EGU22-9500
https://doi.org/10.5194/egusphere-egu22-9500
EGU General Assembly 2022

Moving the frontier of comparative erosion measurements under different agricultural schemes – Development of a long-term, high-resolution, 4D erosion measurement site of the Bavarian Agricultural Institute in Lower Bavaria (Germany)

Florian Ebertseder[1], **Johannes Mitterer**[1,2], and Markus Disse[2]
[1]Institute for Ecological Cultivation Soil Culture and Resource Conservation, Bavarian Agricultural Institute (LfL), Ruhstorf a. d. Rott, Germany (johannes.mitterer@lfl.bayern.de)
[2]Chair of Hydrology and River Basin Management, Technical University of Munich, München, Germany (johannes.mitterer@tum.de)

Today, erosion is increasing in many intensively used agricultural regions with fertile soils. At the same time, scientists expect that the intensity of heavy precipitation events, their erosivity, drought intensity and persistance will increase significantly through climate change. In combination with more strict regulations to protect the natural environment from nutrients and hazardous substances (such as herbicides and micro-plastics), it is challenging to balance the interests of food (and energy) production and environmental protection.

Therefore, we design and establish a worldwide unique measurement plot at the Bavarian Agricultural Institute (LfL) to assess different combinations of four- and six-year crop rotation schemes and machining methods concerning their long-term soil fertility, stability and resilience against climate change effects and environmental impacts, focusing on compound effects. The plot to measure and compare soil-water retention, nutrient fluxes, surface runoff, and erosion masses has an area of four acres and 14 parallel crop strips. Crop cultivation, experiments and measurements with and without artificial rain will be performed for more than ten years after a three-year set-up phase, will have a 4D (3D spatial plus temporal) high-resolution design and combine established and innovative measurement and management techniques, such as artificial intelligence, neural networks, deep learning, and robotics. Finally, up-to-date process-based hydrological modelling will incorporate the measurement data to increase our process understanding and enable upscaling to catchment scales.

This contribution to EGU 2022 will inform and include the scientific community during the set-up phase about the running and planned activities to build an international scientific network, discuss our approaches, efficiently use the existing scientific knowledge, and initiate future collaborations around the measurement financed by the German federal state of Bavaria.