

Creating a new elevation model of Kilimanjaro from very high resolution GeoEye-1 images and assessing ice volume of the Northern Ice Field of Kilimanjaro: the photogrammetry strikes back

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Abstract: Kibo, the highest of three peaks of Kilimanjaro, has not benefited from a medium to large scale topographic mapping in about 50 years. The rapidly changing topography associated with the glacier retreat and the fact that the slopes of Kibo attract about 40,000 climbers each year (UIAA, 2013) thus justify the need to develop a new topographic survey of this outstanding landmark, designated a UNESCO World Heritage Site in 1987. In this context, the application of the photogrammetric principles to the latest generation of very high resolution spaceborne optical sensors (VHRS) offers new surveying opportunities by enabling the topographic mapping with unprecedented spatial resolution.

This study reports on the creation of a 50-cm resolution Digital Surface Model (DSM) of Kilimanjaro via photogrammetry of GeoEye-1 imagery. This allowed the total volume of the ice remnants to be estimated. Finally, the new DSM was compared with the SRTM DEM of February 2000. The difference between both surfaces permitted the volume lost by the NIF over 12.7 years to be estimated, as well as spatial pattern of the thinning to be revealed.



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L1 Lecture Theatre

School of Surveying

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