



Do High Dynamic Range threatments improve the results of Structure from Motion approaches in Geomorphology?

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In this work, the hypothesis of improving 3D models obtained with Structure from Motion (SfM) approaches using images pre-processed by High Dynamic Range (HDR) techniques is tested. Photographs of the Veleta Rock Glacier in Spain were captured with different exposure values (EV0, EV+1 and EV-1), two focal lengths (35 and 100 mm) and under different weather conditions for the years 2008, 2009, 2011, 2012 and 2014. HDR images were produced using the different EV steps within Fusion F.1 software. Point clouds were generated using commercial and free available SfM software: Agisoft Photoscan and 123D Catch. Models Obtained using pre-processed images and non-preprocessed images were compared in a 3D environment with a benchmark 3D model obtained by means of a Terrestrial Laser Scanner (TLS). A total of 40 point clouds were produced, georeferenced and compared. Results indicated that for Agisoft Photoscan software differences in the accuracy between models obtained with pre-processed and non-preprocessed images were not significant from a statistical viewpoint. However, in the case of the free available software 123D Catch, models obtained using images pre-processed by HDR techniques presented a higher point density and were more accurate. This tendency was observed along the 5 studied years and under different capture conditions. More work should be done in the near future to corroborate whether the results of similar software packages can be improved by HDR techniques (e.g. ARC3D, Bundler and PMVS2, CMP SfM, Photosynth and VisualSFM).