



## **Soil water repellency as a phenomenon of initial soil formation – approaches and first results from the Transregional Collaborative Research Centre (SFB/TRR) 38**

R. Spröte (1), O. Bens (2), T. Fischer (3), T. Raab (1), R.F. Hüttl (1,2)

(1) Chair of Soil Protection and Recultivation, Faculty of Environmental Science and Process Engineering, BTU Cottbus, (2) Helmholtz Centre Potsdam, German Research Centre for Geoscience GFZ, (3) Central Analytical Laboratory, Faculty of Environmental Science and Process Engineering, BTU Cottbus

Within the scope of the DFG-funded Transregional Collaborative Research Centre 38 „Structures and processes of the initial ecosystem development phase in an artificial water catchment” initial stages of soil organic matter development are studied on sites of different age. In the recultivation area of the open-cast mine Welzow South, situated about 30 km south of Cottbus (Brandenburg, Germany), the “Hühnerwasser” or Chicken Creek watershed is used as the main investigation site for the initial state (point zero) of landscape development. Plants and micro organisms colonise the freshly dumped Pleistocene substrates by natural succession and form the basis for the development of the first soil organic matter.

The major aim of our research is to study processes accompanying the accumulation of organic matter in soils. Particular attention is given to the role of biological soil crusts. In detail, the phenomenon of soil water repellency (hydrophobicity) as an important factor controlling and preventing the infiltration of precipitation water into the initial soils is studied. Intensity and persistence of soil water repellency is analysed by water drop penetration time (WDPT) analyses and contact angle measurements on samples which are taken at regular time intervals.

To date, soil water repellency was not detected for the initial phase at the Chicken Creek site. However, to compare the results from the Chicken Creek (point zero) with a more advanced state of humus development we use a second artificial water catchment which is located nearby („Neuer Lugteich“). This catchment is five years older than the Chicken Creek watershed. At the “Neuer Lugteich” small contents of soil organic matter have been stabilized in connection to widely distributed biological soil crusts on an artificial dune (Quaternary sands). Our first results show that soil water repellency can be detected at the “Neuer Lugteich”, predominantly in the dry summer periods. Biological soil crusts seem to play an important role in stabilizing organic matter in connection with water repellent microsites during the initial phase of site development.

In order to ensure for the comparability of the Quaternary substrates from the Chicken Creek with the “Neuer Lugteich” further observation sites and sampling plots in addition to the artificial sand dune will be established.