

ITWG Climate Working Group

Recommendations and actions

ITSC-18

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Topics from ITSC-18

- Current programs and mission planning
- Data archiving – ensuring the data record
- Cal / Val Activities
- Planned and ongoing analysis
- Strategy for lossy data compression
- Climate Coordination in CGMS
- Did not discuss FOV issues due to lack of time

Current programs and mission planning

Temporal instrument overlap requirements

There is a need to robustly quantify recommendations in GCOS climate monitoring principles on temporal overlaps required when the satellite technology changes. EUMETSAT is planning an overlap requirement for the EPS-SG programme. Current inter-calibration activities represent an opportunity to study needed overlap among sensors.

Action climate 1: Dieter Klaes to distribute the information on the EUMETSAT overlap requirement to the WG.

Recommendation climate 1: Consider a session at next ITSC specifically on analyses of overlap requirements for continuity across changes in platform or technology (e.g. HIRS2/3/4 to AIRS and IASI, SSMI to SSMIS).

Action climate 2: ITWG co-chairs and Climate WG to consider this recommendation when planning the next ITSC.

Current programs and mission planning

Diurnal sampling / Orbital slots

Considering that hyperspectral IR measurements provide ample opportunities of studying the influences of cloud, moisture and lapse rate changes on the radiation budget and thus the climate change, it is strongly recommended to organise the satellite ECT in a fashion that hyperspectral measurements from various satellites can be compositely used for studying the diurnal variations.

Recommendation climate 2: Agencies to explicitly consider the coordinated international phasing of satellites to ensure adequate sampling of the diurnal cycle. This should include the coverage with hyperspectral IR observations in the early morning, mid morning, and afternoon orbits.

Action climate 3: ITWG co-chairs to communicate to CGMS.

Current programs and mission planning might be dropped – no sounding

Diurnal sampling / Orbital slots (cont.)

Sampling the diurnal cycle also requires a complete coverage with geostationary imagery around the globe carrying a minimum set of common channels, e.g., the historically used channels.

Recommendation climate 3: Agencies to assure the geostationary coverage of the Indian ocean and to assure continuity in spectral channels by applying a common channel policy. The planning should become part of the space-based architecture for climate monitoring.

Action climate 3: ITWG co-chairs to communicate to CGMS

Current programs and mission planning

Coordination of polar orbiting satellite launches

Currently, plans for satellite launches are not well coordinated among international agencies. This leads to an increased risk of instrument failures that cannot be recovered easily.

Recommendation climate 4: Agencies to stagger satellite launches into the polar orbit to minimise the risk of instrument failures. The planning should become part of the space-based architecture for climate monitoring.

Action climate 3: ITWG co-chairs to communicate to CGMS.

Current programs and mission planning

Atmospheric Composition for Climate

Vertically resolved ozone measurements were provided by limb sounding instruments. The OMPS limb sounder is also ~~be~~ planned for the JPSS mission because it is needed to provide continuity for ozone profiling in the future. There are indications that in case of budget problems the OMPS mission may not be kept on the JPSS programme.

Recommendation climate 5: To NOAA to maintain the capability of ozone profiling for climate to assure the continuity from the SAGE missions.

Action climate 3: ITWG Co-chairs to communicate to CGMS.

Current programs and mission planning

DMSP satellites

The DMSP follow on program DWWS was recently cancelled endangering the continuity of microwave imaging/sounding in the early morning orbit. DMSP satellites are currently flying in early and mid morning orbit.

Recommendation climate 6: DoD to stretch out the DSMP mission by flying all remaining DMSP satellites in a single orbit.

Action climate 3: ITWG Co chairs to communicate to CGMS.

Current programs and mission planning

DMSP follow on

A microwave imaging capability will be available on EPS-SG maintaining major channels but not low frequency (6.9, 10.65 GHz). The basis (minimum) for DMSP follow on microwave imagers should be the AMSR-2 channel configuration. In addition, SSMIS mesosphere channels are not part of the EPS-SG mission. However, today's level of exploitation of the SSMIS mesosphere channels for climate is currently unknown.

Recommendation climate 7: DMSP follow on satellites should have a configuration very similar to ASMR-2 for the microwave imaging mission to. The sounding mission should maintain the current SSMIS mesosphere channels.

Action climate 3: ITWG Co-chairs to communicate to CGMS.

Current programs and mission planning might be dropped – no sounding

Radiation budget

Current planning sees only one CERES and TSIS instruments covering very important broad band observations of Earth Radiation Budget and the Solar Constant. One of the major shortcomings is the observation of aerosol optical depth. As these observations are highly critical to climate monitoring the risk of gaps and failure is very high. A gap in solar constant observations cannot be recovered , a first opportunity exists in 2013 to fly an engineering model on a US air force satellite.

Recommendation climate 8: Agencies to initiate the development of a contingency concept for Earth Radiation Budget and solar constant observations such as CERES and TSIS. The planning should become part of the space-based architecture for climate monitoring.

Action climate 3: ITWG co-chairs to communicate to CGMS.

Data archiving – ensuring the data record

Archival of prelaunch characterisation and software as documentation

The preservation of prelaunch characterisation of instruments, algorithm software and meta data is rated as very important. Also a further alignment of meta data definitions seems useful to foster the interoperability of archives.

Recommendation climate 9: Agencies to archive and make accessible pre-launch instrument characterisation and algorithm software.

Recommendation climate 10: Agencies to start to think on common definition of meta data content employing CF conventions. This task shall be attached to existing CGMS actions on the interoperability of archives. Agreements shall be applied in GSICS and SCOPE-CM.

Action climate 3: ITWG co-chairs to communicate to CGMS.

Cal / Val Activities

CLARREO type missions

With the postponement of the CLARREO absolute calibration mission and some potential opportunities to fly CLARREO type instruments on the ISS. It is expected that future IR interferometers such IASI-NG will be needed as reference for other instruments in the next decades .

Action climate 4: Jerome Lafeuille to inform Climate WG chairs on future developments on CLARREO.

Recommendation climate 11: The realisation of absolute calibration missions (such as CLARREO) is further supported including flight opportunities on the ISS.

Recommendation climate 12: For future IR instruments planned to be used as calibration reference such as IASI-NG an onboard SI traceability of the calibration needs to be realised.

Action climate 3: ITWG co-chairs to communicate recommendations 11 and 12 to

CGMS

Cal / Val Activities

GRUAN

GRUAN activities have evolved since the last ITSC and in June 2012 a workshop on the extension of the GRUAN network is planned. However, the radiosonde data planned for GRUAN are currently launched at synoptic times which is not optimal for the usage in satellite cal/val activities. In addition the use of ground-based remote sensing instruments to better enable uncertainty studies need to be strengthened.

Recommendation climate 13: To agencies involved in GRUAN to provide and sustain high quality in-situ observations through programs such as GRUAN. It is recommended to consider radiosonde launches matching overpass times of IASI, AIRS, etc. at least four times a month at each station under favourable conditions (clear sky).

Action climate 5: Martin Stengel to communicate recommendation climate y to the GRUAN workshop in June 2012 and report the outcome to the Climate WG.

Cal/Val Activities

TOVS/ATOVS HIRS series

Several activities such as in LMD and CM-SAF are underway to produce CDRs for the TOVS/ATOVS/AIRS/IASI series. All activities rely on the availability of inter-calibrated HIRS radiance data. The inter-calibration of the HIRS radiances referenced to IASI is under study at NOAA STAR and EUMETSAT. The existing activities may need a better coordination to optimise the generation and usage of the HIRS radiance data.

Recommendation 14: Space agencies to continue and strengthen their activities on inter-calibration of the HIRS series in the frameworks of GSICS and SCOPE-CM.

Action 3: ITWG co-chairs to communicate to CGMS.

Planned and ongoing analysis

Data reanalysis: pre-1979 data records

There is an ongoing need to secure, document and provide satellite data records prior to 1979. The European ERA-CLIM project has made an attempt to describe the situation.

Action climate 6: Joerg Schulz to distribute the ERA-CLIM report to the working group.

Recommendation climate 15: To agencies to assess the availability of pre-1979 data records and to make an effort to provide available data records and associated meta data, in particular spectral response functions, to users.

Action climate 3: ITWG co-chairs to communicate to CGMS.

Planned and ongoing analysis

Cloud property CDRs and ESA CCI

The generation of cloud property data records from sounders has been successfully demonstrated at the ITSC (presentations of Kahn, Stubenrauch). The ESA CCI project on the cloud ECV is not considering the use of sounding data. The CM SAF is considering such a record but only using TOVS/ATOVS. Several activities are planned but not necessarily internationally coordinated.

Recommendation 16: CM-SAF to assess if their plans could be adapted to a complete cloud property data record from TOVS to IASI.

Action 7: Martin Stengel to provide information on the CM-SAF plan to the WG.

Recommendation 17: ESA to further consider the use of third party sounding data in the ESA-CCI phase-2.

Action 8: Thierry Phulpin to communicate to ESA-CCI.

Planned and ongoing analysis

IASI Level-2 reprocessing

At ITSC a successful use of IASI reprocessed trace gas retrievals was reported. To better facilitate the climatological analysis of IASI trace gas products a full reprocessing of the IASI Level-2 product is needed.

Recommendation 18: EUMETSAT and NOAA to reprocess IASI level-2 products following the IASI Level-1 reprocessing.

Action 9: Joerg Schulz to communicate recommendation y to EUMETSAT.

Strategy for lossy data compression

PC scores

Due to the large data volumes that can be expected with future sounders such as the MTG-IRS the distribution of Level-1 data for reprocessing may become difficult and inefficient. Currently, no activities exist that are preparing retrieval schemes using PC-scores and thus employing PC score RT. The construction of a PCR CDR, however, seems very difficult when instruments change. To enable the community to further study this issue the following recommendation is made.

Recommendation 19: EUMETSAT and other agencies to produce PC scores along with the Level-1 data reprocessing activities and to conduct applicable studies to better understand the use of PC scores for CDRs and transition to different instruments.

Action 10: Joerg Schulz to communicate to EUMETSAT.

Action 3: ITWG Co-chairs to communicate to CGMS.

Climate Group Administration

ITWG Climate Group

The number of participants in the Climate Working Group was rather small but all participants agree that the group is useful and needed. The next ITSC shall see more dedicated climate talks which should be assured by inviting key presentations early enough. The group needs to improve the presentation of the activities on the ITWG web pages.

Action climate 11: Martin Stengel to assess the status and update the Climate Group web pages.

Action climate 12: ITWG co-chairs and Climate WG lead to invite key notes on the usage of sounders for climate.