Diplomarbeit J. Derx:

Numerical simulation of seepage face behaviour

Betreuer: D. Gutknecht, A. Blaschke, L. Li, D. Lockington

Abstract:
In this work the aim is to find boundary conditions for the numerical modelling of near-shore water tables and aquifer-ocean mixing processes. For this purpose an existing numerical model is used and modified by including existing field data in the calculations. For verifying the model by realistic data, reliable field measurements are collected.

The work is built up into three parts. In the first part, the basic principle of the numeric model and the governing equations are described.

The second part deals with modifications of the model by implementing topographic field data and the choice of boundary conditions. The beach surface surveys obtained from a previous field trip are implemented into the numerical model and the effect of realistic sand levels on the exit point movement is shown. The computations of the seepage faces are done by the numerical model and to describe the seepage face, statistical methods are used. The model calculations were carried out with a set of modified model parameters to show the sensitivity to parameter changes.

In the third part, the field site and the performance of measurement during a field trip is described, including the set-up of the instruments and the geological situation. A reliable observation of the exit point is presented during a full spring-neap tidal cycle. The water tables along a beach transect where monitored in close distances around the exit point and continuously land inwards.

Finally, the model is verified by comparing water table observations and simulations graphically at different wells and by the performance of the exit point prediction. The performance quality will be calculated by correlation coefficient methods. The observed and calculated seepage faces will be presented.