

Climate Working Group

Action and recommendations from ITSC-21

Co-Chairs:

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Cheng-Zhi Zou (NOAA)

- Currently **25** Members in the Climate WG Mailing List

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- **18** participants at the meeting

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■ main tasks:

- Discussion on the Climate WG survey (Cheng-Zhi Zou)
- Updating status of all open actions from ITSC-20
- Briefing on NOAA reprocessing of SNPP data (Lihang Zhou)
- Discussion of CGMS HLPP topics relevant for Climate WG

Remaining Actions from ITSC-20

Action Climate-1 from ITSC 20 on WG Co-Chairs

Coordinate the update of the webpage of the Climate WG once the new Content Management System (CMS) is available and the ITWG pages as well as the subgroup pages have been migrated to the new systems.

Status: [ongoing](#)

- The new system is not yet available, CIMSS currently working on redesign of the Center's website (for UW-Madison SSEC), ITWG page will be moved afterwards.
- Since ITSC-20 minor update of Climate WG subpage done. Major change will be done on new system (during 2018). Climate WG chairs will contact group members once new system is available. Webpage will be updated with support from WG members.

Remaining Actions from ITSC-20 – ctd.

Merging of AIRS/IASI/CrIS with Stratospheric Sounding Unit (SSU)
(cimss.ssec.wisc.edu)

Action Climate 5 on Cheng-Zhi Zou

NESDIS to look for possibility to merge AIRS/IASI/CrIS with existing SSU CDR for inter-comparisons with the SSU/AMSU merged products

Status: ongoing

This work needs further funding support. Letter of Intent was submitted. A decision on a possible extension of the NOAA CDR work is pending.

Remaining Actions from ITSC-20 – ctd.

Inter-calibration activities

Action Climate 6 on Rob Roebeling

Provide information to the Climate WG webpage on different inter-calibration activities for Level-1 FCDR data, e.g. HIRS, AMSU, AVHRR, etc.

Status: ongoing

Input provided by Rob Roebeling, which has been distributed to the Climate WG mailing list. Provision of information to the webpage pending the availability of the new CMS (see Action Climate-1).

Actions and Recommendations from ITSC-21

Tied up to ITSC-21 Discussion topics:

Global observing System design: gap analysis and mitigation, support to CDRs, redundancy, role of OSCAR, needs for OSEs & OSSEs

- New mission and instrument specification should take into account the climate community requirements for climate applications (e.g. stability, frequency and radiometry requirements, bias characteristics *etc.*)

Recommendation Climate-1 from ITSC 21 on climate community (including (F)CDR developers): Consolidate and develop the capacity (expertise, forums, techniques, ...) to define the detailed technical requirements for future missions/instruments for climate applications (including climate change detection) & strive to ensure climate requirements are appropriately represented at mission advisory groups.

Recommendation Climate-2 from ITSC 21 on satellite agencies: Ensure that requirements for climate change applications are appropriately represented for new meteorological satellite missions.

Actions and Recommendations from ITSC-21

Global observing System design: gap analysis and mitigation, support to CDRs, redundancy, role of OSCAR, needs for OSEs & OSSEs

- New instrument design needs to take into account the need from the climate community for usage of data for climate applications (e.g. stability, frequency and radiometry requirements, etc.)

Action Climate 1 on Climate WG co-chairs:

Establish how requirements from climate community are collected as input for development of new satellite sensors and provide the information to the group. Establish whether there is a clear role for ITWG-Climate group on definition of climate requirements for new satellite sounding sensors.

Status: open

Actions and Recommendations from ITSC-21

Global observing System design: gap analysis and mitigation, support to CDRs, redundancy, role of OSCAR, needs for OSEs & OSSEs

- The current WMO OSCAR system could serve as point of information on availability of (reprocessed) data

Action Climate 2 on data providers/WMO :

Feed link to data, especially FCDR data, recovered data, information on calibration/ inter-calibration of instruments into OSCAR

(Also add information on Climate WG webpage, with support from team members)

Status: open

Actions and Recommendations from ITSC-21

Data archiving: long term archiving of raw data, incl. documentation and instrument information

- The need for long term archiving of raw data and associated metadata, incl. documentation and instrument information is well known by satellite agencies and data centres. No further recommendation from the Climate WG is needed.

Actions and Recommendations from ITSC-21

Data continuity and consistency: upper stratosphere/lower mesosphere post SSMIS, inter-calibration requirements for climate data records, GSICS

- Good calibration/inter-calibration of satellite data is important for climate applications

SSMIS F-20

Recommendation Climate-3 on Satellite Agencies: Climate WG supports efforts to fly SSMIS F-20 to continue the record of upper stratospheric and mesospheric temperatures for climate applications (including climate change monitoring)

Hyperspectral Sounders

Recommendation Climate-4 on Satellite agencies/CDR developers: Inter-calibration of hyperspectral sounders is needed for climate applications

Recommendation Climate-5: Group supports the establishment of traceability for sensors spanning the electromagnetic spectrum from the microwave to the UV. There had been very effective champions for parts of the spectrum (example visible and IR), while other spectral regions require further support (e.g. microwave, FIR, sub-mm).

Actions and Recommendations from ITSC-21

Data reanalysis: pre-1979 datasets; new instruments; - Reprocessing needs of level 1 radiances for reanalysis and CDR generation

- Beta version of reprocessed ATMS, CrIS, OMPS data are available. Contact Lihang Zhou if interested in the data.
- Reprocessed VIIRS data will become available later

Recommendation Climate-6 from ITSC 21 on Reanalysis Groups: Climate reanalysis developing centers shall continue to evaluate the quality of reprocessed/recalibrated data in advance of major new reanalyses, in order to achieve improved consistency in climate reanalysis products, as reprocessed data are better in terms of consistency and accuracy than operational data

Actions and Recommendations from ITSC-21

Data reanalysis: pre-1979 datasets; new instruments; - Reprocessing needs of level 1 radiances for reanalysis and CDR generation

Action Climate 3 on NESDIS: Make climate reanalysis community aware of the reprocessing efforts for SNPP. Lihang Zhou to forward request within NESDIS

Status: open

Recommendation Climate-7 to FCDR developers: The group encourages those engaged in reprocessing FCDRs to make use of techniques developed by the NWP community, based on analysis of departures, to improve quality assurance of the FCDRs.

Efficient dissemination of hyperspectral IR data (global and DB)

- Group recognizes the importance of efficient access to data for climate studies. As data download from the data providers can become problematic due to the amount of data volume, this could be done via, e.g., hosted processing. Data providers are encouraged to consider the concept of hosted processing.

Actions and Recommendations from ITSC-21

Efficient use of hyperspectral IR data: assimilation of PCs/reconstructed radiances, PCs and CDRs, PC RT models, level 2 products, wind tracing

- Data volume for hyperspectral IR data is huge and efficient access to data is important. An option to select e.g. selected channels or reduced spatial resolution on data provider side is encouraged
- There is a risk that information relevant for climate change monitoring gets lost if using PCs
- E.g., MTG-IRS data might only be distributed to the users as PC--users would have to rely on the PCs.
- **Recommendation Climate-8 on Satellite Data Providers:** Satellite data providers should distribute a set of selected channels in parallel to the PC scores. This way users could reconstruct the radiances and compare the reconstructed channels with the distributed channels and check if PCs are done correctly and get a feeling about the potential information loss

Actions and Recommendations from ITSC-21

Biases: treatment, attribution, constraints

- There are International standards on the definition of key terms (**Guide to the Expression of Uncertainty in Measurement**), data providers are recommended to follow these guidelines, as far as practical and useful. (Noting that this is an area where developments are moving rapidly – due to programmes & projects such as: GSICS, X-CAL, FIDUCEO & GAIA-CLIM, ...)
- NOAA is monitoring SNPP instrument biases by comparing with reference observations as much as possible. Group recommend other agencies to establish online bias monitoring as best practice approach

Recommendation Climate-9 to satellite agencies

Traceable ground calibration and characterization is a **necessary** (but not **sufficient**) condition for traceable, low uncertainty, observations on orbit. All space agencies are encouraged to aim to develop calibration strategies which realize traceability for all pre-launch characterization and on-orbit calibration - with the aim of reducing radiometric biases over the long term for sounding observations.

Actions and Recommendations from ITSC-21

Validation: sharing and joint analysis of results during cal/val phase, validation datasets/reference observations, field campaigns, NWP monitoring and assimilation, calibration, inter-comparison of products (e.g., level 2 hyper-IR)

- GAIA-CLIM produced a set of recommendation that satellite agencies could refer to for more relevant actions on satellite calibration sites. GAIA-CLIM has produced a set of recommendations which form a basis for consideration by satellite agencies to address gaps in the current capability for cal/val of Earth observations for a wide set of ECVs. These recommendations can be found here: <http://www.gaia-clim.eu/page/recommendations>

Recommendation Climate-10 from ITSC 21 : The Climate WG supports free and open data policy and recommends satellite agencies to follow this policy. Satellite agencies should support the reference in-situ observation for cal/val activities, such as GRUAN. The group recommends relevant countries to protect calibration sites even after cal/val campaigns.

Tied up to CGMS HLPP:

3. Enhance the quality of satellite-derived data and Products

3.1 Establish within GSICS a fully consistent calibration of relevant satellite instruments across CGMS agencies, recognizing the importance of collaboration between operational and research CGMS agencies.

Recommendation Climate-11 to satellite providers

GRUAN is important in situ reference to co-locate with satellite observations for cross-calibration for a variety of IR, MW and GPS-RO instruments. Satellite agencies should support the GRUAN operations and maintenance.

Tied up to CGMS HLPP:

5. Cross-cutting issues and new challenges

5.1.4 Perform case studies linking CDRs to societal applications and informed policy decisions

- The atmospheric temperature CDR derived from microwave sounders were used several times in the US Congressional hearing on climate change debate
- Better calibration/inter-calibration of satellite data resulted in satellite CDRs with improved accuracy and reliability for climate change detection, which helps the society to resolve the climate change debate.