



## **SF3M 2.0: improvement of 3D photo-reconstruction interface based on freely available software**

Carlos Castillo (1), Michael R. James (2), Rafael Pérez (1), and Jose A. Gómez (3)

(1) University of Córdoba, Rural Engineering, Córdoba, Spain (ccastillo@uco.es), (2) Lancaster University, Lancaster, UK, (3) Institute for Sustainable Agriculture-CSIC, Córdoba, Spain

During recent years, a number of tools based on Structure-from-Motion algorithms have been released for full image-based 3D reconstruction either freely (e.g. Bundler, PMVS2, VisualSFM, MicMac) or commercially (e.g. Agisoft PhotoScan). The SF3M interface was developed in Matlab<sup>®</sup> to use link software developments (VisualSFM, CloudCompare) and new applications to create a semi-automated workflow including reconstruction, georeferencing and point-cloud filtering, and has been tested for gully erosion assessment with terrestrial images (Castillo et al., 2015). The main aim of this work to provide an improved freely-available and easy-to-use alternative for 3D reconstruction intended for public agencies, non-profit organisations, researchers and other stakeholders interested in 3D modelling.

In this communication we present SF3M 2.0, a new version of the graphical user interface. In this case, the SfM module is based on MicMac, an open-software tool (Pierrot-Deseilligny and Cléry, 2011) which provides advanced features such as camera calibration and constrained bundle adjustment using ground control points. SF3M 2.0 will be tested in two scenarios: a) using the same ground-based image set tested in Castillo et al. (2015) to compare the performance of both versions and b) using aerial images taken from a helium balloon to assess a gully network in a 40-hectares catchment.

In this study we explore the advantages of SF3M 2.0, explain its operation and evaluate its accuracy and performance. This tool will be also available for free download.

### References

Castillo, C., James, M.R., Redel-Macías, M. D., Pérez, R., and Gómez, J.A.: SF3M software: 3-D photo-reconstruction for non-expert users and its application to a gully network, *SOIL*, 1, 583-594.

Pierrot-Deseilligny, M and Cléry, I. APERO, an Open Source Bundle Adjustment Software for Automatic Calibration and Orientation of a Set of Images. Proceedings of the ISPRS Commission V Symposium, Image Engineering and Vision Metrology, Trento, Italy, 2-4 March 2011.