Geophysical Research Abstracts
Vol. 12, EGU2010-3495, 2010
EGU General Assembly 2010

QuickBird derived vegetation parameters for soil erosion risk assessment in an alpine catchment

Katrin Meusburger (1), Nadine Konz (2), Monika Schaub (1), and Christine Alewell (1)

(1) University of Basel, Institute of Environmental Geosciences, Basel, Switzerland (katrin.meusburger@unibas.ch), (2) Agroscope Reckenholz-Tänikon Research Station ART, Zürich, Switzerland

The focus of soil erosion research in the Alps has been in two categories: (i) on-site measurements which are rather small scale point measurements on selected plots often constrained to irrigation experiments or (ii) off-site quantification of sediment delivery at the outlet of the catchment. Results of both categories showed that an intact vegetation cover prevents soil loss. With the recent availability of high-resolution satellites such as IKONOS and QuickBird options for detecting and monitoring of vegetation parameters have increased. The aim of this study is to evaluate the usefulness of QuickBird derived vegetation parameters in soil erosion models by comparison to Cesium-137 (Cs-137) soil erosion estimates. The study site (67km2) is located in the Central Swiss Alps and is dominated by grasslands with strong anthropogenic influences due to farming for centuries. Linear spectral unmixing and supervised classification is applied to produce maps of fractional vegetation cover (FVC) for grasslands and detailed land-cover maps from QuickBird imagery. The maps are used to adapt the C factor, which accounts for land management in the Universal Soil Loss Equation (USLE). Further the data was introduced to the Pan–European Soil Erosion Risk Assessment (PESERA) model. Supervised land-cover classification yielded a total accuracy of 93.3%. Linear spectral unmixing of vegetation abundance showed a significant (at the 0.01 level) correlation to ground truth FVC. Both models yielded higher absolute soil erosion estimates and an improvement of spatial patterns when FVC and a detailed land-cover maps are considered. However, discrepancies between model estimates and Cs-137 erosion estimates remained, especially for the PESERA model. This is leading to the assumption that soil erosion processes not considered in the models, e.g. soil erosion caused by snow gliding, play a decisive role.