

IEEE P4005 Working Group
Teleconference 4th Meeting Minutes
3rd of December 2020
WG Chair: Eyal Ben-Dor
WG Vice Chair: Sabine Chabrilat
WG Secretary: Konstantinos Karyotis

1. Call to Order & Opening Remarks
 - a. *The meeting was called to order by the Chair at 15:00(CET). He gave his welcome and opening remarks.*
2. Roll Call and Affiliation
 - a. *. There were 53 participants at the 4th meeting. Their names and affiliations are listed at the end of the minutes. The participants attended the meeting are from Brazil, USA, Europe, Australia, Middle East, Africa and Asia. All participants declared their presence by sharing their full name and affiliation through the group chat and by completing the circulated presence-sheet, that was cross-checked through the Webex participant's reporting.*
3. Quorum establishment
 - a. *Quorum was established at the start of the meeting with 41 voting members. At the kick-off meeting, voting membership was established with 48 members.*
4. Approval of agenda
 - a. *The Chair presented the meeting agenda and called for a motion to approve.*
 - i. *Motion moved by Konstantinos Karyotis*
 - ii. *Seconded by*
 - iii. *Motion passed unanimously*
5. Review and Approval of Kick-off Meeting minutes
 - a. *The Chair briefly highlighted sections of the kick-off meeting minutes (which were shared with the participants for their review prior to the meeting). The Chair called for a motion to accept the meeting #4 minutes.*
 - i. *Motion moved by Dr Chabrilat*
 - ii. *Seconded by Dr. Tsakiridis*
 - iii. *Motion passed unanimously*
6. Presentation of WG Policies & Procedures (P&Ps)
 - a. *The Chair briefly highlighted sections of the P&Ps (which were shared with the participants for their review prior to the meeting).*
7. Technical Discussion

- a) *Dr. Nikos Tsakiridis – The GEO-CRADLE SSL, An open Soil Spectral Library for the eastern Mediterranean countries.*

The speaker briefly presented the Interbalkan Environment Center’s center mission and its contribution to GEO-CRADLE initiative which was the main subject of the presentation. GEO-CRADLE H2020 project aimed the coordination and integration of state-of-the-art Earth Observation activities in the regions of North Africa, Middle East and Balkans, and the development of links with GEO related activities towards GEOSS. During GEO-CRADLE project, an open and standardized SSL was established through the analysis of 1754 topsoil samples, distributed to three continents and nine different countries. The conducted measurements were performed from I-BEC and TAU and concern VIS-NIR-SWIR reflectance measurement and chemical analysis over 9 key properties. The compiled SSL was exploited through the application of a memory-based learning approach that resulted to robust modeling with predictive accuracy of each property ranging from decent to excellent. After the conclusion of the presentation, a quick Q&A round was initiated where Dr. Tsakiridis stated that the main difficulty for the development of the SSL was the sharing of physical samples and that GEO-CRADLE SSL is open and free to use for commercial purpose, which is the key difference over LUCAS topsoil SSL.

8. Subgroup 1 discussion

- a) *Dr. Ben-Dor: The speaker stated the aim of the SG-1 which will cover the operational scheme concerning the usage of optical sensing instruments. The key objective of the SG-1 as stated is to perform measurements of high accuracy and precision by reducing the replication error and obtaining the “true” spectrum. The key problem that was recognized from the presenter is the application of multiple protocols that may affect the final results, since the quantitative models are sensitive to small spectral changes. Furthermore, it is not recommended to merge SSLs from different protocols. The recognized sources of variations were then presented along with their relation to the protocol solution. More specifically, different spectrometers, sample preparation, measurement scheme, optimization and white reference routines and measurement geometry can partially be solved by a protocol, while variations sourced from operator usage or external conditions cannot be solved by a protocol. The speaker concluded their speech by bringing to the spotlight the goals of SG-1:*
- i. To suggest a protocol compatible by most instrumentation and networks*
 - ii. To define a procedure for spectral alignment (such ISS) that can be used by all*
 - iii. To declare a soil or standard (master) sample*
 - iv. To declare a “motherhood” (master) spectrometer and laboratory.*
- b) *Dr. Chabrilat: The floor was passed to Dr. Chabrilat initiating a thorough conversation regarding the actions of SG-1. They first presented a template for the SG working scheme containing the following items*
- i. Evaluate the current situation by literature review and personal communication (table)*
 - ii. Evaluate pros and cons of each protocol (Elaborate on each protocol from expert – invite speakers and presentation, discuss pros and cons, discuss the connection to remote sensing, summarize pros and cons for every protocol including remote sensing aspects)*

- iii. *Discuss the collaboration with other SG*
- iv. *Develop draft protocol*

Then, they invited the participants to put further topics for the discussion and shared a few ideas that were

- i. *The optical set up protocol*
- ii. *Sample preparation and measurement protocol*
- iii. *Measures for the accuracy and precision to use*
- iv. *Merging measurements from different day with the same protocol*
- v. *Merging measurements with other laboratory*
- vi. *Internal Standards*
- vii. *Equipment maintenance*
- viii. *Merging different SSLs*

At first, it was suggested to introduce a template describing standard operating procedures and make sure that all methods have the same layout in order to facilitate the inventory. The initial topic discussed was the necessity for sufficient volume of soil sample to be analyzed while the importance of many repetitions to achieve accuracy and precision. Then the SG discussed that it is really important to include to the protocol the calibration procedure along with the tolerance of the accuracy in terms of variations in comparison to standard measurements. The topic of soil moisture was then opened, and it was suggested that this issue will mostly concern the SG-6, except of air moisture that may affect the measurements of even soil standards. Furthermore, new materials for standardization (i.e. polymer materials) were proposed for inclusion to the protocol. Then co-chair answered a few questions stated in chat area, regarding the illumination sources and she suggested halogen bulbs and concluded that illumination sources must be included to the protocol since there will be induced differences between contact probe and non-contact probe measurements. Then the importance of sample rotation was pointed out since there is the need for homogenizing the sample and acquire representative measurement and increase equipment's stability.

9. Next meeting

- a. *It will be announced after 1st of January 2021.*

10. Adjournment

- a. *The Chair called for a motion to adjourn the meeting at 16:58(CET)*
 - i. *Motion moved by Mr Karyotis*
 - ii. *Seconded by Dr Chabrilat*
 - iii. *Motion passed unanimously*
- b. *Minutes submitted by: Konstantinos Karyotis*

11. List of attendees includes 12 new members who joined at this 4th mtg. Their names are in red.

Agnelo Rocha da Silva, METER Group, Inc. USA

Ben Dor, Eyal - Tel Aviv University | TAU

Chabrilat, Sabine - Helmholtz Center Potsdam GFZ German Research Center for Geosciences

Karyotis, Konstantinos - Interbalkan Environment Center

Acquah, Gifty - Rothamsted Research, Harpenden, UK,

Angelopoulou, Theodora - Laboratory of Remote Sensing, Aristotle University of Thessaloniki

Bacu, Viktor - Technical University of Cluj-Napoca

Berger, Michael - ESA/ESRIN

Boruvka, Lubos - Life Science University Prague

Bradley, Andrew - University of Nottingham

Brook, Anna - Geogrpahy Department, Haifa University

Casa, Raffaele - University of Tuscia

Cizmar, David - Central Institute for Supervising and Testing in Agriculture

da Silva Terra, Fabricio - Institute of Agricultural Sciences, Federal University of Jequitinhonha and Mucuri Valeys

Francos, Nicolas - The Remote Sensing Laboratory, Tel Aviv University

Galanis, George - Interbalkan Environment Center

Gholizadeh, Asa - Czech University of Life Sciences Prague

Gobin, Anne - VITO

Heiden, Uta - DLR Oberpfaffenhofen

Ibanez, Guillermo - Comisión Nacional de Actividades Espaciales

Knadel, Maria - Aarhus University, Dept. of Agroecology

Kokaly, Raymond - U.S. Geological Survey - Denver

Lau, Ian - CSIRO Perth

Levi, Nathan - Ben-Gurion University of the Negev | bgu · Department of Geography and Environmental Development

Liu, Feng - Institute of Soil Science, Chinese Academy of Sciences

Loum, Macoumba - National Institute of Pedology

Luleva, Mila - Agrocares BV

Mészáros, János - Agricultural Research Centre, Institute for Soil Science and Agricultural Chemistry

Milewski, Robert - Research Institute for Soil and Water Conservation

Nagel, Penelope - Persistence Data Mining

Nikolov, Hristo - Bulgarian Academy of Sciences

Oliveros, Sergio - Persistence Data Mining

Omuto, Christian - FAO

Pas Kagan, Tarin - Agriculture Engineering Department Vulcani Center Israel

Pascucci, Simone - CNR IMAA

Pignatti, Stefano - CNR IMAA

Reyes, Javier - Helmholtz Centre for Environmental Research – UFZ

Robertson, Jean - The James Hutton Institute, Scotland UK,

Rocha da Silva, Agnelo - METER Group, Inc. USA,

Romano, Nunzio - University of Napoli

Samarinas, Nikiforos - Interbalkan Environment Center

Sanderman, Jonathan - Joint research centre, United States

Sarjant, Sam - Agrocares BV

Schmid, Thomas - Soil Conservation and Remediation Unit, Department of Environment

Schodlok, Martin - Federal Institute for Geosciences and Natural Resources (BGR)

Strnadová, Veronika - Czech Geological Survey

Tsakiridis, Nikos - Interbalkan Environment Center

Tziolas, Nikos - Aristotle University of Thessaloniki

van Egmond, Fenny - Wageningen Environmental Research (and ISRIC - World Soil Information)

van Wesemael, Bas - Universite catholique de Louvain

Vaudour, Emmanuelle - AgroParisTech

Zalidis, George - Interbalkan Environment Center

Zang, Ganlin - Institute of Soil Science, Chinese Academy of Sciences

Zeng, Yijian - University of Twente