



IMPROVING FREE FACE MAPPING BY THE USE OF HIGH RESOLUTION TERRESTRIAL PHOTOS MERGED ON DEMAND

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The structure of free faces and steep slopes is important for many geomorphological processes like rockfall or debris flows which are dangerous to settlements and traffic routes. Additionally, little is known about geomorphological objects nested in regions of high potential energy. One reason of this shortcoming is the bad representation of steep slope areas by orthophotos and gridded digital elevation models. The best alternative to get high resolution data of walls, the use of terrestrial photos, often leads to huge image files that cannot be handled by the user in order to map and digitalize forms and structures. We provide an approach where high resolution terrestrial pictures are used to map features of steep slope areas without previous merging but visualizing on demand to reduce memory and enhance performance. Only the 3×3 transformation matrix $\mathbf{P}$ has additionally to be stored to each image for its orientation. Each image can easily be projected onto a given reference jacket, establishing both the connection between image- and real world coordinates and the needed images. Depending on scale an initial view can be generated for the working environment in which mapping and analysing is possible with direct connection to real world coordinates. Only the area of interest and a cache region around the view is displayed and therefore memory requirement is limited to monitor resolution. The interrelationship between the point mapped on the monitor $\vec{P}_M$ and real world coordinates $\vec{P}_B$ is given through the projection matrix of the image, the known reference jacket, and the transformation matrix of the displayed area on the monitor.