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Estimating surface parameters for soil erosion assessment in an alpine catchment by means of QuickBird imagery

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Soil erosion rates in alpine regions are related to high spatial variability. A crucial triggering parameter that can be derived from satellite imagery is fractional vegetation cover (FVC). Thus, the objective of this study is to assess the applicability of linear spectral unmixing (LSU) and mixture tuned matched filtering (MTMF) in estimating fractional abundance of vegetation and soil. To account for the small scale heterogeneity of the alpine landscape we used very high resolved multispectral QuickBird imagery. The performance of LSU and MTMF for estimating vegetation abundance was good (r^2=0.85, r^2=0.71). A poorer performance was achieved for bare soil abundance (r^2=0.28, r^2=0.39). The obtained FVC map was used to adapt the C-factor of the Universal Soil Loss Equation (USLE). Compared to the low erosion rates computed with a homogenous 100% vegetation cover the satellite supported USLE map showed “hotspots” of high erosion. Field measurements of Cs-137 as well as ground truth observation could verify the derived soil erosion estimates.