Deutscher Tropentag, October 11-13, 2005, Hohenheim

"The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies"

Investigation and Simulation of the Effective Anisotropy in Hillslope Soil in Northern Thailand

Kamal D. Pathak, Gunnar Kahl, Joachim Ingwersen, Thilo Streck

University of Hohenheim, Biogeophysics, Germany

Abstract

Application of the agrochemical by farmers in the mountainous regions of Northern Thailand resulted in increased pollution of water sources. To understand and predict the movement of agrochemicals in the soil, the knowledge about the anisotropy of the hydraulic conductivity is essential. Major factors affecting the anisotropy are layered heterogeneity of soil and moisture content variations. Major aim of this study is to investigate the anisotropy in the soil by tracer movement and to model the effect on water and solute transport with the model Hydrus2D. The solute transport study will be carried out on plot scale ($2\,\mathrm{m} \times 2\,\mathrm{m}$). Two ideal tracers (NaCl and KBr) will be applied at two different rates of irrigation (10 and 20 mm d^{-1}). Water content and suction will be measured with Time-Domain-Recflectometry probes and Tensiometers at different slope positions and depths from 10 cm to 100 cm. Twenty to twenty-five days after the tracer application soil samples will be collected from different depths and positions and will be analysed for their salt concentration. The orientation of the tracer plume along with the head measurements will be used for calculating the effective anisotropy of the hydraulic conductivity of the soil. These results will be used to calibrate the model Hydrus2D with the purpose to predict the movement of tracer in the soil.

This study will help to understand the effect of anisotropy on solute transport in the soil of the study area,. Furthermore, it will show if it is possible to enhance the modelling results by including of hydraulic anisotropy.

Keywords: Anisotropy, hillslope, hydraulic conductivity, solute transport, Time-Domain-Recflectometry, tensiometers

Contact Address: Kamal D. Pathak, University of Hohenheim, Biogeophysics, c/o Sadat Ali Yawar 2- Schwerzstraße 2217, 70599 Stuttgart, Germany, e-mail: kamalspalace@yahoo.com