



Detection and Monitoring of Vegetation Patterns and Borderlines in High Mountain Environments by using combined Terrestrial and Remote Sensing Methods

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The GLORIA network collects ground-based, multi-site, long-term monitoring data since 1999 to document how changes in biodiversity and vegetation patterns correlate with climate change in the world's high mountain ecosystems (www.gloria.ac.at). To broaden GLORIA's basic multi-summit approach, more terrestrial and remote sensing methods will be applied combined in order to use the synergetic effects of detailed information at a large scale as well as area-wide information at a smaller scale.

The proposed target region is located in the Hohe Tauern Nationalpark, Austria, which will serve as the first study site to realize this conception. A second study site will be chosen to validate the novel monitoring-concept.

The retrospective development of both sites will be studied by means of orthophotographs. The current situation of vegetation patterns and borderlines will be recorded by terrestrial vegetation mapping as well as by semi-automated classifications of QuickBird data (very high spatial resolution). The results will be used as ground truth for a sub-pixel classification of RapidEye data (very high temporal resolution). Phenological time series will be defined. Consequently, change detection will be used to test the aptitude of the data for a monitoring system. To investigate critical borderlines, transects with permanent plots perpendicular to the borderlines in question will be implemented. Satellite data and aerial photographs (20 cm geometric resolution) will be used for remote sensing investigations. Thus, the changes in community distribution and altitudinal determined borderlines beyond the GLORIA summit area, will be monitored.

Summarized, in this project, a monitoring concept will be developed by observing two target regions at three spatial and two temporal scales to provide information about changes in vegetation cover due to climate change.