Geophysical Research Abstracts
Vol. 16, EGU2014-5498, 2014
EGU General Assembly 2014

Effect of rainfed cereal crops on the wind erosion in the Algerian steppe (Case study in Laghouat)

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Summary

The Algerian steppe 20 million ha, bounded on the north by the 400 mm isohyets and south by the 100 mm isohyets. This territory is subject to increasing human pressure. For several decades, this area has been home to rainfed cereal cropping subjecting soils to a strong fragmentation during seedbed preparation, thereby facilitating the degradation of soil by wind erosion. This study was conducted within the agricultural area of Mokrane (Laghouat), a region of the Algerian steppe. In 2009 and 2010, sediment mass flux densities were measured using BSNE sand-traps on a plot of 1.35 ha cropped with rainfed barley (Hordeum vulgare). A weather station equipped with anemometers, a wind vane and a saltiphone was used to acquire the data needed to characterize erosive events. The results show that in Laghouat sandstorms can last for several days. However, the actual erosive periods were highly variable in terms of duration, ranging from a few minutes to several hours interspersed with calm periods. Erosive winds originated from the west and north. The average wind speeds during saltation were between 6.2 and 7.3 m/s. The threshold velocity had low seasonality and varied between 5.7 m/s and 7.6 m/s. The measured mass balances were negative and fluctuated between -74.5 t/ha -2.8 t/ha depending on the measurement periods. The total soil loss measured over a period of two years confirms that rainfed cultivation induces severe degradation of soil by wind erosion in the Algerian steppe and should be discouraged.

Keywords: Wind erosion, rainfed cereal cropping, steppe, Algeria.