

Development and application of a GIS supported model which describes the movement of water and material in the ground within a catchment area

The increasing anthropogenic utilisation of the environment causes gradual alterations in the soil structure, including soil compaction, surface sealing, erosion and contamination. It is difficult to estimate the long-term consequences, for instance impacts on the quality of groundwater and surface water.

Remediation of such impacts are, for technical and financial reasons, limited to small scale reorganisation and redevelopment projects and little attention is given to large scale soil degradation. For large scale impacts, emphasis is given more to preventive measures rather than repair or reorganisation.

It requires a considerable effort to describe and evaluate large scale solute transport processes through soil which further limits such attempts. It is difficult to predict the behaviour of the solute movement and the possible contamination of ground water and surface water based on available measured spatial data. The use of models which are able to reflect spatial and temporal dynamics of flow and transport processes can be used to assess large and differentiated areas.

The aim of this project is to develop a reliable transport model at the scale of a whole catchment area, which is physically substantiated. This model will be calibrated and tested in collaboration with potential users, who will apply it to natural/ real situations and demonstrate its functioning. The model will be based on existing scientific knowledge and experimental results from former and future dissertations within the Graduate School. Initially the model should be limited to transport modelling of inorganic components (e.g. radio-nuclides and metals) to ensure the project remains focussed and realistic in its aims.