

## Raw image processing in for Structure-from-Motion surveying

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Consumer-grade cameras are now commonly used within geoscientific topographic surveys and, combined with modern photogrammetric techniques such as Structure-from-Motion (SfM), provide accurate 3-D products for use in a range of research applications. However, the workflows deployed are often treated as “black box” techniques and the image inputs (Quality, exposure conditions and pre-processing thereof) can go under-reported. Differences in how raw sensor data are converted into an image format (that is then used in an SfM workflow) can have an effect on the quality of SfM products.

Within this contribution we present results generated from sets of photographs, initially captured as RAW images, of two cliffs in Norfolk, UK, where complex topography provides challenging conditions for accurate 3-D reconstructions using SfM. These RAW image sets were pre-processed in several ways, including the generation of 8 bit-per-channel JPEG and 16 bit-per-channel TIFF files, prior to SfM processing. The resulting point cloud products were compared against a high-resolution Terrestrial Laser Scan (TLS) reference.

Results show slight differences in benchmark tests for each image block against the TLS reference data, but metrics within the bundle adjustment suggest a higher internal precision (in terms of RMS reprojection error within the sparse cloud) and more stable solution within the 16 bit-per-channel data.