GSICS Collocated Data Sets

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Purpose of the Presentation

Define the inter-calibration process
Identify data needed to perform the analysis
Describe the analysis performed with the data
Identify tools needed to do analysis
Scope the results to be shared

Proposed formats for packaging these data sets for deployment onto the GSICS Data Management Server.
Use these formats as recommendations for discussion towards a consensus on what source data format to use.
Defining the inter-calibration process

Get the Data
Read the Data
Collocate the Data
Transform the Data to allow comparisons
Compare the Data
Analyse results
Develop methods to correct biases in data
Report the findings
Data needed to perform the analysis

Collocation data:
- Orbital predictions
- Specification of collocation criteria (time, space, ...)
- Date/Time & Positions for target collocations

For each pixel of the datasets:
- Pixel index (scan line/element, orbit/granule, etc...)
- Radiances in all channels to be used
- Quality flags
- Either the following values or formulae to calculate:
  - Date/Time
  - Position (Latitude, Longitude)
  - View geometry at surface (azimuth, elevation)
  - Solar geometry at surface (azimuth, elevation) (only 1 of each pair)
Analysis performed with the data

The inter-calibration analysis:
- Collocating observations
- Transforming them to common observation-space
- Defining uncertainty on observations
- Comparing them
- Compiling time series
- Calculating statistics
- Interpreting results
- Reporting findings

As described in previous presentation
What else is needed to do all this?

Tools to calculate collocations
The satellite data! (described above)
Tools to read radiometer data
Tools to transform data
e.g. Spectral convolution, patching, etc.
Documentation describing data formats
Structure for results to be uploaded
Method to alert/distribute results
What are the results?

Collocation algorithms
Spectral correction algorithms
Channel radiance differences
  Mean values & uncertainties
  For every collocated pixel
  Overpass average
  Time series statistics
Re-calibration algorithms
Reports
Recommendations for Source Data Format.

The source data format shall be concise and compact for transfer over the Internet.

A self describing format shall be used to remove the need for accompanying meta-data information.

Ideally the format shall be an established format used in the Meteorological and Space community.

Tools available to support the analysis and processing of this format should be a factor for its selection.
The NetCDF (Network Common Data Form) format fulfils the proposed recommendations for the source data set format.

Benefits of using NetCDF are:

Portable, Accessible, Maintainable.

Incorporation of metadata with the data, reducing possibilities for misinterpreting the data.

Tools like Unidata’s THREDDS Server, IDV and NOAA’s ncBrowse are available for interrogating and visualising this format.
Proposed Source Data Set Format Candidate Continued.

Limitations of the NetCDF Format.

Relative to other formats like BUFR, NetCDF data sets are larger when representing the same data.

Max. 2 gigabytes of data can be stored in a single NetCDF file.

Limited data structures within the format.

There are currently no official conventions that the NetCDF format adheres to for metadata definition.
Who is Using NetCDF?

US Meteorological and Space Organisations.

EUMETSAT.

European Centre for Medium-Range Weather Forecasts (ECMWF).

European Satellite Application Facilities (SAF).
The approach taken to create EUMETSAT's Source Data Format.

Extract from the source data the data fields needed to perform the comparisons.

Structure these fields into the selected source data format.

Present this source data format to users and NetCDF experts for comment. Feedback is taken to evolve the format.

Present these formats here for discussion with the goal of coming to a consensus on whether the source data format fulfil the data management needs of GSICS.
Generic view of the Data Management Server
End of Presentation

Handout showing an example MSG SEVIRI NetCDF Radiance Product.

Handout showing an example EPS IASI NetCDF Radiance Product.

Questions