Geophysical Research Abstracts
Vol. 12, EGU2010-5412, 2010
EGU General Assembly 2010

Impact of Climate Change on Soil Erosion and the Efficiency of Soil Conservation Practices in Austria

Andreas Klik and Josef Eitzinger

Universität für Bodenkultur Wien, Department of Water, Atmosphere & Environment, Vienna, Austria
(andreas.klik@boku.ac.at, 00431 36006 5499)

The goal of this study was to assess the impact of selected soil protection measures with respect to soil erosion and retention of rainwater in the landscape for a 1.14 km^2 large, agricultural used watershed in the north-east of Austria. Watershed conditions under conventional tillage, no-till and under grassland use were simulated using the WEPP soil erosion model. The time period 1961-1990 was used as reference and simulation results were compared to future IPCC scenarios A1B and A2 (2040-2060).

Under current climatic conditions no-till and grassland decrease runoff by 38 and 75%, respectively. The simulation results suggest that under future climate scenarios the effectiveness of the selected soil conservation measures will be similar or slightly decreased to 16-53%.

For the actual situation average net soil losses in the watershed between 2.57 for conventional soil management systems and 01 t.ha-1.a-1 for grassland are calculated. This corresponds to a maximum average yearly loss of about 0.2 mm which is considered to be the average yearly soil formation rate and therefore a tolerable soil loss. The current soil/land use does not exceed this limit. Most of the erosion occurs during spring time. Under future climate scenarios conventional tillage will lead to changes in soil erosion by -55 to +56%. Under these conditions the tolerable limits will partly be exceeded. The use of no-till reduces yearly soil loss rates to 0.2 and 1.4 t.ha-1. They are in the same range or slightly higher than under actual conditions. The conversion to grassland prevents soil erosion nearly completely.

The selected soil conservation methods maintain their protective effect on soil resources independent from the climate scenario. Therefore with small adaptations they can be recommended as sustainable soil/land management systems also under future climatic conditions.

However, based on the available climate scenarios climate induced changes in frequency and intensity of heavy rainstorms were considered only in a limited way. As the general future trend indicates a strong increase of rainstorms with high intensity during summer months the results of this study may be too optimistic.