



Metabolic hot spots in a virgin landscape - research concept in an artificial watershed

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Data on the spatial distribution of organic matter transformation processes in landscapes under initial development is rare. From theory so called metabolic hot spots, with higher reaction rates relative to the surrounding, are proposed to occur at terrestrial - aquatic interfaces, where hydrologic flowpaths deliver complementary reactants. We tested proposed hot spots in the artificial watershed 'Chicken Creek Watershed', a virgin landscape in the post-mining area, Lower Lausatia, Brandenburg, Germany. The experimental watershed was created in 2006 using sandy Quaternary sediments and is currently in its initial open land state with free primary plant succession. The geomorphology of the initial plane surface is shaped by strong gully erosion processes.

We assessed the metabolic potential along hydrological flow paths from samples of terrestrial soil, sediment samples from dry, moist and permanent submerged sites in gullies. In the gully reaches which have permanent water supply we distinguished sites with upwelling and downwelling water and sites without strong vertical water exchange.

Terrestrial sites were particularly characterized by a higher content of organic matter and a finer texture compared to the gully sites. Referring to dry weight, respiration rates measured at terrestrial sites were in the same range as in the water influenced sites in the gullies. However considering the ash free dry weight as reference, respiration rates were higher at sites with permanent water supply compared to dry sites. Moist sites showed the highest metabolic potential. The first results indicate that metabolic

hot spots in a virgin landscape occur at sites with permanent water supply.