Geophysical Research Abstracts
Vol. 14, EGU2012-911, 2012
EGU General Assembly 2012

UAV derived data for the monitoring of gully erosion in the Souss Basin, Morocco

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The usage of unmanned aerial vehicles (UAVs) for monitoring purposes has strongly increased in the last couple of years. The high potential of UAVs lies in the variety of installable sensors for data acquisition as well as in their quite easy handling. In this work, a monitoring scheme for investigating soil erosion (i.e. gully erosion) in the Souss Basin (South Morocco) using UAV data is presented. Existing conflicts in the study region such as agro-industrial areas and settlements threatened by soil erosion additionally motivate the need of up-to-date analysis. The monitoring of rills, gullies and badland forms of various sizes requires very high resolution data with precise ground control in order to enable the quantification and analysis of short-term developments. Data is acquired using a fixed-wing aircraft carrying a digital interchangeable lens system camera as optical onboard sensor. For survey purposes, ground control points (GCPs) were distributed on selected field sites for creating local coordinate systems, including some permanently remaining points. Small-format aerial photographs are taken at different flying heights with stereoscopic overlap, allowing detailed quantification of gully growth in 2 and 3 dimensions and furthermore analysis of the existing vegetation cover, ploughing or planification patterns, rill erosion processes etc. Processing the aerial images is done using digital photogrammetry (Leica Photogrammetry Suite LPS) and geographical information system (ESRI ArcGIS) software.