



Soil characteristics of semidesert soils along a precipitation gradient in the Negev (Israel)

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The sand dunes of the north-western Negev desert (Israel) show a unique precipitation gradient on a short distance. This area is build up by the same parent material and suited to investigate the influence of changes in rainfall on soil characteristics in semi-desert ecosystems. The study site is the western extension of the Sinai sand field, the sand dunes are stabilised by biological soil crusts and perennial vegetation like *Retama raetam*.

Along this precipitation gradient the three investigation areas Nizzana South (90mm \hat{a} -), Nizzana 84 (130mm \hat{a} -1) and Nizzana 69 (170mm \hat{a} -1) are situated. At every study site two soil profiles were investigated, each under the legume *Retama raetam* and in the bare interspace covered by biological soil crusts. The soil samples were taken at the interdune positions at every study site. The soil sampling included the biological soil crust, the topsoil and the subsoil up to 1,5 m. The narrow sampling of 20cm wide steps allow a mapping of the distribution of nutrients, carbonates and soluble salts of in order to show the impact of perennial plants and rainfall on soil properties. Soluble salts and nutrients were measured in a 1:5 water extraction, calcium carbonate was determined according to Scheibler.

The data shows a strong influence of perennial shrubs on the deposition of dust and the redistribution of nutrients compared to the bare interspace. The distribution of highly and less soluble salts below the perennial shrub proofs a shallower water infiltration than in the comparable interspace area. The interspace between the plants is covered by a biological soil crust, which also strongly influences the matter fluxes by nutrient-fixation, creation of runoff and stabilization of the soil surface. These biological soil crusts show higher amounts of elements than the subsoils.

The comparison of the three areas along the rainfall gradient shows higher inputs of soluble salts with increasing precipitation due to wet deposition, while carbonate contents are negatively correlated with decreasing precipitation. This is related to a higher dust input in the southern study site, which was generated in the lime stone Negev. Higher amounts of rainfall introduce higher element leaching. Perennial plants cover the surface and reduce infiltration. Inputs into the soils through dust have to be evaluated for every location to separate between effects of deposition and rainfall.