



Soil does matter in agroecosystem models

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Jannis Groh (left) and Thomas Pütz at the experimental lysimeter site that belongs to the TERrestrial ENvironmental Observatories (TERENO)-SOILCan lysimeter network. Photo by Forschungszentrum Jülich/Sascha Kreklau.

Agroecosystem models need to capture all biophysical processes that control crop growth and soil ecosystem services. While previous model intercomparison studies mostly focused on predicting agronomic variables (e.g., crop yield), simultaneous implications on soil and environmental fluxes (e.g., water balance) received less attention. Researchers also have not focused on effects of soil heterogeneity in erosion-affected arable soil landscapes.

A recent *Vadose Zone Journal* article, published within the special section “Transdisciplinary Contributions and Opportunities in Soil Physical Hydrology,” presents a model intercomparison study to predict crop growth and soil water flux data from weighing lysimeters. The study involved 12 models and data from intact soil lysimeters representing erosion-affected soil types of hummocky morainic landscapes.

The authors showed that for identical initial and boundary conditions, and calibrated for development stages, the simulations differed among models and failed in predicting crops and fluxes compared with lysimeter observations. Particular differences in yield and soil water fluxes between the eroded and colluviated soil profiles were not captured.

These findings demonstrate that soil does matter in agroecosystem modeling, and a high-precision lysimeter can provide valuable crop and flux data of the soil-vegetation-atmosphere system for improving agroecosystem modeling.

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Groh, J., Diamantopoulos, E., Duan, X., Ewert, F., Herbst, M., Holbak, M., ... Gerke, H.H. (2020). Crop growth and soil water fluxes at erosion-affected arable sites: Using weighing lysimeter data for model intercomparison. *Vadose Zone Journal*, 19, e20058. <https://doi.org/10.1002/vzj2.20058>

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