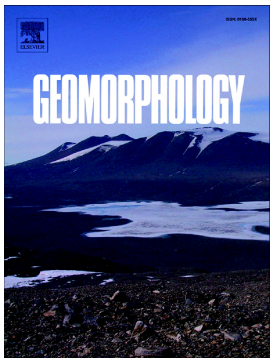

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Estimation of small-scale soil erosion in laboratory experiments with Structure from Motion photogrammetry

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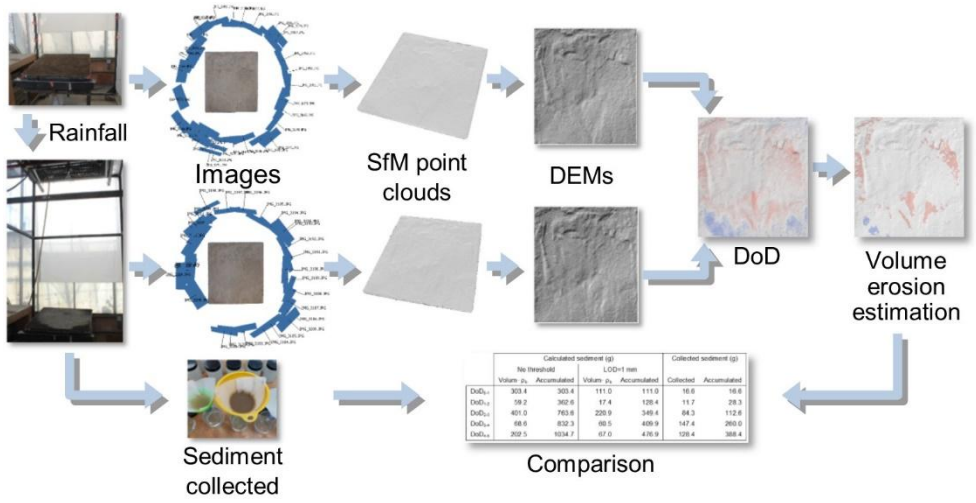
Highlights

- Convergent SfM provides reliable DEMs for microscale geomorphic change detection.
- Reliable results require rigorous DEMs georeferencing in a local reference system.
- Comparison with dragged sediment in runoff shows good agreement.
- Basic LOD_{min} thresholding shows right performance to detect tiny changes.

Graphical Abstract



Abstract

The quantitative estimation of changes in terrain surfaces caused by water erosion can be carried out from precise descriptions of surfaces given by means of digital elevation models (DEMs). Some stages of water erosion research efforts are conducted in the laboratory using rainfall simulators and soil boxes with areas less than 1 m^2. Under these conditions, erosive processes can lead to very small surface variations and high precision DEMs are needed to account for differences measured in millimetres. In this paper, we used a photogrammetric Structure from