



A new approach for measuring microscale platform erosion: A comparison of the Transverse Micro Erosion Meter and Structure from Motion Photogrammetry

Niamh Cullen and Mary Bourke

Trinity College Dublin, Geography, Dublin, Ireland (cullenni@tcd.ie)

For decades researchers have used the Micro Erosion Meter and its successor the Traversing Micro Erosion Meter (TMEM) to measure microscale erosion of shore platforms. These instruments are relatively cheap and portable and have provided a wealth of information on the rate of platform downwearing at a range of locations and lithologies. These data allow an inference of processes operating on shore platform and have improved our understanding of shore platform evolution. Recently, geomorphologists have embraced Structure from Motion (SfM) Photogrammetry as a tool for detecting and quantifying geomorphic change at the landform and sub-landform scale. Until recently it has not been applied to sub-millimetre resolution topography with accuracies that would render it capable of measuring annual rates of downwearing on shore platforms. Here we present the results of a 3-stage experiment that compares TMEM measurements of downwearing on a simulated platform surface with high resolution SfM Multi View Stereo (SfM-MVS) Digital Elevation Models (DEMs). DEMs produced using a novel technique employed in a recent study of rock breakdown features on crater impacted rocks in Arizona. The results demonstrate that SfM-MVS derived DEMs can detect sub-millimetre scale abrasion of a rock surface with the additional benefit of identifying abrasion features that indicated the erosion process such as abrasion by clasts.