

SEASONAL VARIATIONS OF SOIL-GAS EMISSIONS IN DEPENDENCE OF TOPOGRAPHY AND SOIL TYPE

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Soil-gas emissions are very sensitive to changes of the meteorological conditions (air pressure, rain, wind). Therefore, identification of diurnal and seasonal variations of emissions must go along with a large number of measurements. In this study, soil-gas emissions are investigated along a slope over a period of 3 years. The bedrock of the whole slope is build up by a sandstone, which results into differing soil types in dependence of the topographical situation: at the top coarse-grained, dry soils are developed, which are getting more fine-grained and wetter to the end of the slope. To identify and quantify diffusive and convective processes, 2 natural occurring radon isotopes with differing half-lives (Rn-222 , Rn-220) are used as natural tracers for soil-gas emissions. During the summer season the radon emissions are low from coarse-grained soils and higher from fine-grained ones. In winter the emissions are vice versa showing very high emission rates from coarse-grained soils. During winter a convective flow of soil-gas is observed under the coarse-grained and dry soil conditions of the top, which results in extremely high emission rates. At the end of the slope the fine-grained and wet conditions of the soil inhibit convective processes. During summer the fine-grained and wet soils from the lower parts of the slope show a high evaporation rate. This results in high emissions due to evaporation of soil-water containing solved soil-gases. The strong capillary force of the fine-grained soil guaranties a subsequent delivery of soil-water.