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STSM title: Measurement of soil water balance with fast track Isotope field methods along a desertification gradient in the SE of Portugal

STSM Host scientist: Christoph Külls, Institut für Hydrologie, University of Freiburg, Freiburg, Germany

Five Keywords: soil water percolation, desertification, vegetation, water isotopic signature, soil water availability.

Topic summary: Application of a method for measuring past (up to 5 years) soil water percolation based on the measurement of stable isotopic signature on pore water soil, along a desertification gradient in SE Portugal.

Methods summary: Collection of soil samples along soil profiles in 4 sites in Portugal. In Freiburg, we measured water content and the isotopic signature of the soil water pores, which allowed to calculate water percolation.

Results and implications for restoration: Water availability is a major factor affecting ecosystem productivity and plant communities. This method enabled to calculate water percolation, which is closely related to the water availability for plant along time. The data collected was used to interpret plant community data that was sampled previous to this STSM. We aimed at studying soil-water-plant interactions, and these are key processes to restore degraded areas. The soil chemical, physical and biological properties determine the type of potential vegetation by controlling water and nutrient availability to plants.



Fig. 1. A and B: soil sampling along a profile, in Portugal. C: Isotopic signature measurement, in Germany.