TUM

Modeling of pesticide fate in the soil-plant system & environmental impacts

Motivation:

Agricultural activities are often related to the release of pollutants to the subsurface, including pesticides and fertilizers. Model approaches are set up and applied, to improve process understanding and support decision making aimed at minimizing risks for human health and ecosystems.

This Master's thesis is embedded within a project where we are collaborating with the Adnan Menderes University in Aydin,Turkey. Field experiments are carried out there with maize and the application of different pesticides. Chemical concentrations in soil and different plant parts are measured. In this thesis, you will work with model development and application, i.e., the simulation of pesticide leaching and plant uptake. Optionally, the estimation of risks can be added. Baseline questions include:

How can we describe pesticide uptake into plants and leaching through soil? Which processes are important? Which impacts can we expect from the pollution?

Description:

- Numerical simulation of field experiments (pesticide leaching and dynamic plant uptake)
- Optionally: estimation of risks arising from pesticide residues in soil and plant
- Optionally: **research stay** at the collaborating institution in **Aydin, Turkey**, for learning on sample preparation and chemical analysis techniques

Requirements:

- Interest in the modeling of subsurface processes and programing with Matlab or Python
- Basic knowledge in hydrogeology and biogeochemistry
- Motivation to work independently on model codes and simulations

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