Contribution ID: **466** Type: **Poster Presentation**

Integrating LUCAS data with AI-driven models for predicting soil Salinization across the EU

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Soil salinization influences vegetation, biodiversity, crop production, land-atmosphere interactions, soil health and ecosystem functioning. Quantifying soil salinity is essential to mitigate its determinantal effects (Hassani et al., 2020; 2021). This study utilizes an AI-driven approach for the quantification of soil salinity in EU using a wide range of environmental covariates including soil properties, terrain attributes, climate, and remotely sensed variables. Soil salinity point data from the LUCAS survey (2015 and 2018) were used for the training and validation of the models. Different algorithms were employed in our analysis including Random Forest, LightGBM, and XGBoost, with XGBoost demonstrating superior accuracy in predicting soil salinity across EU. The predictive model output is a gridded dataset illustrating the spatial and temporal variations of soil salinity, with corresponding uncertainty maps. This work represents one of the first attempts to integrate LUCAS data with AI models, aiming to generate soil salinization maps specifically designed for EU soils. The outcome will contribute substantially toward devising necessary action plans for protection of EU soils against salinization and degradation which is at the heart of the European Green Deal, Paris Agreement, and the United Nations Sustainable Development Goals especially UN SDG15.

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References

Hassani, A., Azapagic, A., Shokri, N. (2020). Predicting Long-term Dynamics of Soil Salinity and Sodicity on a Global Scale, Proc. Nat. Acad. Sci., 117(52), 33017-33027, https://doi.org/10.1073/pnas.2013771117 Hassani, A., Azapagic, A., Shokri, N. (2021). Global Predictions of Primary Soil Salinization Under Changing Climate in the 21st Century, Nat. Commun., 12, 6663. https://doi.org/10.1038/s41467-021-26907-3

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