Topics for Bachelor and Master theses related to the Permanent Soil Monitoring Program of the State Saxony

Topics:

- Temporal development of soil moisture and soil temperature with regard to climate change
  - Trend analysis at intensive monitoring plots separately for soil moisture and temperature
  - Examination of interrelated behavior of the two parameters
  - Assessment of influencing factors on potential long-term trends (e.g. land management, altitude, physical soil properites).

- Long-term development of soil water and matter fluxes through seepage water
  - Simulation of the soil water fluxes at intensive monitoring plots by applying an appropriate soil water balancing tool
  - Calculation of matter fluxes using the simulated water fluxes and observed concentrations in seepage water
  - Assessment of long-term trends of matter fluxes in different soil depths (e.g. for nitrate, phosphate, heavy metals, DOC, …)

- Long-term trends of chemical soil properties in different soil depths
  - Which parameters are variable within the observation periods (30 years) in topsoil and/or subsoil, which parameters stay more or less stable depending on soil depth?
  - Derivation of recommendations for the sampling periods to assess long-term changes

- Soil microbiology and biodiversity in agricultural managed soils
  - Assessment of historical data from oberservations of microbial-related parameters in the period 1997-2014
  - Development and execution of soil sampling at selected monitoring plots to assess the current state of parameters on microbial properties and on biodiversity (given that a cooperation with a specialized lab is established)

- Own topics: More than 200 separate parameters are measured at the 55 permanent soil monitoring plots in Saxony. Own ideas for data analyses, new research questions related to soil chemistry or physics, and novel approaches from sampling to data analysis are welcome.

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