



Structure- and process-related indicators for dry Tropical soil development, Socotra Island (Yemen)

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Dry Tropical regions are pre-eminently suitable for the study of the polygenesis and degradation of layered soils, even more so if the land surface is concurrently influenced by a monsoonal climate. High rates of substrate relocation and an increasing aridity, as well as unsustainable land use practices like felling and overgrazing, cause the thinning of the vegetation cover and produce an ascendant water movement. Results are e.g. soil erosion and secondary calcification, leaving behind diverse patterns of regolith and soils. Both soil development and soil heterogeneity can be recorded using indicators of processes and structures.

One example of a high soil variety concerning the polygenesis and degradation of layered soils occurs on the Island of Socotra, situated in the Arabian Sea. Investigation of soils in different relief positions, existing under different land use practices, showed not only various features of soil formation, but also distinct patterns of soil heterogeneity. In small areas of a few square kilometers non-calcareous regolith is distributed beside Haplic Cambisols, Calcic Cambisols and Hypercalcic Calcisols, and calcretes. Even at single locations different soil stratigraphies occur.

The present structural indicators of soil heterogeneity (as rubefication patterns) are so far exclusively valid for Socotra. Process-related indicators for soil development (as secondary calcification) are, however, valid for the whole dry Tropics, which emphasises the supra-regional significance of the approach to identify the layered, polygenetic and degraded soils in the context of global warming.

The presentation introduces the first soil data for Socotra, and is to be regarded as a first step in examining the recent soil development on this dry Tropical island. The present approach considers that the soil degradation processes are not isolated phenomena, but are to be regarded as inevitable and important soil forming processes.

The characterisation of the soils and their distribution is based on macro- and micro-morphological results as well as on lab and mapping data, from which structural and process-related indicators can be deduced.