisotropy models are developed every 5° in VZA in overlapping bins of 20 Wm$^{-2}$sr$^{-1}$

- A large database of radiances and flux simulations is used:
  - SITS LibRadtran 1.4 database of 12366 scenes (540 clear sky)
  - GERB SBDART database of 2311 scenes (only clear sky)

- Implementation in the EarthCARE BBR LW processor is on going
Product development (priorities from GSAG)

Ed 2: Planned priority updates

- Calibration updates to unify and stabilise calibration through record (requires further studies)
- Aerosol over ocean correction planned implementation (requires testing)
- Improve ocean wind speed ADM selection to use ERA for reprocessing
- Move to effective radiance through record for consistency
- Updated LW radiance to flux developed, tested and awaiting implementation
- Improvements to scene ID (cloud retrieval)
Scene ID (Alessandro Ipe)

New $\rho \rightarrow \tau$ LUTs for SEVIRI 0.6 & 0.8 $\mu$m
- Uses LibRadtran v1.7
- Generated at ECMWF (2-3 weeks instead of 8 months)
- Using 96 streams to avoid bug in Legendre expansion
- $\tau$ values of up to 400
- Parameterized according to surface albedo
- No more negative reflectances!

To Do
- Integrate LUTs in processing code
- Perform comparisons between scene IDs obtained using ED1 and ED2 LUTs
- Validation with CERES cloud products at 3km and every 15min:
  » 4 weeks across 2011 selected: Feb May Aug Nov 1-7
  » awaiting CERES SEVIRI cloud products
  » potential to use Doelling hourly geo clouds instead/initially?
Need to find a solution to fill missing GERB3 period.

- Adjust processing to use MSG3 SEVIRI (0°) with GERB 1 filtered radiances (9.5°E)
  - Provides best link to existing GERB record
  - Risk of failure of G1 increases with time
  - 9.5° viewing difference likely to affect quality of geolocation, effect on unfiltering TBD, radiance to flux needs to be adjusted for