M.Sc. Thesis (Umweltschutztechnik, WAREM, SimTech)

For predicting water, energy, and matter fluxes in the soil-vegetation-atmosphere continuum, different scientific model concepts compete with each other. Among the competing models, the ones that are more accurate typically are more complex and require more data for calibration. Thus, a given level of data availability restricts modelers in choosing between available model alternatives. Bayesian Model Selection is a toolkit to rank models objectively. It implicitly performs an optimal trade-off between performance in fitting available data and minimum model complexity. In other words, it finds the model that is complex enough to capture the system behavior but is not too complex so it still generalizes well to unseen data.

The aim of this Master’s thesis is to use Bayesian Model Selection to rank the competing models and to check if this ranking changes for different sites / years (meteorological conditions) and state variables. Simulation results from different agro-ecosystem models and measurement data will be provided.

Prospective Tasks
- Literature review of (Bayesian) Model selection, soil-vegetation-atmosphere models
- Applying Bayesian Model Selection for different sites / years / variables
- Visualization of results and discussion

Desireable Skills
- Affinity to numerical simulations, statistics and programing (MATLAB)

General Information
- Earliest starting date: 01.02.2019
- Advisors:
  - M.Sc. Aline Schäfer (University of Stuttgart)
  - Dr. rer. nat. Tobias KD Weber (University of Hohenheim)
- Examiners:
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  - Priv. Doz. Dr.-Ing. Sergey Oladyshkin