

# ***Interactive comment on “A comparison of Structure from Motion Photogrammetry and the Traversing Micro Erosion Meter for measuring erosion on rock shore platforms” by Niamh D. Cullen et al.***

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esurf-2018-55 Submitted on 02 Jul 2018 A comparison of Structure from Motion Photogrammetry and the Traversing Micro Erosion Meter for measuring erosion on rock shore platforms Niamh D. Cullen, Ankit K. Verma, and Mary C. Bourke

This paper offers an interesting and useful comparison between SfM and the TMEM methods. It helps to demonstrate how erosion measurements on shore platforms can be made across a range of scales from sub-millimetre to centimetres. While this is

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welcome I think the absence of a genuine field trial and data from a shore platform is a significant weakness. I suspect that such data are available and hope that some could be presented in a revised version of the manuscript to show that it actually worked in the field. This might help address my second main concern related to rock swelling. Throughout the paper there are many places where further reference to rock swelling is needed. Certainly in the consideration of SfM versus TMEM the value of the TMEM for the study of rock swelling has not been given enough attention. In addition to swelling the TMEM has enabled much shorter timescales to be considered. At line 53 – there needs to be a correction, since short times scales are actually hours not years based on a number of studies that have investigated rock swelling over hours and days. Can your SfM method detect short term variability in rock surfaces? Reference to this point is needed at line 115 needed.

Where multiple references are provided these must be in chronological order, not alphabetical (I suspect that is an artefact of using reference management software). It is important that chronological order is used so to recognised correct attribution and who made the contribution first. E.G. it is important that Spate et al is recognised before Moses et al 2014, since Spate clearly identified sources of error long before Moses.

Scale terms need far more careful definition, micro – meso and macro scales need to be defined with a range of values. E.g. at line 165, what is micro to meso?

I wondered if it is possible to expand the applicability of the paper by reference to rock erosion more broadly than just shore platforms. This should probably include reference to: Turowski, J.M. and Cook, K.L., 2017. Field techniques for measuring bedrock erosion and denudation. *Earth Surface Processes and Landforms*, 42(1), pp.109-127. After all the method is not limited to shore platforms and clearly has potential in any environment where bedrock erosion is of interest.

I find the use of the term “rock shore platform” unnecessary, it is almost a tautology – just shore platform.

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Line 65 The limitation to smooth surfaces is pretty well known, I don't think you can claim to have identified this limitation.

Line 142, what does "specially" mean? Needs explanations.

Line 145 how accurate is accurately? +/- how many millimetres?

Line 148 how was the bolt levelled? Move explanation from lower down up.

Line 150 you need to tell the reader what is the "high degree of relocation precision". Is this same as the Kelvin clamp used by the TMEM? Or is it +/- some number and unit?

Since this is a technical methods paper I think you need to provide a technical drawing of your bolt and plate so others can manufacture both themselves.

Fragments and granular need definition, what size are these?

Caption to Fig. 1 can you add some dimensions of the triangle angles so we get a better sense of scale?

Was the camera held by hand or placed on a tripod? Does it matter? Line 186 again what does "smaller-scale" mean?

A key point you have not made and this becomes evident at start of the results is that SfM is an order of magnitude lower in precession than the MEM.

Lines 368-69, actually I think the key is not factors such as cost (they are actually pretty similar if you cost the camera) but what questions are being asked and so at what scale are measurements required.

Installation times are way off here, it does not take 80 minutes to install a MEM site. An experienced operator with a good drill, can install a site in 20 minutes or less. If two people are operating together it can be very fast. The other factor is the rock type, more resistant rock, then yes a bit slower.

In section 3.3 you need to discuss the benefit the TMEM provides for investigating rock

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swelling, something you have not really dealt with, and not (yet) shown to be detectable by the SfM method. You need to say something about this in your discussion section as well.

Minor typos Line 63 Stephenson and Kirk 1966 – probably 1996 or is it 1998?? Cullen and Burke 2018 not in reference list. Verma and Burke without year or in press. Line 62 use and between moulds and gypsum

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