SCOPE • CM

Sustained Coordinated Processing
of Environmental Satellite Data
for Climate Monitoring

SCM-06: Status Report to EPM-9

Inter-calibration of imager observations from time-series of geostationary satellites (IOGEO)

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EUMETSAT

IOGEO Work plan 2014

SCM-06: Project Plan 2014 (1)

Task	Description	Period	Actors
	WP 0 **Management**		
0.1	Establish contacts with INPE, KMA, and CMA at the upcoming CGMS meeting (CGMS-41 in July 2013)	2013	EUM
0.2	Detail project implementation plan with participating partners. Among others, to include a schematic view of the data flow between the participating space agencies (as requested by the SEP).	2013	ALL
0.3	Define the involved of INPE, KMA, and CMA within this SCOPE-CM-project	Q1	EUM
0.4	Set-up a web application for exchange of project information	Q1	EUM
0.5	Attend quarterly Tele Conferences	Q1 -Q4	ALL
0.6	Contribute to *Progress Report 2014* and *Work Plan 2015*	Q4	ALL
	WP 1 **R & D inter-calibration methods for the infrared (IR) and water vapour (WV) channels**		
1.1	Research the potential of using HIRS on Metop, tied to IASI observations, as reference instrument	Q1	EUM, NOAA
1.2	Contribute to the research on the potential of using HIRS on Metop as reference instrument (WP 1.1)	Q1	JMA

SCM-06: Project Plan 2014 (2)

WP 2 **Modification of the IR and WV inter-calibration approach**			
2.1	Update of the IR and WV inter-calibration approach for the GOES satellites. This activity is performed jointly with JMA and EUMETSAT. The actions are: •to share and discuss inter-calibration methods used within the SCOPE-CM activity on ISCCP reprocessing •to compare inter-calibrated results derived from full resolution data against those derived using sub-sampled ISCCP data •to exchange experiences on settings to be used for selecting simulations overpasses between the monitored and reference instrument, and for applying the double difference approach.	Q2-Q3	NOAA
2.2	Update the IR and WV inter-calibration approach for the METEOSAT satellites in line with the approach proposed by NOAA. This task is performed jointly with JMA and NOAA. The actions are: •to include the useful temporal resolution imagery; •to apply double differencing for inter-calibration; •to tie the HIRS reference to IASI.	Q2-Q3	EUM
2.3	Contribute to the update of the IR and WV inter-calibration approach for the MTSAT satellites in line with the approach proposed by NOAA. This task is performed jointly with NOAA and EUMETSAT.	Q2-Q3	JMA
WP 3 **Implementing and testing the IR & WV inter-calibration approach**			
3.1	Implement the updated IR & WV inter-calibration approach at the participating space agencies;	Q3	EUM, NOAA, JMA
3.2	Prepare test datasets of observations from the geostationary satellites operated by the participating space agencies; (i.e. METEOSAT, GOES, or MTSAT)	Q3	EUM, NOAA, JMA
3.3	Test the updated IR & WV inter-calibration approach on the test datasets;	Q3-Q4	EUM, NOAA, JMA

SCM-06: Project Plan 2014 (3)

WP 4 **Generation of inter-calibrated IR & WV radiances for the GEO satellites;**			
4.1	**Collect data required for the generation of the FCDRs, or the generation of inter-calibration coefficients, for the GEO satellites;** **(i.e. HIRS and IASI reference data, and geostationary satellite data of the satellites operated by the participating space agencies)**	**Q3-Q4**	**EUM, NOAA, JMA**
4.2	**Generation of FCDRs or inter-calibration coefficients for IR & WV radiances from observations from the METEOSAT, GOES, and MTSAT geostationary satellites;**	**Q4**	**EUM, NOAA, JMA**
WP 5 **Free Tropospheric Humidity demonstrator product**			
5.1	**Development and computation of a Free Tropospheric Humidity (FTH) geo-ring demonstrator product for July 2009. The items of this activity are:** **•to define a common reference channel;** **•to compute spectral calibration coefficients.** ***Note: this activity starts in 2013.***	**Q1-Q2**	**DWD**
5.2	**Test the recalibrated WV radiances for the FTH demonstrator product and assess the differences with previously used calibration for the common reference channel.**	**Q4**	**DWD**

SCM-06: Project Procedures

- **Meetings**
  (Side meetings at conferences and/or 2 monthly Tele Conferences)
- **Web interface (e.g via Wiki)**
- **Code and data exchange**
  (Source codes algorithms, "Deep-Dive" Validation Tools , Coding standards, …)
- **Review procedures**
  (Share scientific algorithm procedures)
- **Annual Planning**
  (Annual plans and planning adjustments to be presented to SCOPE-CM secretariat)
- **Progress Reporting**
  (Annually to SCOPE-CM secretariat)

EUMETSAT: Status of activities

- **Identified candidate inter-calibration reference instruments:**
  - *HIRS/2, HIRS/3, HIRS/4, AIRS, IASI*
- **Quantified uncertainty associated with use of HIRS/2, HIRS/3 and HIRS/4 as inter-calibration references for WV and IR channels of MFG and MSG**
  - *Negligible for IR in all cases*
  - *Significant for WV using HIRS/3, HIRS/4 and MSG (~1K)*
- **Developed Simultaneous Nadir Overpass Tool**
  - *Allows fast selection of collocations from GEO-LEO satellites*
  - *Based on 2-D histograms binned to sampling interval of LEO sounder*
  - *Important when re-processing archive datasets*
- **Identified AIRS as a suitable instrument to transfer calibration of HIRS/2 to MetopA/IASI**
  - *Hyperspectral sounder: lower uncertainty introduced in Spectral Band Adjustment*
  - *Bridges period 2000-2007*
  - *Developing method to perform inter-calibration based on GSICS GEO-LEO IR ATBD*

EUMETSAT: Dependencies and Links

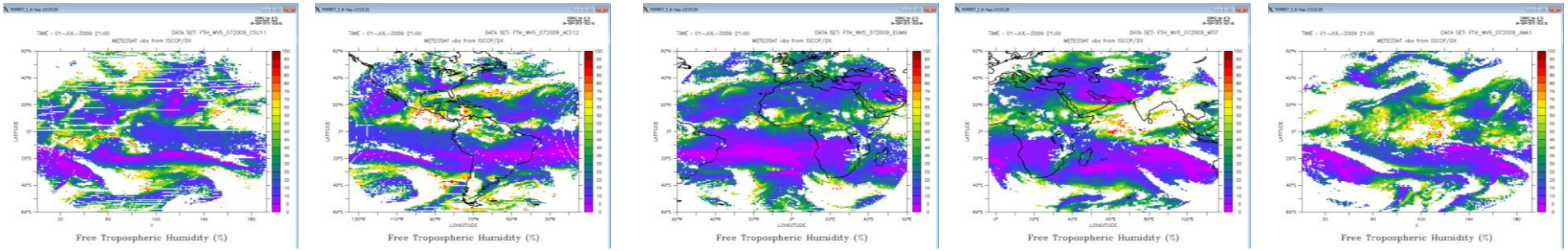
SCM-06: Internal dependencies

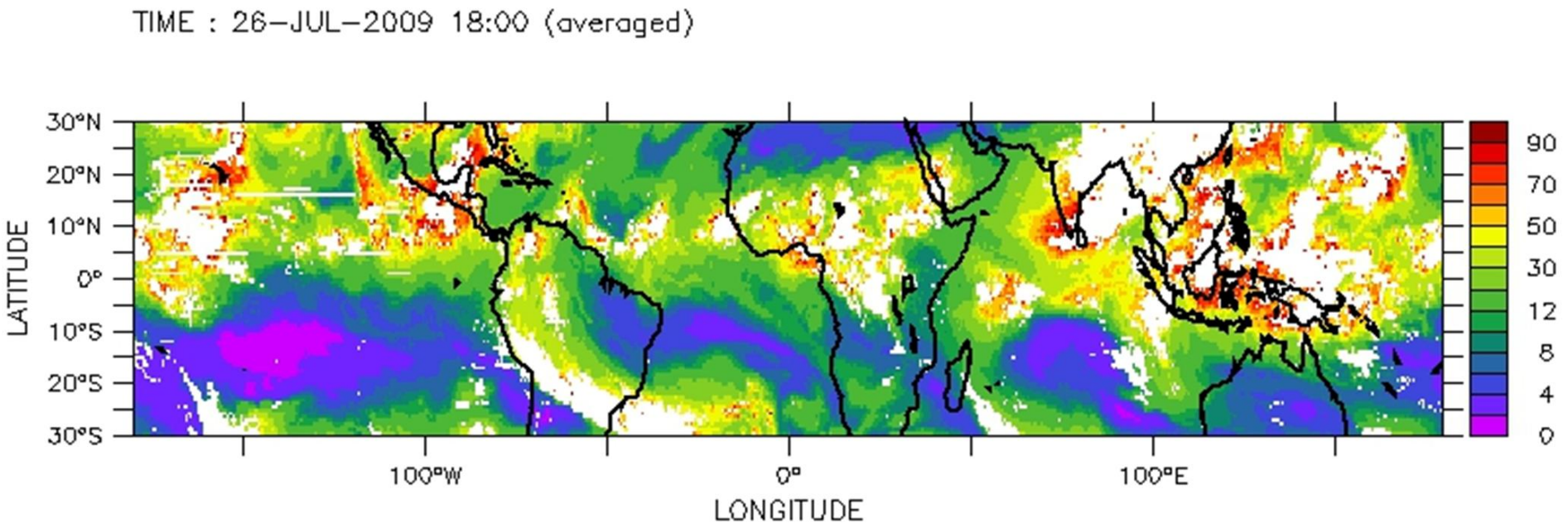
- Provide inter-calibrated WV radiances (or recalibration coefficients) from METEOSAT time-series to DWD (2014-2015)
- Provide inter-calibrated HIRS radiances for selection of channels to DWD (2014-2015)

SCM-06: Links to external projects

- SCOPE-CM Albedo (requires re-calibrated VIS radiances METEOSATs)
- EU QA4ECV (requires re-calibrated VIS radiances METEOSATs)
- SCOPE-CM FCDR (SMHI) (requires inter-calibrated HIRS data record)
- GSICS
  - *Application of GEO-LEO IR inter-calibration ATBD*
  - *Tying FCDR to GSICS reference (MetopA/IASI)*
  - *Developing best practises to define reference instrument*
  - *Developing best practises to define Spectral Band Adjustment Factors*
- Potential link to EU-H2020 projects (e.g. EO-02 call related to re-calibration)

Status DWD: FTH geo-ring (example)





DWD: Activities and Dependencies

Status of Activities:

- Single common reference channel selected
- Comparison against ARSA radiosondes started.
- Recalibration of GOES-11 and GOES-12 ISCCP-DX data.

Dependencies and Links:

SCM-06: Internal dependencies

- Inter-calibrated IR and WV radiances, or recalibration coefficients, GEO ring complete time-series (2014-2015)
- Inter-calibrated IR and WV radiances HIRS (2014-2015)

SCM-06: Links to external projects

- CM SAF
- ESA-CCI

NOAA: Status or activities

NOAA contributes through discussions and collaborations on:

- SNO matchup limits
- Previous NCDC inter calibration of HIRS at NCDC and also from the CDR project
- Visible calibration results
- Comparison of NOAA results against results from other SCM-06 members
- NCDC efforts to produce inter-calibrated product (GridSat-B1)

Discussion

- Is the end result a FCDR of calibrated radiances or a set of correction coefficients?
- Does SCM-06 plan to provide a combined product with better specs than GridSat-B1 (e.g. radiances and/or BTs at pixel resolution, hourly, VZA corrected)?

NOAA: Dependencies and Links

SCM-06: Internal dependencies

- Provide inter-calibrated WV radiances (or recalibration coefficients) from GOES time-series to DWD (2014-2015)

SCM-06: Links to external projects

- SCOPE-CM ISCCP (advices on IR, and VIS inter-calibration)
- SCOPE-CM Albedo (requires re-calibrated VIS radiances for GOES)
- CM SAF (compare WV products CM SAF and NOAA)
- ISCCP (NOAA Project that requires inter-calibrated IR and VIS radiances)

JMA: Activities and Dependencies

Status of Activities:

- JMA will collaborate with EUMETSAT and NOAA on the IR/WV re-calibration, and adopt the method that is developed within SCM-06 (2014-2015)
- JMA will re-calibrate the IR/WV channels of the GMS satellites (planned 2015)
- JMA did much research on using visible calibration methods in combination, and will exchange this information with the members of SCM-06.
- JMAs visiting scientist at EUMETSAT (2014) is the SCM-06 representative. This helps to make the collaboration more effective.

Dependencies and Links:

SCM-06: Internal dependencies

- Provide inter-calibrated WV radiances (or recalibration coefficients) from GMS and MTSAT time-series to DWD (2014-2015)

SCM-06: Links to external projects

- SCOPE-CM Albedo (requires re-calibrated VIS radiances for GMS and MTSAT)

Plans 2014-2015

SCM-06: Project Plan 2015-2016

- **ALL:** To continue development of Meteosat-HIRS inter-calibration based on GSICS methodology.
- **ALL:** To release product version 1 of the inter-calibration coefficients reference to IASI for all MFG MVIRI and SEVIRI IR 6.3µm and 10.8µm image data
- **ALL:** To assess visible channel calibration methods for MFG reprocessing; (Including the development of Replay Mode for SSCC)
- **ALL:** To provide algorithm/tools/products (to be defined) for inter-calibration using the DCC method (by summer 2014)
- **DWD:** To utilize draft version of the IOGEO FCDR (all five satellites, July 2009: clear definition of SRF, BT/radiances, cloud mask and cloud top pressure information) and re-compute FTH.
- **DWD:** To compare new and old version, compare to ARSA and to UTH from HIRS.
- **NOAA:** To do matchups for a test period once calibrated IASI/AIRS/HIRS data are available
- **NOAA:** To compare for all GEOs ISCCP B1 (3hr) against EUMETSAT and JMA results
- Potential tasks which depend on definition of FCDR:
  - *Re-compute spectral conversion coefficients,*
  - *Re-compute regression coefficients,*
  - *Radiance to BT conversion,*
  - *Cloud masking,*

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Thank You

EUMETSAT