



## Pedo-hydrological patchiness in the northern Negev, Israel, as affected by grazing

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A mosaic-like spatial pattern, consisting of three main cover types (patches) – shrubs, trampling routes, and open areas in between – characterizes the landscape of many semiarid rangelands. These patches may differ in their pedological and hydrological characteristics, and they play important roles in ecogeomorphic system functioning. In the northern Negev region of Israel, soil properties such as organic carbon content and aggregation were measured in each of the above patch types. The soil was sampled from two depths (0-2 and 5-10 cm), inside and outside long-term grazing exclosures on a north- and a south-facing hillside, in the peak of the growing season (March) and at the end of the dry season (September). Overland flow and sediment yields were collected from small runoff plots (0.25-1.0 m<sup>2</sup>) representing the three patch types, during the rainy season of 2007/8.

Whereas the shrub patches exhibited the lowest overland flow and sediment yields, the highest soil moisture and organic carbon contents, and the lowest bulk density and calcium carbonate contents, the trampling routes were at the other end of each scale; in the remainder of the intershrub areas, intermediate values were found. The effect of grazing on overland flow and soil properties was not significant at the plot scale but highly significant at the patch scale. Grazing increased the spatial heterogeneity of the soil properties and created a network of trampling routes on the hillsides. These routes exhibited a locally degraded soil status, but their existence improved the soil properties of the remainder of the open area, because they enhanced the efficiency of source-sink relationships.