



**JNCC Report
No. 668**

**Workshop Report: Monitoring Soil Moisture with Earth Observation
for the
Caroline Herschel Framework Partnership Agreement for Copernicus User
Uptake (Work Package Three)**

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1 Context

The JNCC's (Joint Nature Conservation Committee) 'Caroline Herschel Framework Partnership Agreement for Copernicus User Uptake' project aims to increase UK downstream environmental Copernicus applications through upskilling and cross border collaboration. This includes delivery of a thematic workshop aiming to introduce potential users to the Copernicus Soil Water Index (SWI) and Surface Soil Moisture (SSM) products, their validation, access and use. This report provides the summary statistics and feedback on the success of the workshop.

2 Format and Presentations

The workshop was held online over two afternoons on the 14th and 15th July 2020. It comprised a mixture of presentations, question and answer sessions, and a collaboration session.

2.1 Presentations

Day one was introduced and hosted by Dr Gwawr Jones, Senior Earth Observation Specialist at JNCC. The keynote presentation 'Satellite-based Soil Moisture Data within the Copernicus Global Land Service' was delivered by Dr Bernhard Bauer-Marschallinger (TU Wien, Vienna University of Technology, Austria), the lead author of the Copernicus SSM and SWI documentation. This was an introduction to the products themselves followed by a lengthy 'Ask the Expert' session and further presentations by Dr Bauer-Marschallinger detailing the validation and ground truthing of the data as well as a session on accessing and using the data.

Day two was introduced and hosted by Lynn Heeley, Technical Project Manager at JNCC and comprised a second presentation on validation and ground truthing: 'Copernicus in Situ and COSMOS-UK' delivered by Matthew Fry (UKCEH) and three case studies that have used the SSM and/or SWI products. These were 'Open Big Data and Precision Agriculture in the Agrosat Project' by Riccardo Dainelli (IBE-CNR, the Institute of BioEconomy), Drought Impact on Coffee Plantations and Biodiversity on both sides of the Pacific Ocean by Fernando Roque (Quantic Statistics, Guatemala) and Soil Moisture Data use for Environmental Monitoring in Romania by Anisoara Irimescu (National Meteorological Administration, Romania).

The presentations were recorded and made available on JNCC's YouTube channel¹ (those from Dr Bauer-Marschallinger were made available for two weeks only) and additionally, these and the presentation slides were made available to download as pdfs from the JNCC Resource hub².

2.2 Collaboration Session

The final hour of the workshop, on day two, was dedicated to collaborating with other attendees in three themed 'rooms' through posting questions, problems, comments and suggestions to one another. The themes were: Discuss Methods and Data; Discuss

¹ https://www.youtube.com/channel/UC14QLVv3QA1Xu6Fjdn7GJnw/videos?disable_polymer=1

² <https://hub.jncc.gov.uk/assets/50b31a33-a058-4bb2-99f4-da303a662da8>

Applications and Use Cases; Discuss Future Project Ideas. Many 'conversations' were initiated, and email addresses shared.

3 Statistics

The participant information and interactions were analysed in several ways. This section provides the results of these and covers participant attendance and interactivity through the statistics around questions, the collaboration session, downloads and social media activity.

3.1 Participant statistics

In total there were 177 people who registered for the workshop from 23 different countries. Overall, the total number of participants across both days was 151 from 22 countries (which translates roughly to an 85% attendance rate). On day one there were a maximum of 140 from 18 countries and on day two there were a maximum of 126 participants from 18 countries.

3.1.1 Sector analysis

Overall, there were participants from 78 different organisations who attended. These were attributed to different sectors which can be seen in Figure 1. In summary the largest percentage of the participants (44%) were from Government or public bodies with the next largest sectors (16% each) being academic and commercial.

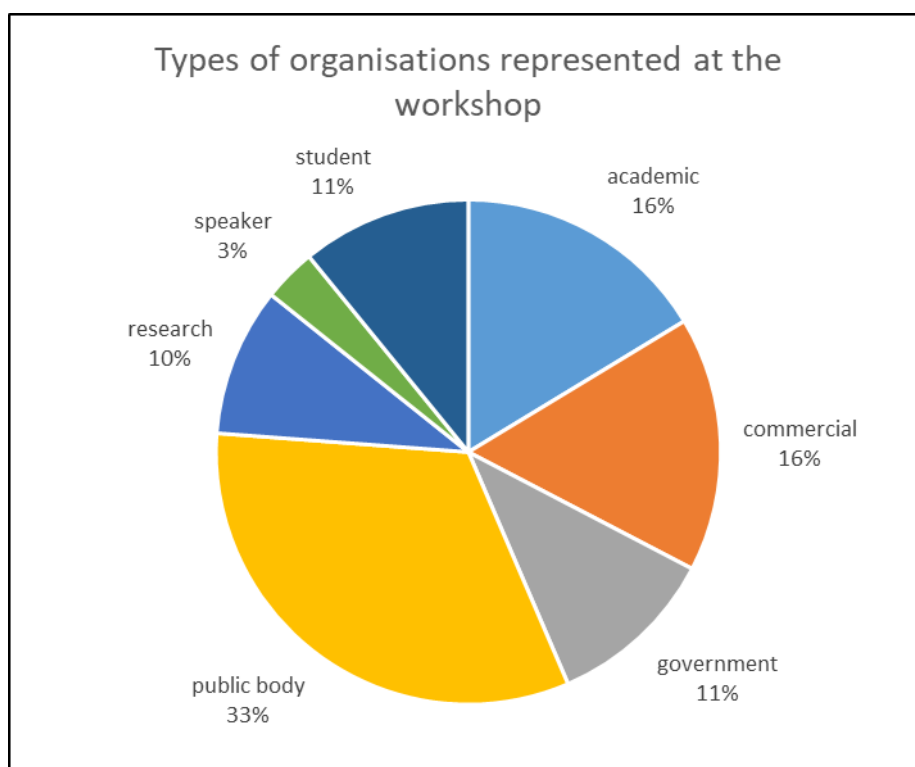


Figure 1. Pie chart showing the sectors from which the participants joined. This was determined by the organisation type.

3.1.2 Global reach

Participants attended from 22 different countries. This global reach can be seen on the map in Figure 2. Although, as expected the majority of participants were UK based, almost one-third of participants attended from outside the United Kingdom. See Appendix 1 for a text list of countries included.

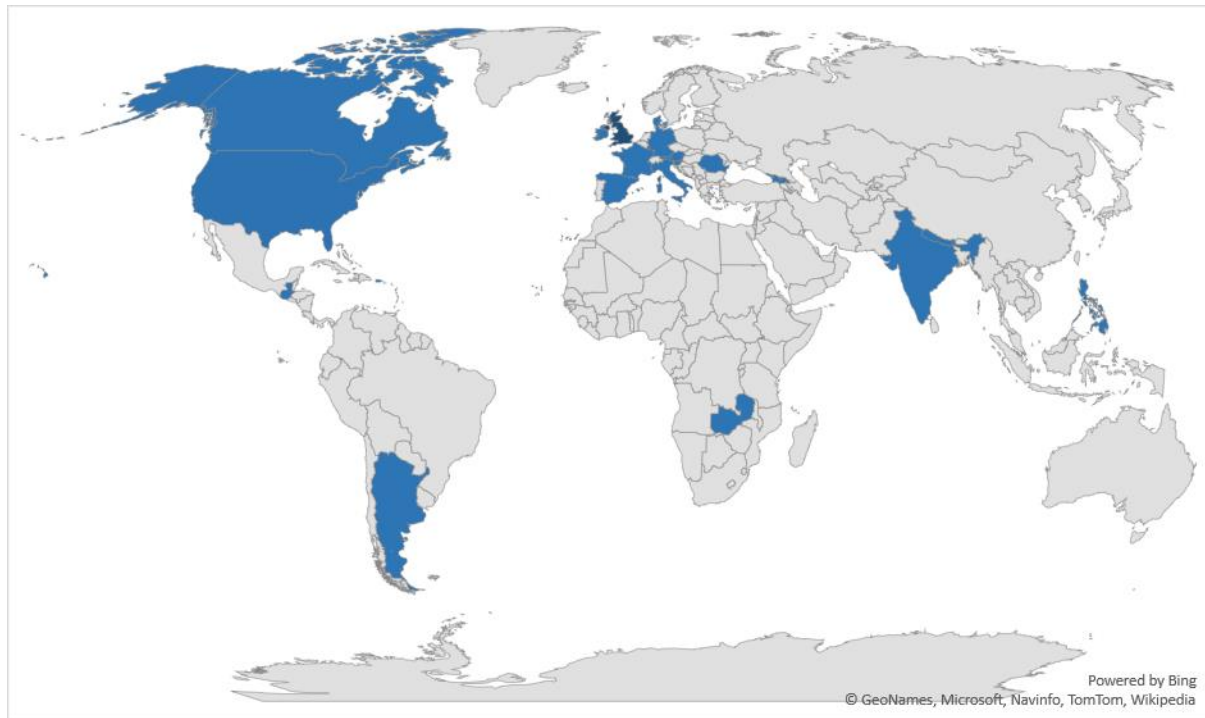


Figure 2. Map, highlighting in blue, the countries from which participants attended.

3.2 Question & Answer Session statistics

Participants were encouraged to ask questions using a piece of software (MeetingPulse³) that also allowed them to upvote other people's questions. This resulted in a total of 225 "upvotes and therefore reduced duplication as well as helping to ensure the most popular questions got answered. Seventy-three different questions were asked and all but one were answered – 47 on day one and 26 on day two. The feedback indicated that some participants had wanted to further clarify a question or provide a follow up question which had not been possible with this format and something to consider for future events.

3.3 Collaboration Session statistics

Three themed collaboration spaces were set out using MeetingSphere⁴. The discussion themes were: methods and data, applications and use cases, and future project ideas. Thirty-eight participants took active part in the typed conversations and posted a total of 166 posts across the three discussions, many exchanging email addresses. Interestingly a large number of participants posted in only one of the three discussion spaces, whilst twelve people took active part in two conversations and four people in all three. Although the collaboration space was left open for two weeks after the event, the vast majority of the

³ <https://meet.ps/>

⁴ <https://www.meetingsphere.com/meetingsphere-collaborative-meeting-solutions>

posts were posted during the event. The following sub-sections provide a little more detail for each of the three themed collaboration spaces.

3.3.1 Discussion on methods and data

The main topics of conversations on methods and data were peatland, wildfire risk, monitoring of archaeological landscapes, and monitoring water use and leakage issues. The success measures from this session are:

- 18 people took part;
- 9 separate conversations started;
- 12 contacts for further collaboration made.

3.3.2 Discussion on applications and use cases

The main topics of conversations on applications and use cases were peatland research, archaeology, catchment-wide water usage/abstraction, and flow calculations. The success measures from this session are:

- 18 people took part;
- 13 separate conversations started;
- 10 contacts for further collaboration made.

3.3.3 Discussion on future project ideas

Five of the discussions on future project ideas were extensive, providing useful information and leads to the participants. The main topics of conversation were ground truthing, spatial resolution, analysis, post-processing of data, and how to cope with high levels of moisture in the analysis. The success measures from this session are:

- 23 people took part;
- 10 separate conversations started.

3.3.4 Collaboration Session Summary

At least 22 new connections where attendees shared their contact details were made during the collaboration session, and we are aware of further discussions set up since. Many of these collaborations involved overseas attendees, highlighting the benefits of the international aspect of the workshop.

3.4 Download statistics

After the event, the recordings of the presentations were made available on JNCC's YouTube channel⁵ (for Day 1 this was limited to a period of two weeks with the exception of the introduction). The participants were emailed links to the slide presentations and a news item⁶, posted on 20th July, further advertised these (45 unique views of this article occurred by 2nd August). Table 1 shows the number of YouTube views for each item between 17th July and 2nd August and Table 2 shows the number of pdf downloads of the slides over the same period.

⁵ https://www.youtube.com/channel/UC14QLVv3QA1Xu6Fjd7GJnw/videos?disable_polymer=1

⁶ <https://jncc.gov.uk/news/monitoring-soil-moisture-using-earth-observation>

Table 1. The number of YouTube views for each presentation between 17th July and 2nd August.

Session	YouTube views
Day 1 Introduction	53
Day 1 Introduction to Copernicus SSM and SWI products	46
Day 1 Ask the Expert Q&A	41
Day 1 Validation and ground truthing part 1, Access and Use	18
Day 2 Validation and ground truthing part 2	22
Day 2 Case studies on practical applications	14
Total YouTube views	194

Table 2. The number of pdf downloads of the slides between 17th July and 2nd August.

Session	Slide downloads
Day 1 Introduction	22
Day 1 Copernicus SSM and SWI products, and validation part 1	38
Day 1 Validation and ground truthing part 2	29
Day 2 Case study on the AgroSat project	25
Day 2 Case study on drought impact on coffee plantations	21
Day 2 Case study on soil moisture data in environmental monitoring	23
Total downloads	158

3.5 Social media statistics

JNCC activity on social media during the event resulted in the following engagement on Twitter (Table 3), Facebook (Table 4) and LinkedIn (Table 5):

Table 3. Twitter statistics between 17th July and 2nd August.

Total engagements	Use of #	Retweet	Link clicks	Likes
344	11	25	25	41

Table 4. Facebook statistics between 17th July and 2nd August.

	Number of tweets	Reached	Engaged	Liked	Comments
Day 1	4	756	31	23	1
Day 2	4	623	23	21	0
Video/presentations	1	226	10	8	0
Round up #	1	141	3	3	0

Table 5. LinkedIn statistics between 17th July and 2nd August.

	Impressions	Clicks	Reach	Comments	Shares
Day 1	1,737	10	6	1	1
Day 2	3,283	24	28	0	0
Post/recording	1,198	7	10	0	3

4 Feedback

Twenty-six people filled in the feedback survey and overall people were very happy with the event. People were particularly appreciative of the unrushed feel to the event with in-depth presentations and long question and answer sessions. There were some small niggles in relation to the tech used to deliver the event, but those were pointed out in an understanding manner appreciating that the root was limitations of the tech beyond organisers' control.

4.1 Questionnaire results

Nine questions were presented in the feedback questionnaire and participants rated these on a whether they agreed or found it useful on a scale of 0 (not at all useful) to 10 (extremely useful). The results can be seen in Figure 3.

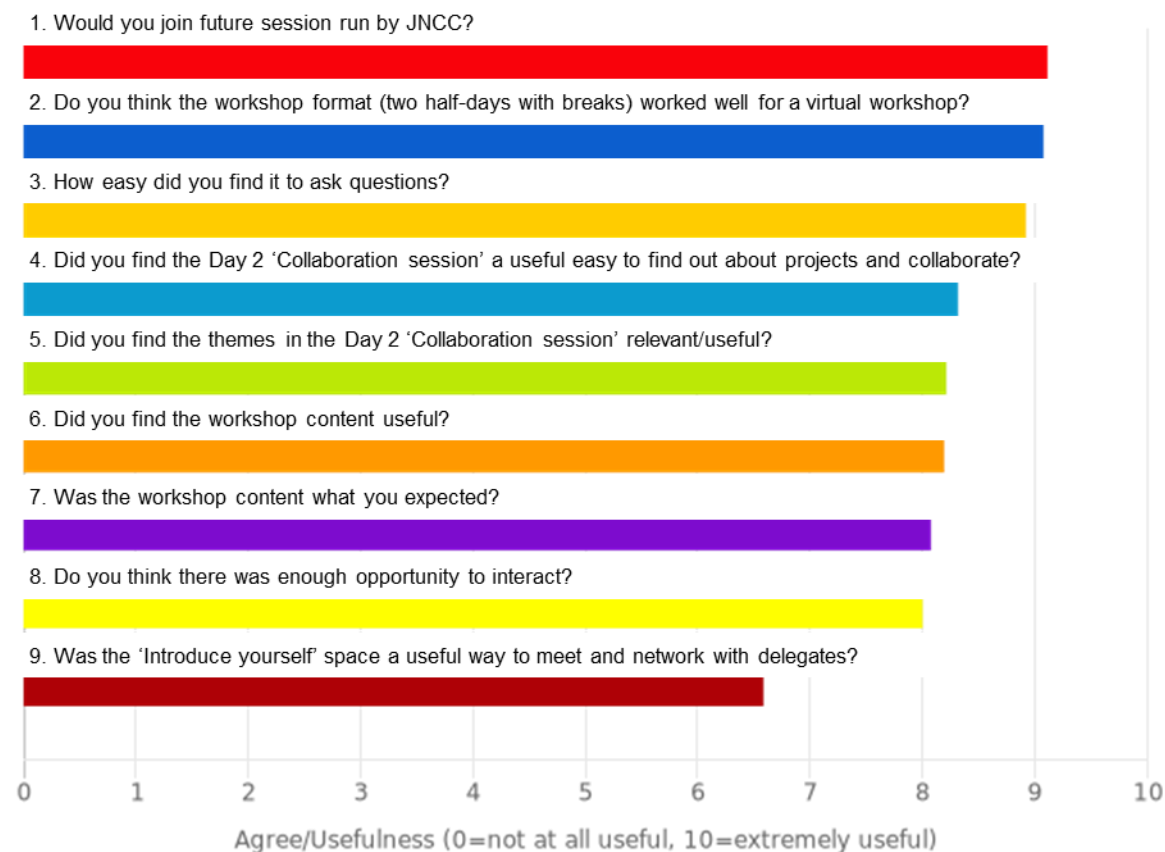


Figure 3. Average rating score per question for 26 participants. The scale was from 1-10 (1 being not useful at all, 10 being extremely useful).

4.2 Other Comments

Other comments left in the feedback space included:

“Really great to have a good long question and answer session, particularly with Bernhard, often lacking with these online workshops.”

“I really valued yesterday’s presentation from Bernhard he went into the soil moisture products in a great deal of depth. It was really great to be able to hear him reply to in-depth questions and to ask questions too. I wish more workshops did this rather than lots of short presentations. I think Day 2 was good also especially the first presentation which is directly relevant to delegates from the UK.”

“Thanks to all of the organisers and presenters for a really useful and interesting workshop. One issue with the format, is that although it’s very easy to ask questions, doing this via an intermediary means that it’s not possible to follow up with clarifications etc. There were a few questions where the key point was lost in the transfer, and perhaps in translation (e.g. reliability of data was discussed as existence of data etc). However, I’m not sure I have a solution to this, as your system was very efficient, and allowing people to ask questions individually could be chaotic and time consuming.”

“I found the workshop very useful overall and the collaboration space was great. One minor irritation, which I suspect is beyond your control, is the fact that if someone

added new content whilst you're in the middle of typing, your screen scrolls away to the end."

"Great that you split it across two afternoons I thought that worked really well, it was nice that it didn't feel rushed like it can do with lots of smaller presentations. Well done with the collaboration space I only dipped into it but saw that it was very busy with comments and connecting going on!"

5 Conclusions

The Monitoring Soil Moisture using Earth Observation Workshop was highly successful in terms of both content and delivery. The technology, format and agenda chosen (in order to achieve the necessity of delivering the workshop online), worked well and resulted in a high calibre of speakers and global engagement meaning that we have reached far more potential users than if we had held the workshop face-to-face. The availability of the slides and videos after the event also means that the material will reach an even wider audience with a potential increase in user uptake for the Copernicus SSM and SWI products. This workshop has exceeded all aims and results indicators as stated in the original Copernicus User Uptake Project Action.

Appendix 1

The countries from which the participants originated can be seen in Table 6.

Table 6. List of countries from where participants originated.

Country	Number of participants
UK	107
USA	8
Spain	5
Austria	4
Romania	3
Canada	2
Eire	2
Nepal	2
Argentina	1
Denmark	1
France	1
Georgia	1
Germany	1
Guatemala	1
India	1
Italy	1
Luxembourg	1
Malta	1
Philippines	1
Puerto Rico	1
Slovenia	1
Zambia	1
unknown	4