



Soil formation in the Tsauchab Valley, Namibia

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The BMBF-funded project GeoArchives (Spaces) investigates soils and sediments in Southern Africa. A focus area lies on the Tsauchab Valley (Namibia), South of the Naukluft mountain range (24°26'40" S, 16°10'40" E). On a gently sloping alluvial fan facing East towards the river, the surface is characterized by a desert pavement covering soils used as farmland.

The landscape units were mapped and the area at the lower slope of a hill was divided into three units: a rinsing surface and a gravel plain, separated by a channel. On these surfaces soil profiles were excavated. Profile description followed the German system (Bodenkundliche Kartieranleitung KA 5) and disturbed samples were taken at various depths and analysed in the lab. Undisturbed soil cores with a volume of 100 cm³ were taken just below the surface at a depth of ~1-6 cm. Lab analyses included texture and gravel content, colour, pH, electrical conductivity, carbonates, CNS, cation exchange capacity, pedogenic oxides, main and trace elements (XRF), and clay mineral distribution (XRD). Undisturbed samples were used to determine soil water retention curve, air permeability and bulk density.

The profiles revealed moderately developed cambic soils rich in clay minerals and with total carbon contents ranging up to 1.8 %, bearing shrubs and after episodic rainfall a dense grass vegetation. Their genesis is discussed and interpreted in the context of the landscape and climate history of this semi-desert environment.