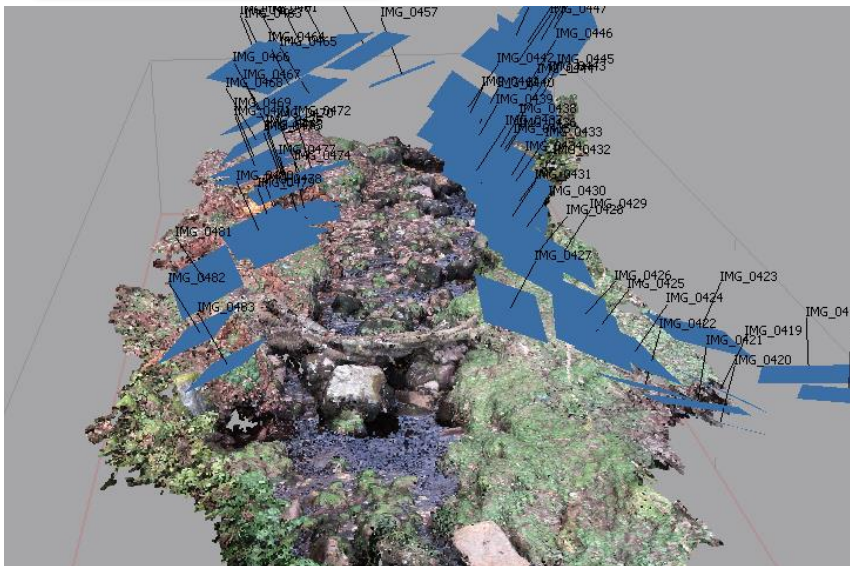


Using Structure from Motion Photogrammetry to Monitor NFM Projects

Mark Smith m.w.smith@leeds.ac.uk

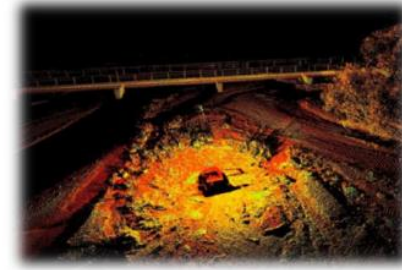
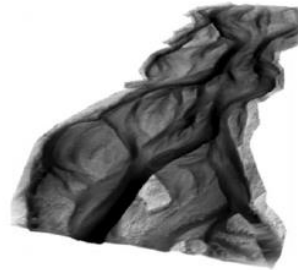
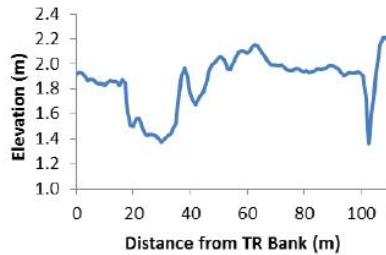


Dr Mark Smith

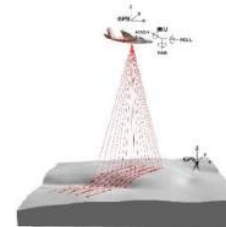
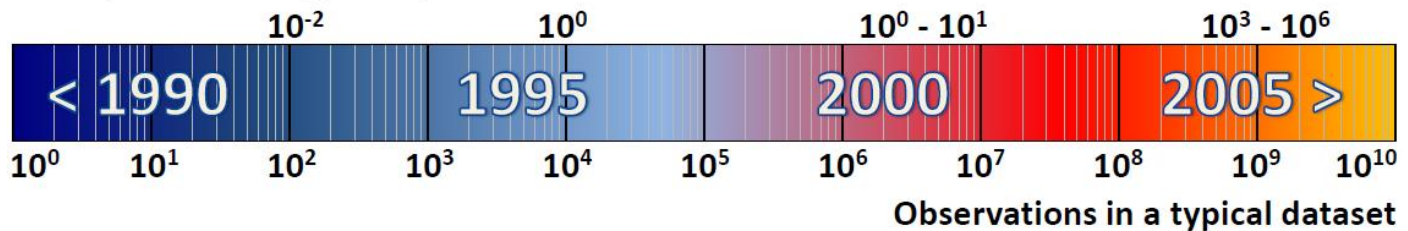
From Data Poor to Data Rich...



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Survey Resolution (pts/m²)

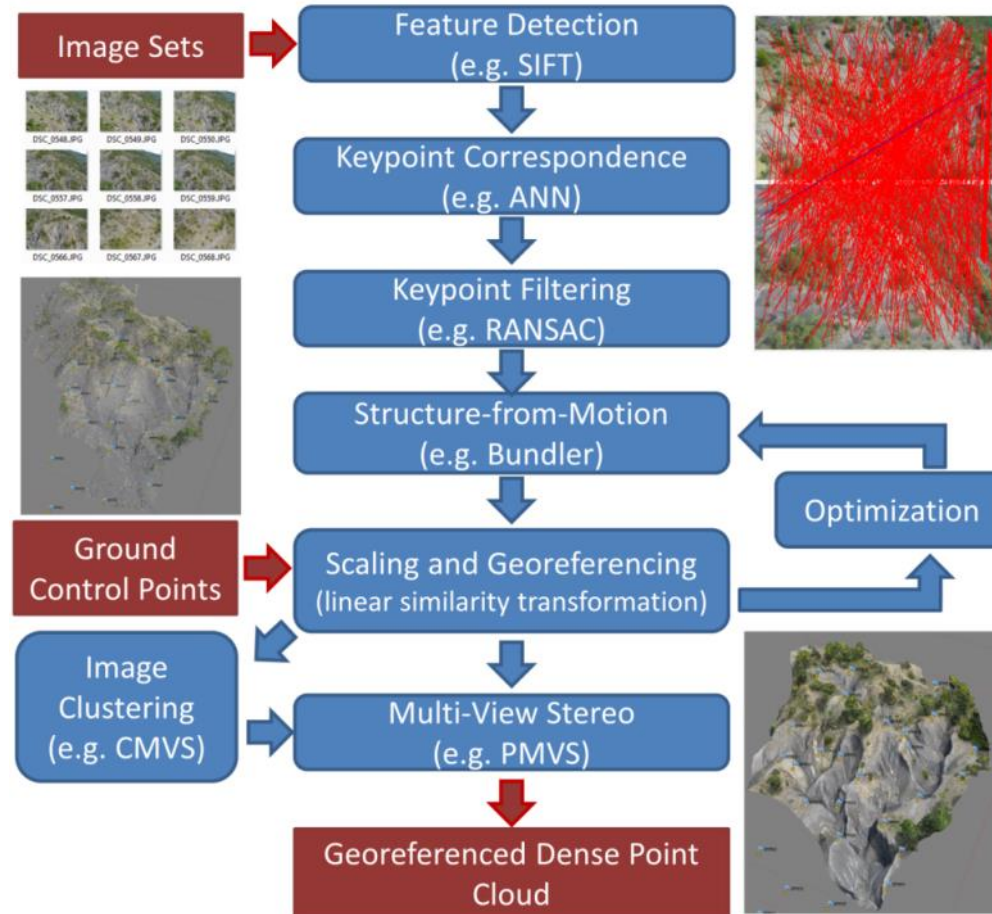


Background: What is SfM?

A Multi-Step Process



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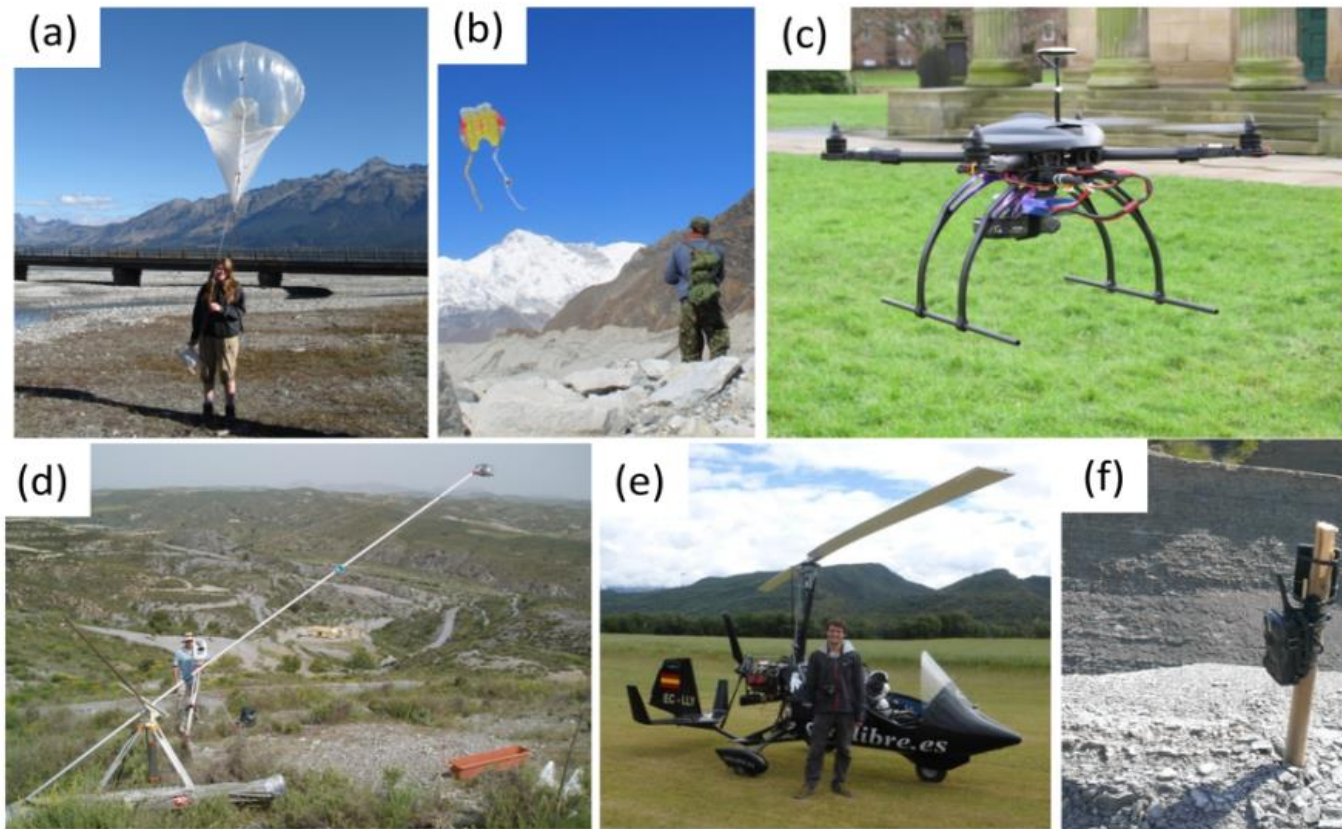
Smith *et al.* (2016) PIPG

Background: What is SfM?

Camera Platforms



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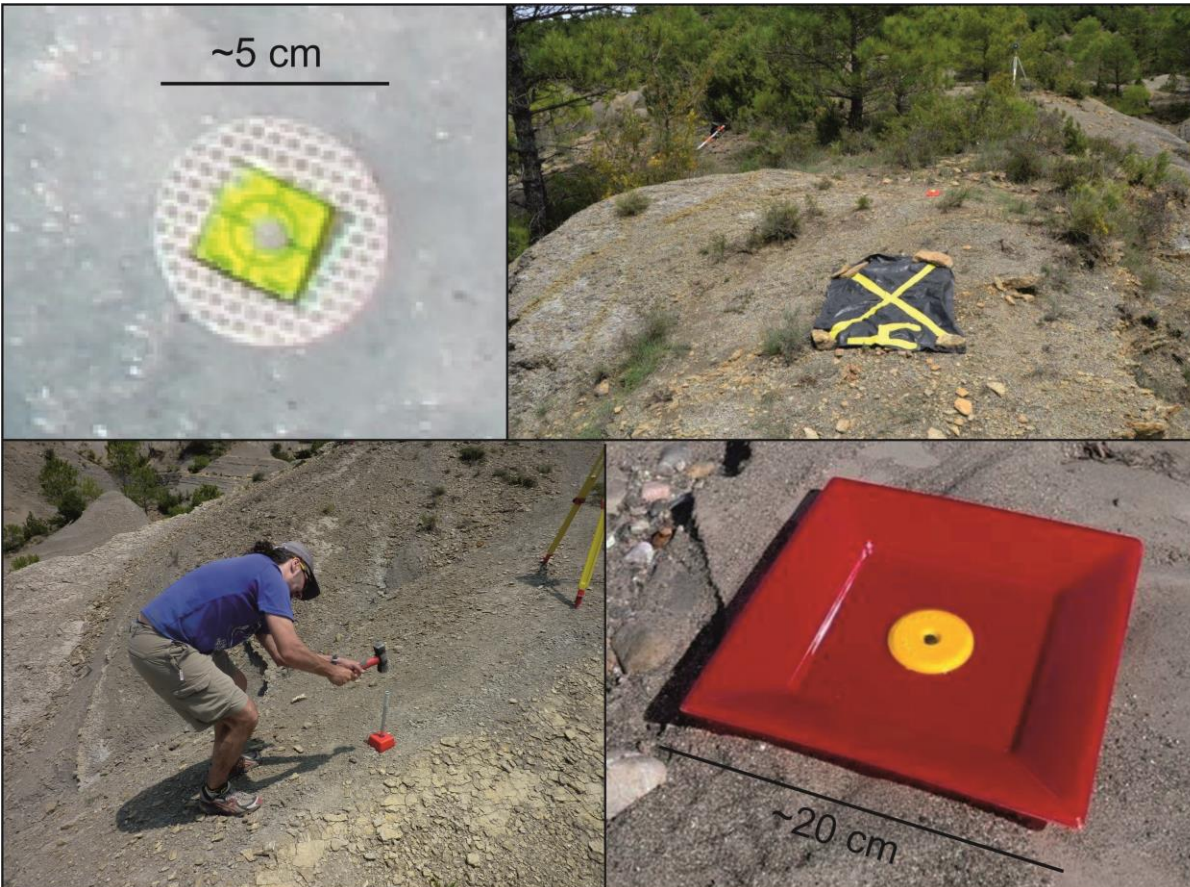
Smith *et al.* (2016) *PIPG*

Background: What is SfM?

Ground Control



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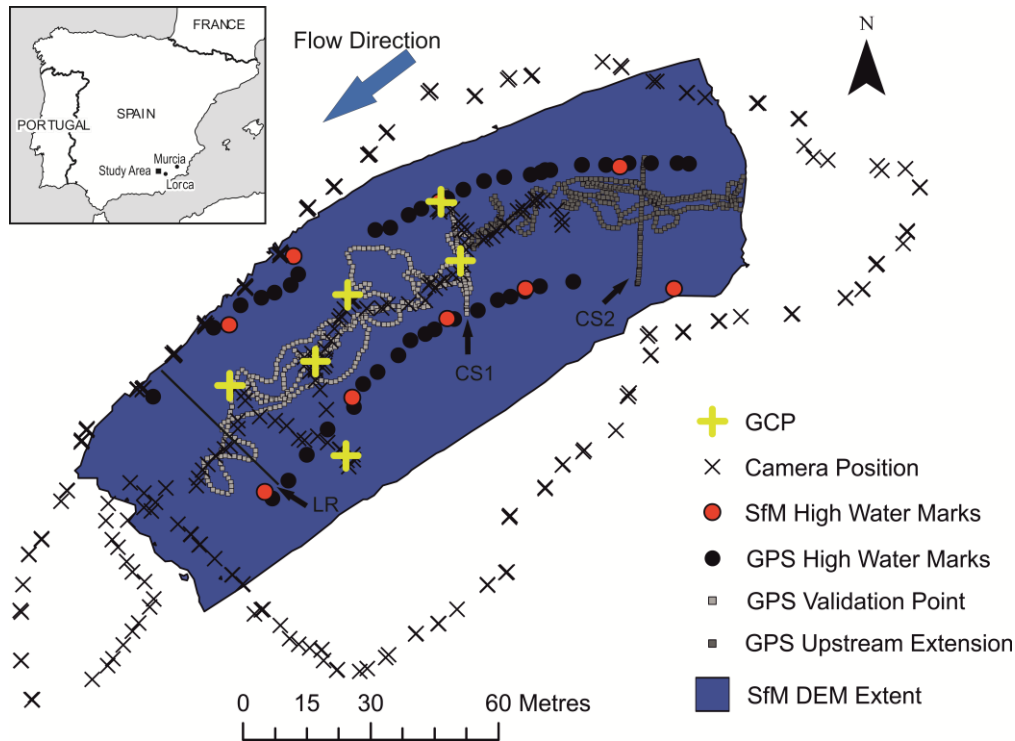


Background: What is SfM?

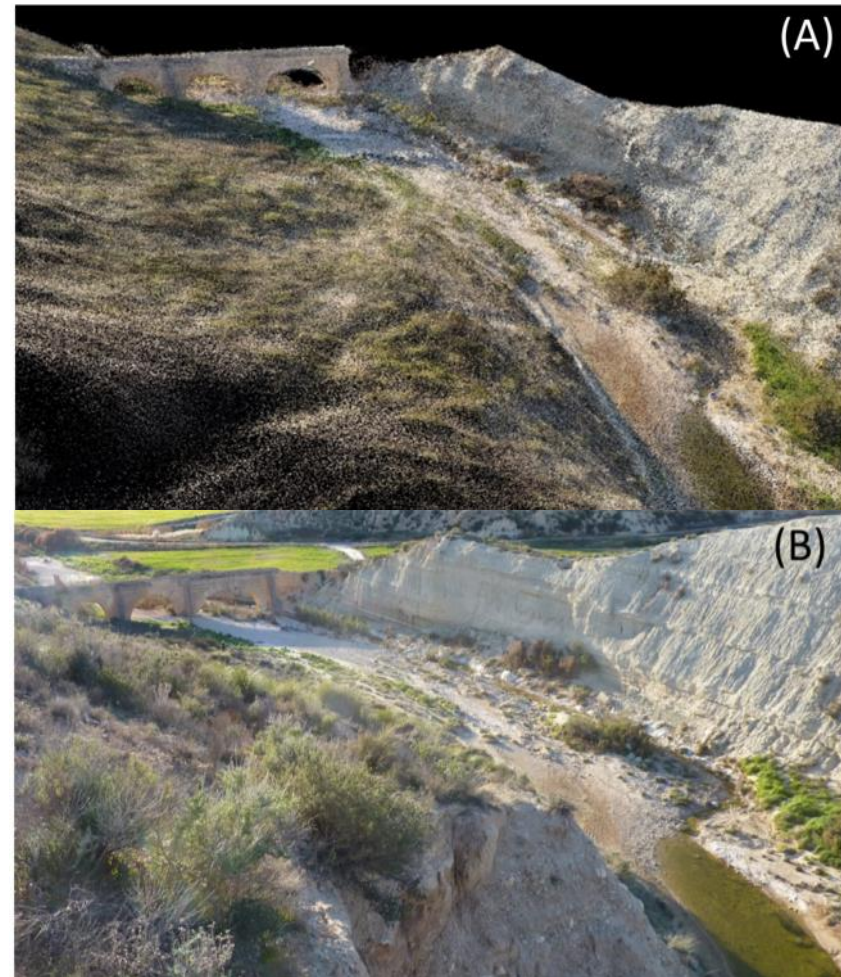
Reconstructing Event Magnitudes



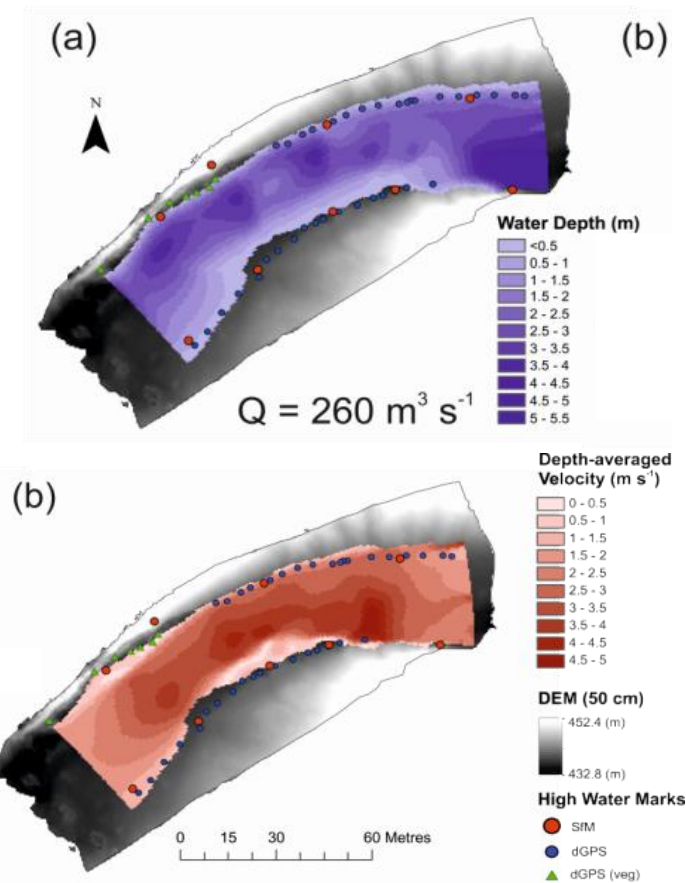
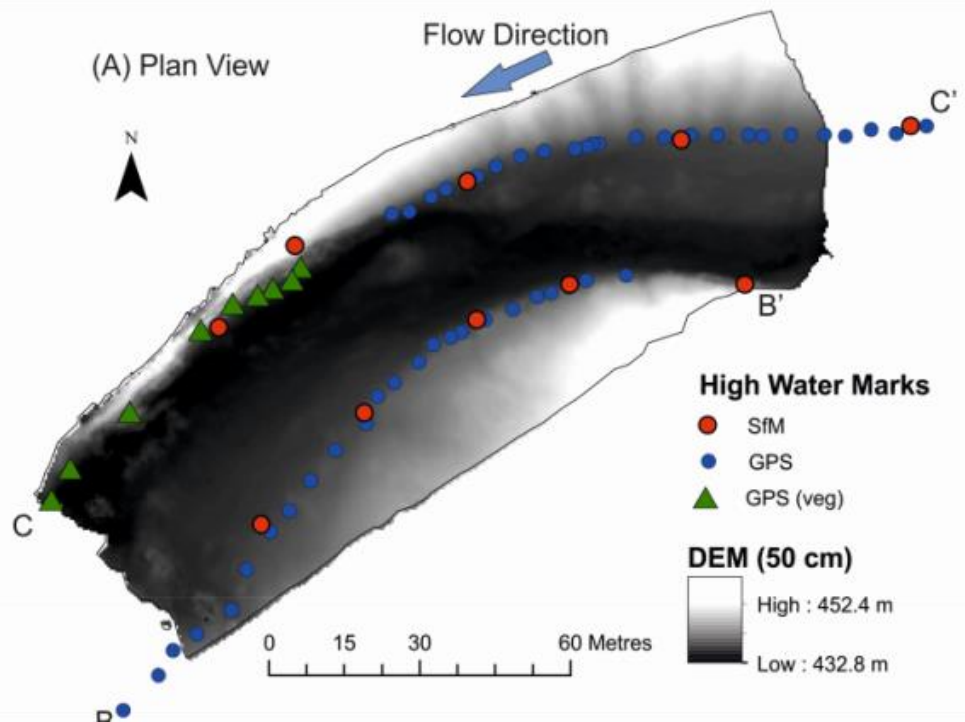
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Smith et al. (2014) *Journal of Hydrology*



Estimating flash flood magnitudes with SfM



Smith et al. (2014) *Journal of Hydrology*

Estimating flash flood magnitudes with SfM

Trail Cameras for Time-Lapse SfM



Zora van Leeuwen

Monitoring with SfM



- Visualisation
- Level Gauging
- Process Observation
- 3D Topographic Modelling
- Morphometric Sediment Budgets
- Automated alerts (?)



<https://skfb.ly/6GV6o>



Suitable for many types of NFM

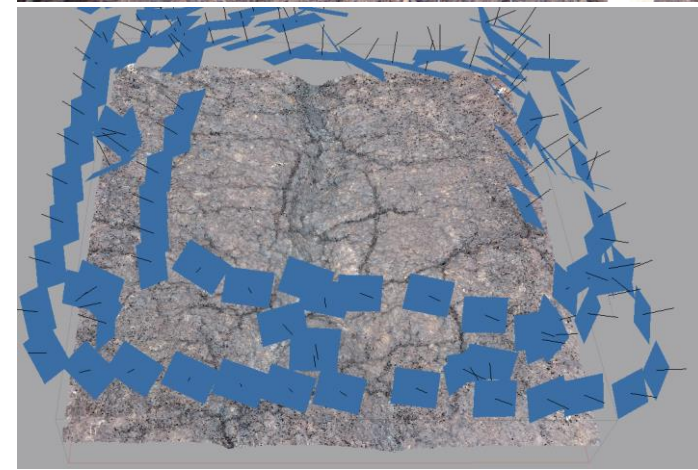


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29 June 2018

0 0.375 0.75 1.5 Kilometers



Saddleworth Example

Democratizing HD Survey

- Any camera will do
...but not a GoPro
- Take lots of pictures from lots of different places from different angles and scales
- More often than not, SfM will be 'good enough'
- Freely available software  AUTODESK® 123D®
- Scale using a tape, laser rangefinder or dGPS
- Our students are doing it!
- Data decimation now the bottleneck
- You're gonna need a bigger hard drive...



Happy Snapping