SWA Proposed Etiquette for SWA Science Data Use

Christopher J Owen
SWA Principal Investigator, UCL/MSSL, c.owen@ucl.ac.uk
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Change in this version: Simplification of user groups in Section 1 to reflect agreement of IS teams on sharing of calibration data

This document sets out suggested guidelines for the use of science data from the 3 SWA sensors on Solar Orbiter, both within the team and for the general public, and before and after the release of data to the general public within 90 days of receipt of the corresponding telemetry packets at UCL/MSSL. It is clear that some framework for use of the data should be set up to foster a collaborative spirit without risking alienating individual researchers and/or SWA sensor teams and/or other instrument teams. This needs to be achieved while allowing some scope for those individuals and teams to capture some recognition for (in some cases) > 20 years past investment of effort in the SWA project, not to mention the forthcoming 10+ years of activity to process to SWA data into science quality data products. This document is not intended to establish hard and fast rules of the road, since there will almost certainly be situations when such rigidity would be inappropriate and counterproductive, and after public release of the data it is anyway likely impossible to police any such rules.

In the event of a situation arising in which it looks like these guidelines cannot be honoured, it is suggested that individuals concerned contact the SWA PI, Prof Christopher J Owen, who will consult with the SWA co-PI group (R. Bruno, S. Livi, P. Louarn – hereafter the SWA PI executive group), on whether any special handling can be agreed.

1 Definition of User Groups for the SWA Operations- and Science-related Data Products

During discussions on data handling and distribution at the SWA team meetings in March 2019 and October 2019, and fed into the SWT meetings in April 2019 and October 2019, the following user groups were broadly recognized as relevant to the operations and science activities with SWA data. Note that it is expected that many members will be in more than one group and/or there will be significant overlaps within the groups:

i) MSSL SWA Operations team members;
ii) SWA Sensor Institution Operations Team Members;
iii) Members of the SOC and those members of the SO science community involved in making VSTP decisions;
iv) Members of the Operations team for other in situ instruments on SO;
v) Original and adopted co-I's of SWA;
vi) General Public

User groups (i) – (v) above are expected to be defined as containing those individuals who are actively involved in processing and preparation of SO data to the highest science quality possible within the 90

days prior to the required public release of the data. Remaining user groups contain those individuals expected to benefit from such effort and who may primarily contribute through purely scientific exploitation of the high-level data products.

Within this etiquette, it is anticipated that post-doctoral researchers and students of an individual falling within the above user group definitions (the key member) will be working closely with this individual and therefore contribute to that user group's activity. They can thus assume the same status as the key member. Given this, it is expected that bona fide members of a particular defined team can share the data products available to them at a particular point in time with their internal team members, postdocs and students. However, it is requested that individuals with membership of more than one user group should consult the PI and the PI executive group before sharing data with members of another user group, or indeed more widely, before that user group acquires access under the guidelines set out below.

Membership of the above-defined user groups will be discussed and agreed within the SWA co-PI group, and where appropriate with the other SO PI's and the project. For the purposes of clarity, it is anticipated that lists of members of the user groups (i) - (vi) will be maintained by the SWA PI and used as the basis of permissions to access data (see next section). This etiquette expects that members can be added and removed from those user groups following proposals for specific need (either short term for e.g. a specific calibration task or science goal, or longer term e.g. to support some data processing function) to be discussed and agreed by the SWA PI executive group.

It is requested that all members of the above user groups respect the guidelines and etiquette associated with their group, as set out in the rest of this document.

2 Data Access

2.1 SWA Data Product Definitions

Broadly for the purposes of this document, we assume that data from all 3 of the SWA sensors (PAS/EAS/HIS) are treated under the same policy. However, it may be that some high level products cannot be derived on the required or desired timescales. SWA will track and inform the affected user groups of such eventualities.

The SWA team broadly defines classes of data according to the following schema:

i) SWA HK/Engineering data;
ii) SWA low-latency data;
iii) SWA level 0 data – raw data as delivered from MOC;
iv) SWA level 1 - uncalibrated, uncompressed L0 data in CDF format;
v) SWA level 2a data – the science products near-immediately produced through automated pipeline;
vi) SWA level 2b data – the science products after anomaly/calibration checking, etc.
vii) SWA level 2c data – the science products that can only be created using calibrated and validated data from another team;
viii) SWA level 2d data – the science products deliverable to public archives after application of external products and human validation – validated science quality data products;

ix) SWA level 3 data – 'value added data products' and data products which cannot be produced without (at least initially) a long run of data (e.g. HIS 'difficult to produce' data products);

2.2 SWA Data Product Availability (Aspirations and Requirements).

Following discussions at its 2019 team meetings and with other IS teams, the SWA executive group set out the following *aspirations* for data availability to the teams defined above:

	MSSL Ops Team	SWA Sensor Ops Team	SOC/ VSTP Team	SO In Situ Instrument Calibration Teams	SWA Co-I	Public Archives
SWA HK/Eng	0 days	0 days	-	-	-	-
SWA LL	0 days	0 days	0 days	0 days	0 days	0 days
SWA L0	0 days	0 days	-	-	-	-
SWA L1	0 days	-	-	-	-	< 90 days
SWA L2a	0 days	0 days	-	3 days	3 days	never
SWA L2b	<30 days	<30 days		<30 days	<30 days	never
SWA L2c	<60 days	<60 days		<60 days	<60 days	never
SWA L2d						= 90 days
SWA L3	Provided as conceived and created, 90 days to archive if it becomes a regular data product					

3 Publication Policy

In general, the justification for continued funding from national agencies (UKSA, ASI, CNES and NASA) of the various SWA operations and data processing efforts will rely on having an accurate record of scientific outputs using SWA data. If we cannot make that justification, the entire community will lose the access to processed SWA data. It is therefore requested that, as the ABSOLUTE MINIMUM, use of SWA data is recognized in the acknowledgements and an e-mail to the SWA PI (c.owen@ucl.ac.uk) is sent to inform the SWA team of the submission and publication of such papers.

However, the preferred baseline is that the SWA team (through the PI, as above) be informed of active paper topics and the preparations of manuscript drafts so that these can be monitored and if necessary coordinated in order to maximize the science output and minimize overlap. This will certainly happen within the SWA team, and we would invite all researchers using SWA data in any form to participate in this. It is not anticipated that the SWA co-PI-executive team will prescribe what topics can and cannot be worked on, but we would, for example, like to preserve space for PhD students to complete their

active research work without more experienced researchers effectively trumping their efforts. The SWA team would inform affected researchers of potential overlaps, and if necessary the SWA co-PI-executive group will attempt to mediate a way forward which respects the aspirations of both parties.

The MSSL Operations team will update and maintain a list of active papers, and completed papers using SWA data will be listed on an open public web page.

It is anticipated that there will be one or more special issues for first results papers. For these papers we request a special level of coordination and that the user groups defined above respect any embargoes that may be put in place by the SO project and/or the relevant journals. The special coordination envisioned here will attempt to allow SWA members within the institutions which have provided SWA hardware to have priority in the event of overlap on topics/papers for those special issues, as recognition for the (in some cases) decades already invested in the SWA project. It is not anticipated that SWA would prevent anyone from contributing a paper, but we request that the subject matter for that paper be discussed with the SWA executive PI group to ensure that everyone gets maximum impact from their efforts.

More generally, we believe that it is appropriate that longstanding efforts by SWA hardware and operations institutes to obtain and process SWA data should be recognized through invitations for co-authorships on papers that benefit from this effort. In the event of doubt, we would prefer researchers to err on the side of being too inclusive instead of not inclusive enough. At a minimum, we would expect that all papers using SWA data led by researchers falling into groups (i)-(vi) defined above papers should invite the PI (Christopher J Owen), together with sensor lead co-PI (EAS – Christopher J Owen, HIS – Stefano Livi, PAS – Philippe Louarn) and DPU co-PI (Roberto Bruno) as appropriate to the SWA dataset(s) used in the research. We would hope that the vast majority of the wider community using SWA data would follow the same policy. In addition, depending on the nature of the research, the SWA PI executive team may recommend to the corresponding author that additional and/or replacement key sensor team members be included in the author list. In such cases we seek only to recognize individuals who may have significantly contributed to the production of relevant data and/or will work with the lead researcher to advise on proper interpretation of the SWA data as necessary.

It is expected that papers produced using SWA data will include the following acknowledgement to the funding agencies that have supported the build and operation of SWA:

Solar Orbiter Solar Wind Analyser (SWA) data are derived from scientific sensors which have been designed and created, and are operated under funding provided in numerous contracts from the UK Space Agency (UKSA, most recently grant ST/T001356/1), the UK Science and Technology Facilities Council (STFC), the Agenzia Spaziale Italiana (ASI), the Centre National d'Etudes Spatiales (CNES, France), the Centre National de la Recherche Scientifique (CNRS, France), the Czech contribution to the ESA PRODEX programme and NASA.

It is expected that any coauthor on any paper whose participation is based on use of SWA data or expertise, will actively participate in, review, and comment on the paper. They will document that they generally agree with the interpretation, results and analysis by reply email to the lead author. If no reply is received from a potential coauthor within a reasonable timeframe requested by the lead author, it is accepted that they should then be removed/replaced from the author list such that there is no blockage

to the paper being submitted. Again, in the event of dispute the SWA PI-executive group will attempt to provide mediation.

4 Coordination of Research Topics

4.1 Coordination of Science Topics within the SWA teams

Active members of the SWA team as a whole will develop ideas for topics and record interests and activities on a centrally maintained list. The list entries should record a short description of the science interest (not much more, say, than a proposed paper title) and the names of individuals who are planning to work on each topic. The purpose of this list is to stimulate synergies and to avoid overlap of efforts while trying to fulfill the science plans outlined in the Solar Orbiter project Science Activity Plan (*https://issues.cosmos.esa.int/solarorbiterwiki/display/SOSP/Solar+Orbiter+detailed+science+objectives)* . This list will be maintained by UCL/MSSL and used to identify joint interests as a group, so that we can maximise the scientific return from our research. As a guideline, we see this list as containing a rolling summary of all priority topics in which SWA team members wish to use SWA data within the next year of the mission. Members of the wider community are invited to participate in this exercise should they wish.

4.2 Coordination of SWA Data Sharing with Other SO Teams and Outside

4.2.1 Early shared data files

SWA acknowledge that it is essential for the development of higher level SWA data products that preliminary versions of some key parameters be made available by other instrument teams. This includes unit vector B and potentials from MAG and RPW respectively. Some SWA parameters are similarly needed by other teams and may also be used for selection of periods for download from the archive. The scheme above accommodates the sharing of such data as critical in achieving data production and maximizing data quality ahead of the 90-day public release. The SWA team do not believe that these shared data should be used ‘as is’ as the basis of scientific publications due to their unverified nature, and moreover that it would be a public relations ‘own-goal’ to be seen to be doing so. However, if these shared data products indicate a scientific result, the SWA team will be open to collaborating on the earliest possible submission with the use of *validated* data.

4.2.2 General coordination

The SWA team accept that there will be occasions (e.g. during SWTs, WGs etc), in which early data sharing within the broader SO community will happen even before data are validated. However, we strongly prefer that any scientific use or publication of SWA data by researchers outside the SWA team be coordinated through the SWA PI and PI executive team, in order that we can work as necessary to furnish validated data for publication purposes and where appropriate recommend appropriate SWA science collaborators and potential coauthors.

More generally, co-I’s of other instrument teams, and indeed members of the wider community, who do not automatically have access to full SWA data before 90 days under this etiquette scheme are always

free to seek to engage in specific collaboration with an SWA co-I should they wish to gain knowledge of SWA observations (e.g. context for their own observations) that may be available from pre-release data.

5 Working Groups

It is anticipated that broader coordination of science using SWA data and other in situ instruments on SO will be undertaken by the ISWG and any subgroups formed under this. Coordination of activities with the remote sensing instruments is anticipated under collaboration between ISWG and RSWG. Topics with particular call or reference to modelling will be coordinated under the MADAWG. Some specific activities may also occur under the remit of the SO-PSP WG or the SO-DKIST working group, and there may be other groups formally recognized by the project as the mission progresses. The SWA PI executive group recognizes and endorses such WGs and will endeavor to collaborate within them in a way that respects the baseline etiquette set out above. In particular, the SWA co-PI executive group undertakes to nominate members for specific collaborations and to share expertise, for example to explain data use and instrument behavior, and coordinate and de-conflict analysis projects and results.