Theme 2: Advances in soil mapping and monitoring

Totally, 67 oral presentation (48 in person and 19 online) have been well presented.

☐ Sub-theme 2.1: Soil survey and monitoring strategies

- 29 oral presentations

☐ Sub-theme 2.2: Digital soil mapping techniques and applications

- 34 oral presentations

☐ Sub-theme 2.3: Unlocking the potential of soil legacy data

- 4 oral presentations

Theme 2: Advances in soil mapping and monitoring

The soil parameters concerned in these studies are very diverse, but some are predicted or mapped with high frequency

1	**Soil carbon**	18
2	**Soil functions and threats**	7
3	**Soil health / quality**	4
4	Soil salinity	4
5	Soil depth	4
6	Soil moisture	3
7	Trace elements	2
8	Heavy metal pollutant	2
9	(Multiple parameters)	8

→ Still a hot topic

→ Going up and getting more and more attention

Theme 2: Advances in soil mapping and monitoring

A notable feature of these studies is that multi-source data integration, not only for the characterization of soil-forming environment conditions, but also for the training and optimization of soil prediction models.

- Multi-source remote sensing data: sentinel images are frequently used

- Multi-source proximal sensing data: Gramma Ray, EMI, ERT, etc

- Multi-source and multi-scale legacy soil databases (global and local)

Theme 2: Advances in soil mapping and monitoring

Machine learning is the most frequently used soil mapping method in these studies, but considerable prediction uncertainty remains. The exploration of new theory and methods are very necessary.

The evaluation of DSM results may be not perfect or may not oriented to soil maps applications.

Another significant feature of this theme is that many studies focus on high resolution soil mapping to reveal soil variations in a detailed way.

- The Third Law of Geography: A New Perspective on Digital Soil Mapping

- Evaluating soil maps by their pattern

Theme 2: Advances in soil mapping and monitoring

Recommendations:

- Promote the wider application of digital soil mapping products. More applications would be helpful for the development of digital soil mapping theory and methods.

- Integrate multi-source data, especially legacy soil data, to improve digital soil mapping and monitoring performance.

- Establishing a global soil monitoring network which may be based on national or local soil monitoring networks.