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## Development of Chernozem – Luvisol toposequence in the North-east Namibia

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Namibia is a country with limited sources of high quality soils. Most of the soil cover is formed by soils with low productivity such Arenosols and Leptosols. A toposequence of Chernozem-Luvisol was found in the North-east Namibia, Otjozondjupa district (S19°45,78' E17°43.29'). The location is characterized by a mean annual precipitation of 564 mm, mean annual temperature 19.9°C and aridity index of 0.35. The location belongs to area between towns Tsumeb, Grootfontein and Otavi where the aridity index is significantly higher (0.28-0.72 - Semi arid to Dry sub-humid conditions) than in the surrounding, where the aridity index is between 0.22-0.25 (Semi arid conditions). The location is formed by wide dry flat valley bottom.

The observed soils were classified as Haplic Chernozems (Pachic, Loamic) (Figure 1). The deep humus rich ( $C_{ox}$  4.17%) mollic horizon (70 cm) is underlayed by a weathered limestone. The material forming the mollic horizon is loamic (21.0% clay) with alkaline reaction (pH 8.3). Because of the coarser texture, we assume that the material is not pure limestone residuum, but admixture of another material. The Chernozem development is conditioned by relative shallowness of the under lying limestone, which enables, due to pedoturbation, more favourable chemical properties (high pH) and therefore more intensive process of a humification. Moreover, the humification process is enhanced by better soil water holding capacity, due to higher clay and humus content. The Chernozems alter with Chromic Luvisols (Arenic, Cutanic) (Figure 1). The transition between the soil units is rather abrupt. The Luvisols develops on deep unconsolidated sandy-loam deposits with no carbonates. The high depth of the under laying limestone (> 2 meters) leads to acid soil reaction (pH 6.1-5.7). Less favourable conditions given by lower pH, low clay content (15.1 %) and water holding capacity limits humification ( $C_{ox}$  1.12%). A periodic percolation of the soil profile during the wet period (December to March) is sufficient to cause clay illuviation though the soil profile.



*Figure 1: The observed soil units: Haplic Chernozems (left) and Chromic Luvisols (right)*

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