



Automated spaceborne mapping of debris-covered glaciers in high Asia

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With increasing global warming the debris coverage of glaciers has also been increasing in recent years and is still expected to be extending and thickening. Even in the field it is sometimes, also for experts, difficult to determine the actual termini of the glaciers. Thus it appears to be an urgent research issue to develop methods of automated glacier mapping on the basis of space borne imagery. Having tested the early approaches of U.S. American (Bishop et al. 2001), Swiss (Paul et al. 2004) and German scientists (Bolch & Kamp 2006) in the Mount Everest Region with reasonable success, the Dresden Remote Sensing Glacier Research Team (with its member Tobias Bolch) tried to develop novel methods (Buchroithner & Bolch 2007, Bolch et al. 2007) where expert knowledge is integrated. Still founded on a morphometric-spectral approach by means of an error-free DTM, various visible and thermal spectral bands with putting emphasis on the consideration of the shading effects, a smart self-learning system has been developed. Making use of a Probabilistic Gibbs-Markov Model this approach only needs a minimum of human interaction. The latter fact is, however, essential because it helps to integrate the local or regional peculiarities which might be known to the “operator” (who is supposed to act as a “bridge-builder” between field evidence and mere physical parameters recorded by satellite sensors and being segmented by software). Every study area and every satellite scene needs an optimised relation between robustness and speed of recognition (“Pace of Convergence”). The “robustness” of human knowledge to be integrated into the segmentation process is a key factor for a sound classification. The developed AI approach allows to classify larger scenes based on a valid selection of training areas, which can in an initial stage still be refined, with a very high degree of accuracy in comparatively short time. Testing and development of this method are still in progress. A first live demonstration of the classifier’s behaviour will be given.