



## **Soil profile dynamics in an eroding soil landscape – a catena through a kettle hole**

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The arable hummocky ground moraine soil landscapes are characterized by a spatial continuum of more or less eroded soils at hilltops and slopes, and by colluviated soils in topographic depressions. After removal of forest in the middle ages, colluvium started covering the pre-existing Histosols and Gleysols within and Luvisols in the vicinity of kettle holes. A catena through originally peat-filled kettle-hole has hardly been described with respect to ongoing pedological modifications according to changes in landscape and hydrology. The objective was to derive the lateral continuum of soil horizons by identifying the location of the lateral boundaries between regions of clay mobilization/migration and gleisation (gleyic conditions), peat accumulation, and secondary carbonate accumulation. Data from an intensively-sampled field in northeastern Germany are presented. The start of colluviation could be dated by tree ring analyses of a buried stem. The location of the fossil topsoil A and peat horizons was determined from a dense grid of auger holes and geophysical explorations. In addition to older processes in the landscape, also younger redoximorphic processes were indicating changes in soil hydraulic properties and a modified hydrology of the arable soil landscape. We found in micromorphological analyses of soil thin sections that clay migration is an ongoing process; samples indicated vertical gradients in C-contents and secondary carbonate accumulation. The clay mobilization in the colluvium and the migration into the fossil horizons seemed to depend on the direction of soil water movement; anisotropic hydraulic conductivity indicated a potential for lateral water movement. The catena data suggest that the soil landscape development was relatively dynamic; the results may allow the reconstruction of former land surfaces, soil distributions, and erosion rates and may help predicting future developments.