The Global Soil Laboratory Network (GLOSOLAN): the importance of reliable soil data worldwide

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ESA Symposium on Earth Observation for Soil Protection and Restoration
Global Soil Partnership

• Established in 2012, hosted by FAO
• Globally recognized mechanism
• Mission:
  • To position soils in the Global Agenda
  • To promote sustainable soil management

Established in 2017

....if you can not measure it, you can not manage it...

To be successful in global soil management, a Global Soil Laboratory Network is essential

Ensure the quality of soil data WORLDWIDE

Soil Protection and Restoration, 06 – 07 March 2024, ESA-ESRIN, Frascati (Rome), Italy
We operate at all levels...

GLOBAL

REGIONAL

NATIONAL

- 07 March 2024, ESA-ESRIN, Frascati (Rome), Italy
Main areas of work:

- Harmonization of Standard Operation Procedures (SOPs)
- Training on the implementation of GLOSOLAN SOPs
- Training on safety and health
- Execution of external quality control (proficiency testing)
- Training on the execution of internal quality control
- Training on equipment use, maintenance and purchasing
- Establishment of a donation/bartering system
- Spectroscopy
Quality control

Global Soil Laboratory Network:
Basic guidelines on how to produce a soil sample for proficiency testing

Global Soil Laboratory Network
Basic guidelines for preparing a sample for internal quality control
• 2018 (regional PTs in Latin America and Asia)
• 2019 (global)
• 2022 (global)
• 2023/24 (regional PTs in Eurasia, Asia, Africa+NENA)
• 2024 (global)
GLOSOLAN PT 2022

- 240 laboratories from around 110 countries
- Targeted parameters (using GLOSOLAN SOPs)
  - Soil organic carbon
  - Available phosphorous
  - Total nitrogen
- Each lab received a set of 10 samples (6 soil types/5 blind replicates)
- Thanks to the support of BGS (UK) and IRD (France)
each lab received 1 set

each set =
10 soil samples

1 set: only 6 different soils

1 soil had 5 replicates
Results: differences among methods

- C_WB / 160 lab.
- C_Dum / 54 lab.
- C_Ig / 42 lab.
Results: differences among regions

Africa – 41 lab.  
Am.Latina – 36 lab.  
Asia – 38 lab.  

Europe – 21 lab.  
NENA – 20 lab.  

Carbon (%)

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Results: differences among laboratories
Precision and accuracy: have the labs met them?

Yes, and in all regions

W&B

DUM

LOI

Precision and accuracy: have the labs met them?
Some conclusions

• Different methods have different ranges of uncertainty
• Different methods are preferred in different regions
• Some laboratories have great need to take actions to improve their QA/QC practices (including capacity building of the lab staff)
• There are laboratories with good performance in all regions
• Inter-laboratory proficiency tests are key to assess soil data quality (precision and accuracy among laboratories for various methods)
Thanks for your attention

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