CHEMICAL AND ISOTOPIC COMPOSITION OF SOIL SOLUTIONS FROM CAMBISOLS (AUSTRIA) – FIELD STUDY AND EXPERIMENTS

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In most natural surroundings soil solutions are primary gained from the uptake of meteoric water. Subsequently infiltration, capillary exchange, bioresponse, evaporation etc. result in complex and individual gas-water-solid systems. Knowledge on the chemical and isotopic composition of soil solution and its evolution is highly relevant for environmental and forensic studies, but respective systematic and combined field and experiment studies are rare.

The composition of solids and interstitial solutions of individual horizons has been investigated for three cambisols in Styria (Austria). The solutions were separated from the soils by compaction method at hydraulic pressures of 27 and 55 MPa, corresponding to respective matric potentials (mp).

The soils consist mainly of quartz, chlorite, muscovite and plagioclase with associated silicates like kaolinite, vermiculite and smectite due to weathering processes. No significant vertical variability was visible. The pH of the soil solution typically increases with depth and elevated mp. Concentrations of dissolved ions such as Ca^{2+} and Mg^{2+} increase at high mp, which correspond to higher δD and $\delta^{18}O$ values. Lab experiments for wetting and evaporation indicate higher concentrations of dissolved components of the soil solutions at higher δD and $\delta^{18}O$ values. Field-related and experimental results are discussed in respect to the impact of seasonality, evaporation, wetting and mp-related interstitial distribution of the (isotope) geochemical compositions of the separated soil solutions.