2.6 PRODUCTS AND SOFTWARE

Web site: http://cimss.ssec.wisc.edu/itwg/pswg

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2.6.1 Introduction

The scope of the working group covers:

- Both Level 1 and Level 2 satellite products;
- Software tools and packages for generating, analyzing, and visualizing products;
- Enabling end users to obtain or generate the products they need;
- End user feedback and training;
- Exchange of information for validation of products;
- Informing the user community about requirements for future missions; and
- Informing agencies about requirements of the users.

2.6.2 Review of open actions and recommendations from ITSC-21

- **Action PSWG21-2**: KMA and SSEC to come up with a plan to make the GK-2A software available to DB users.
  Hyunjong Oh reported that L2 software (source code) is still at the validation stage. It could be provided to SSEC to wrap up into CSPP. The software relies on level 1B input data; these data can be obtained by ftp on application to KMA (1 party per country). Alternatively, to receive UHRIT the user would need to purchase an antenna system with the L1 software. This is commercial software (Soletop). There may be a licensing fee. An encryption key is needed. Specification and other information is available on the NMSC/KMA web site. Interested users of GK-2A data access and GK-2A L2 algorithm should contact Hyunjong Oh and Hee-Jung Kang respectively.
  The action remains open.

- **Action PSWG21-3**: NCEP to clarify requirements on VIIRS cloud products within the CrIS FOV, and to discuss with the AAPP and CSPP teams the possible implementation in DBNet.
  The discussions have taken place and provision has been made for VIIRS cloud and cluster products in AAPP.
  Therefore, the action is closed. However, NOAA have not yet been able to implement the VIIRS clustering in their products. To facilitate this a new action is proposed:

  Action PSWG-1 on Nigel Atkinson
  To provide Lihang Zhou with information on the VIIRS to CrIS clustering in AAPP.

- **Action PSWG21-4**: Nigel Atkinson to look at the CrIS PC product and compare the implementation with that used for IASI.

The CrIS PCA product is not currently being produced. However, the NUCAPS team has been asked to resume the product generation. It will be available on PDA and CLASS.
The action remains open.

- **Recommendation PSWG21-3 to DB data users**: Any DB data users interested in the provision of software to generate their own wind products should contact the CSPP team to register their interest.
  There is significant interest in generating winds from GOES satellites, and this is planned in CSPP-GEO. However, note that substantial processing resources would be needed. One user (NWS) would like to do the same from Himawari – the feasibility of this is TBD.
  Close the recommendation, as actions are in hand.

- **Recommendation PSWG21-8 to NOAA and the CSPP team**: Support the creation of VIIRS products for nowcasting, similar to the existing MODIS products.
  IMAPP had some nowcasting products but with the end of NASA funding for IMAPP these are no longer supported. There was no strong interest from the group members, but there may be interest from the wider ITWG.

- **Recommendation PSWG21-12 to data users**: Users should note that L2 profile datasets for validation are available from the NPROVS team, and are encouraged to use them.
  This recommendation is still valid. Any users interested in comparing L2 products should contact the NPROVS team.

- **Recommendation PSWG21-18 to researchers involved in L2 studies**: Continue to publish the results of L2 comparisons, particularly those that involve NPROVS, and report to future ITSC meetings.
  Kathy Strabala noted that comparisons of operational products with CSPP products are routinely performed before releasing software. They are different implementations, so expect some differences.

- **Recommendation PSWG21-9 to NOAA**: Where possible, provide historical LUTs that are compatible with the latest version of the CSPP SDR processing software.
  This is an issue that arose in GSICS re-processing work. Most DB users are not involved in re-processing, but some are. Also, there is sometimes a need to re-process L0 data from CLASS. The problem is that LUT formats have changed with time and are not compatible with a single version of the L1 software. However, it is thought that a solution could be found:

  Action PSWG-2 on SSEC (Scott Mindock)
  To work with NOAA to obtain and make available LUTs for VIIRS, ATMS, CrIS.

- **Recommendation PSWG21-10 to NOAA:** Consider improving the CLASS interface to allow scripted retrieval of historic data.
  Nathalie Selbach reported that DWD (within the CM SAF project) have succeeded in doing scripted retrievals from CLASS, for specific cases. But it's not clear that CLASS would support making this method widely available.

Action PSWG-3 on Lihang Zhou
To discuss with the CLASS team whether a scripted retrieval from CLASS can be supported to allow easier access to larger/historic data amounts

NOAA has a 90-day rolling archive of the most recent data available, which does not require retrieval of data from the CLASS archive

Action PSWG-4 on Lihang Zhou
To circulate a link to the NOAA 90-day rolling archive.

- Recommendation PSWG21-11 to CMA: Consider implementing a subscription-based anomaly/event notification service, similar to that provided by NOAA and EUMETSAT.
  It was felt that this recommendation should be widened as it does not only apply to CMA:
  Recommendation PSWG-1 to agencies
  To implement subscription-based notification of anomalies or events that impact users.

Several of the other actions (notably those related to (i) RFI and (ii) provision of source code) are still relevant but it was not felt necessary to explicitly repeat them.

2.6.3 New topics for ITSC-22

Software packages

Maintaining support for old operating systems was discussed. It was noted that CentOS6 will reach end of life in Nov 2020. A package built under CentOS6 will run under CentOS7, but not the other way round. Some organisations will want to upgrade OS sooner than others. CSPP Leo is planning to transition to CentOS7 builds in Jan 2020; Geo in Nov 2020. CSPP prefers to avoid providing multiple versions.

Recommendation PSWG-2 to software providers
To give advance notice of plans for moving to new operating systems. One year is considered reasonable notice.

Users can expect to receive the CSPP SDR 3.2 release in December 2019, which will include polarisation correction for CrIS as well as ATMS updates.

AAPP v8.5 will be released in November 2019. It will consolidate various calibration updates, bug fixes and new ecCodes utilities.

There was interest within the group for use of "containers" such as Singularity or Docker, to reduce problems with external dependencies. Nigel Atkinson reported that some notes from Liam Gumley on Singularity have been recorded in an AAPP "Frequently Asked Questions" page https://www.nwpsaf.eu/site/software/aapp/documentation/aapp-faqs/.

Recommendation PSWG-3 to software providers
We encourage software providers to explore the use of containers for packaging their software.

The group was asked how often is it reasonable to update the various software packages … frequent small updates or infrequent larger ones. In general, having fewer updates is preferred, though it is recognised that sometimes emergency fixes are needed (e.g. if the status of an instrument changes).

Recommendation PSWG-4 to software providers

To avoid frequent package updates. As a guide, not more than twice per year is recommended, excluding patches.

New sensors (recently launched and upcoming satellites)

KMA: A LEO mission is under consideration, starting its development in 2022, if approved. To include an ATMS-like sounder and/or a CrIS-like sounder. Early morning orbit. To include direct broadcast (and accompanying L1 software).

JMA: The GOSAT-2 FO mission, with AMSR-3, was mentioned.

NOAA: Support for Metop-C is already provided, with the exception of their IASI BUFR product which is delayed to 2020 (due to software freeze and migration to new platform). NOAA are planning a demonstration of doing the product generation via the Cloud, for both LEO and GEO. Distribution would still be via PDA.

Both EUMETSAT and SSEC are also looking at making use of cloud processing for certain tasks. EUMETSAT confirmed that their archiving would remain at EUMETSAT.

Although Cloud processing has its attractions, concern was expressed that this could lead to an organisation losing technical expertise, and that product distribution via the cloud may result in high costs for users for data processing and egress.

EUMETSAT reported that IASI L1 and L2 from Metop-C are disseminated via EUMETCast. GIIRS is also disseminated (EUMETCast Terrestrial). The Hybrid approach for IRS PCs was mentioned. Sample data are being provided and User Preparation workshops are about to be held. For test data, the main interest for PSWG is that the format is correct. Also, test datasets of Eigenvectors are needed for MTG-IRS.

Recommendation PSWG-5 to EUMETSAT

To provide a schedule for release of different types of test data for both EPS-SG and MTG.

Processing of EPS-SG direct readout was discussed. Hardware requirements are an important issue: some organisations struggle with resources and connectivity. At present the design of the DB software for EPS-SG is not yet decided, i.e., whether it will be based on the global processor (which is not optimal for the short passes that a DB user typically receives) or on prototype software. Users may need 100 cores, though this may not be so much of a problem in 4 years time as it appears now.

Recommendation PSWG-6 to Agencies

When designing software, keep DB users in mind from the outset in order to minimise costs at the user end.

EUMETSAT are putting a lot of effort into preparations for EPS-SG and MTG. Can any of that effort be used to benefit other missions? Thinking, for example, of data format. On the US side it is probably too early to answer that question.

DBNet

At past ITSCs, the possibility of obtaining DB software for ASCAT L1 processing has been raised. Our understanding is that the software is complex and would not be well-suited to DB processing from a single station because the amount of calibrated data available from a single pass would be small. However, there is still interest in this possibility for remote regions, e.g., Alaska. Dorothée Coppens reported that Stephanie Linow is now in charge of ASCAT at EUMETSAT.

Action PSWG-5 on PSWG co-chairs

To ask EUMETSAT for an update on the feasibility of providing ASCAT processing software to DB users.

Studies on the impact of DBNet are of interest to the PSWG group, but the initiative would probably have to come from the NWP group.

Transition of SNPP CrIS from NSR to FSR in DBNet data: A transition in April 2020 was proposed, which is believed to correspond to the time of withdrawal of NOAA's NSR product. Note that there have been various changes recently in CSPP to reduce the run-time when generating this product, including multiple cores running a string of granules.

Miscellaneous

It was noted that it could also be possible to reduce context requirements for CrIS, by making use of CrIS level 1B NASA software. This is an alternative implementation, involving different averaging of the calibration views.

Recommendation PSWG-7 to CSPP team

To look into reducing the latency and improving the coverage of CrIS products.

In a wider discussion of timeliness, GMI was cited as an excellent example of timely data provision (see plots on the NWP SAF web site at https://www.nwpsaf.eu/site/monitoring/nrt-availability/data-timeliness/). It is believed that a satellite re-broadcast facility is used.

SSEC/UW currently runs AMSR-2 level 1 code. This code is not available to ordinary users from JAXA, but some users would like it (e.g., Alaska NWS).

Recommendation PSWG-8 to JAXA

To consider providing AMSR-2 L1 software for release to the DB community. The CSPP team could host it.

Note that GCOM-W direct broadcast is only active over limited regions of the world, due to the transmitter being shared with the global downlink.

Related to the question of whether an imager is necessary for generation of sounder products, the group had the following recommendation:

Recommendation PSWG-9 to Agencies

Where a sounder and imager are on the same platform, a means should be provided to map the imager data to the sounder fields of view, so that the users have ready access to this information.

RFI on data reception was discussed.

Recommendation PSWG-10

The frequencies used in DB reception (L band and X band) should be preserved, to ensure continued fidelity of downlink reception.

Finally the PSWG web site was discussed. The CIMSS web site is planned to be migrated to Wordpress in the next year. It was agreed that this would form the basis for a new version of the web site, giving co-chairs (and perhaps other members) the ability to edit web pages. Old links (from the days before PSWG) should be made less visible.

Action PSWG-6 on PSWG co-chairs

To update the group web page by next ITSC, assuming Wordpress is implemented by CIMSS as planned.