Geophysical Research Abstracts
Vol. 17, EGU2015-2400, 2015
EGU General Assembly 2015

Soil water dynamic studies from two Arenosols of North-Central Namibia

Brice Prudat, Lena Bloemertz, and Nikolaus Kuhn

Physical Geography & Environmental Change, Environmental Sciences, University of Basel, Switzerland (brice.prudat@unibas.ch)

In North-Central Namibia, farmers mainly cultivate Pearl Millet based on dryland agriculture. Based on interviews of farmers in the study area, agricultural soil quality is mostly related to soil water moisture characteristics, in particular the capacity to provide water during dry periods on one hand and the risk to get water-logged on the other. In order to assess these differences in the perspective of water use efficiency, two soils types have been studied. The first one, Omutunda (mostly Arenosol hypereutric), is nutrient-rich, but does not supply much water to the crops during long rainless periods that occur over the growing season. The other soil studied, Ehenge (mostly hypoluvic albic Arenosol), is nutrient-poor, but it keeps water for a longer period. Soil water monitoring as well as rainfall simulations have been used to examine the difference in soil hydraulics between these two soils. These data have been compared to the information gathered during the interviews on the farmers′ perspective on the use of both soils. The nutrient-rich soil, Omutunda, has very high water retention capacity, but a high landscape position, the presence of sealing, as well as low percolation rates can cause high runoff and evaporation. This is particularly obvious during rainstorms that are frequent in the area. On the other hand, high percolation rates into the sandy top layers of the poor-nutrient soil, Ehenge, permit rainwater to reach a deep sandy loam layer in which water is accumulated. Low matric potential of the upper sandy layers isolates this water reservoir from the dry soil surface and crops can use this water to grow for at least six rainless weeks. These results show that, despite their spatial proximity, these two soils types would have very different requirements related to irrigation to balance rainfall regimes. This is particularly important to adapt to future climate change in the area, which should increase rainfall intensity events and lengthen rainless periods. Finally, if irrigation schemes are implemented in the area, small scale precision irrigation will be required in order to take into account the contrasting soil hydrology.