



Mapping topographic plant location properties using a dense matching approach

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Within the project MEDIALPS (Disentangling anthropogenic drivers of climate change impacts on alpine plant species: Alps vs. Mediterranean mountains) six regions in Alpine and in Mediterranean mountain regions are investigated to assess how plant species respond to climate change. The project is embedded in the Global Observation Research Initiative in Alpine Environments (GLORIA), which is a well-established global monitoring initiative for systematic observation of changes in the plant species composition and soil temperature on mountain summits worldwide to discern accelerating climate change pressures on these fragile alpine ecosystems. Close-range sensing techniques such as terrestrial photogrammetry are well suited for mapping terrain topography of small areas with high resolution. Lightweight equipment, flexible positioning for image acquisition in the field, and independence on weather conditions (i.e. wind) make this a feasible method for in-situ data collection. New developments of dense matching approaches allow high quality 3D terrain mapping with less requirements for field set-up. However, challenges occur in post-processing and required data storage if many sites have to be mapped. Within MEDIALPS dense matching is used for mapping high resolution topography for 284 3x3 meter plots deriving information on vegetation coverage, roughness, slope, aspect and modelled solar radiation. This information helps identifying types of topography-dependent ecological growing conditions and evaluating the potential for existing refugial locations for specific plant species under climate change.

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