

## **Wadi dynamics in the Souss region, South Morocco**

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The Souss region is strongly influenced by sheet wash, rill and gully erosion and intersected by ephemeral rivers, varying in size, called wadis or Oueds. Since this region is used intensely for agricultural purposes, land levelling is used to prevent the area from becoming badlands. The aim of this study was to identify the factors controlling the dynamics inside a wadi and especially to determine if wadis act as sinks for the sediment that is washed from the plains or if the sediment is transported further through the network of wadis.

Scour chains were used to measure erosion or accumulation on the wadi bed. During the years 2011-2014 37 measurements were conducted in seven different wadis. These study areas were situated from northeast to southwest on an alluvial fan between the High Atlas in the North and the city of Taroudant in the South. To be able to identify factors contributing to wadi dynamics accumulated wadi length and catchment area as well as land use classes were mapped based on a Quickbird satellite image. The measurements showed variable data, with results ranging from +30 cm (accumulation) to -37 cm (erosion) per measurement interval ranging from two weeks to one year. While erosion was dominant in some wadis, others showed a tendency towards accumulation. From the measurement data, the phenomenon of 'Scour & Fill' becomes apparent. Sediment from the plains is eroded from the wadi with high water velocities and with decreasing flow speed fills scour rills downstream. Due to the high variability of measurement data from the scour chains, satisfying correlations between wadi erosion/accumulation and possibly contributing factors could not be detected. Daily maximum precipitation ranked as the factor that most likely controlled wadi dynamics, while land use showed virtually no correlation, possibly because of limited connectivity in the study area. Other contributing factors like accumulated wadi length and wadi width are linked more closely to the fluvial processes in the wadi than differing parameters on the plains. Since scour chains represent punctual measurements this study can only show trends inside a wadi. Erosion and accumulation in the cross-section of a wadi can vary greatly so an interpolation from punctual measurements to areal data in a wadi would be faulty.