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Evaluating sub-millimetre erosion monitoring in a mountain torrent

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Many geomorphological processes act slowly. To advance the understanding of important processes like river incision as inputs for landscape evolution modelling, there is need for high precision measurements. In this context two stone slabs installed flush with the stream bed of a mountain torrent are monitored following flood events to relate erosion to sediment transport.
In order to resolve sub-millimetre abrasion induced by impacting sediment particles, two surveying techniques have been applied to test their capability. Digital photogrammetry (ALPA 12 Metric) and fringe pattern projector sensor (GOM ATOS III) are compared regarding accuracy and precision based on the on-site reference system consisting of HUBBS targets plugged into brass anchors embedded in concrete. Detected surface changes can be checked against cutting rates from erosion sensors installed in the stone slabs measuring at 0.1 mm resolution. Further analysis will be used to develop best usage concepts regarding practicability, precision and accuracy for erosion monitoring in the field.