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Experiences from a Virtual Mapathon for collaborative Georeferencing of historical terrestrial Images in Alpine regions

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Historical terrestrial images for identification, documentation, and especially the quantification of change in the alpine landscape are a largely unused source. Metric exploitation requires estimating the unknown camera parameters (camera location, angular attitude, and focal length) by photogrammetric resection. This is a challenging task, especially the identification of ground control points in mountainous terrain is time consuming and requires experience. Furthermore, due to the limited field of view of single images only small areas are captured. Hence, despite their possibility to provide quantitative information from more than one hundred years ago, integrating information from these historical images into subsequent analysis is often avoided.

Enabling their usage requires suitable software as well as users willing to engage in the challenge of image orientation. To facilitate this, a virtual Mapathon was organized, inviting participants to collaboratively orient historical images of the Val Martell (Italy) in the Ortler Alps. The participants from varying geoscience backgrounds (e.g. Botany, Climatology, Geomorphology, Glaciology, Hydrology) had little experience in photogrammetry prior to the Mapathon. Nevertheless, within one day nearly 100 images were oriented by 20 participants. The Mapathon was organized as a video conference using a web-based 3D image orientation software linked to an image database. Sessions with the whole group and in small teams alternated. Working in small teams stimulated internal discussions, promoting the understanding and success of each participant. Feedback received from the participants shows that the Mapathon helped overcoming the initial problem of getting started. Furthermore, the gained knowledge allows the participants to work with historical terrestrial images on their own in the future.

The set of oriented historical images created within the Mapathon further underlines the potential of historical terrestrial images. Due to the availability of numerous oriented images, the limited fields of view of individual images can be combined, allowing the documentation of changes for larger areas. With the calculation of the viewshed for each image, the image database can not only be queried by metadata, but more importantly by location and spatial coverage. Especially the possibility to search for images capturing a certain region of interest will encourage scientists to include historical terrestrial images into their analysis.