

Interactive comment on “Extant shore-platform stromatolite (SPS) assemblage” by Alan Smith et al.

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Interactive comment on “Extant shore-platform stromatolite (SPS) assemblage” by Alan Smith et al. Anonymous Referee #2 Received and published: 19 August 2017

In this manuscript the authors compare different stromatolite assemblages along the south-east African shoreline, compare in situ factors under which they form, and evaluate their potential to gain further understanding of Precambrian stromatolite formation as well as their potential as an indicator of previous life on Mars.

While the topic in general is interesting and a comparison of recent and ancient stromatolite formation across different geological settings may make an important contribution to our knowledge of this field, the paper appears rather descriptive and lengthy and may

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benefit from some restructuring and focusing.

Reply: I accept the paper needs focusing and shortening. Because this paper is trying to distill a facies association from a relatively newly documented Marine mineral precipitated stromatolite association it has to be descriptive. SPS is the only growing marine stromatolite environment that can be directly compared to an Archean marine fossil palaeoenvironment, ie Strelley Pool (Allwood et al. (2006) who interpreted the 3.4Ga stromatolite as stromatolites developed on a shore platform (wave-cut platform). This makes the SPS setting very important.

The SPS are mineral precipitated stromatolites, whereas Shark Bay and the Carribean are of the trapping and binding variety. Thus the SPS setting lends itself to a direct comparison with Archean stromatolite occurrences.

Work has been done on Cape Morgan, South Africa (Smith & Uken, 2003; Smith et al, 2005; 2011) and the Giants Causeway SPS (Cooper et al., 2013) and other SPS from the Eastern Cape, South Africa (Perissinotto et al., 2014; Rishworth et al., 2016; 2017; Edwards et al 2017) but no attempt has been made for a detailed comparison of all the known SPS occurrences. We do this in this paper hence it is very descriptive.

This paper compares all known SPS occurrences to determine similarities and differences. From this we try to distill an SPS facies association. As this is work on a new marine stromatolite setting it has to lean heavily on fieldwork and facies analysis and is thus descriptive.]

Ref 2: In the first place, I would suggest to modify the title in a way that it at least contains more specific information about this study or reflects the major outcome.

Reply: I agree to this. Perhaps the following might be better:

Geomorphological and Stratigraphical Aspects of the Extant marine shore-platform stromatolite (SPS) assemblage and comparison with certain Archean examples.

Ref 2: Similarly, the abstract appears as a listing of findings of this study. Here, a

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clear statement of the motivation of this study and highlighting the major outcome in C1 BGD Interactive comment Printer-friendly version Discussion paper one concluding sentence should be added.

Reply: I agree with this and it can be done.

Ref 2: The motivation of this work is stated rather clearly at the end of the introduction section. However, especially in the results section, a stronger structuring along the original research objectives would help the reader find their way through this large amount of detailed site information which is provided in the results section.

Reply: I agree with this and it can be done.

Ref 2: Although some of the site-related information is already presented in tables, comparison of key features across sites would benefit from a more condensed presentation in tables rather than in text. This way it would be easier for the reader to recognize in which key aspects the different study sites differ and what might be the most important regulating factors for stromatolite formation. This would also help the authors to check carefully if really all the aspects that they provide in the results section are needed for the discussion.

Reply: I think that this is a very good idea and should be explored. Perhaps the large table can be split up into several smaller with only the more important tables displayed in the main text, others can be in a supplement.

Ref 2: The discussion is already written quite concisely, however, a more direct reference to the objectives stated in the introduction would be helpful. For example, the discussion of the potential of SPS as Precambrian analogues remains rather superficial.

Reply: This can certainly be beefed up.

Ref 2: In addition, I have two concerns regarding the integration of aspects of microbiology. The authors integrated a longer section about the role of prokaryotes in

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stromatolite formation and the importance of the competition between prokaryotes and metazoans. However, this aspect is not targeted at all in the results section and only occasionally addressed in the discussion, and I was wondering why it was introduced so thoroughly in the introduction.

Reply: I accept this criticism and this section can be reduced. The purpose of the paper is not to prove that these are stromatolites as this has already been done and the relevant papers are quoted. The purpose of this paper is to fully describe the SPS geomorphological setting and to indicate its global (Archean and possibly extraterrestrial) significance. I can see that the introduction lacks a strong description on the geomorphological and stratigraphical focus of this paper. This needs to be clearly stated at the outset as the referees are clearly expecting a strong biological focus to follow.

Ref 2: In addition, some of the statements in this paragraph of the introduction (p. 2, l. 5-14) are not correct or are not sufficiently explained. What is meant by the statement that "Prokaryotes, however, do not react well to Metazoan competition"? (p. 2, l. 6). In line 10-11 "...but under contemporary conditions they can only thrive in extreme environments that limit Metazoan competition". Given the fact that you find about 10¹⁰ bacteria per gram forest or grassland soil, this statement does not hold or its meaning in this context here should be clarified.

Reply: This criticism can be circumvented by a condensation of the biological discourse as this is not the main thrust of this paper. However some of this may be required for the discussion.

Ref 2: Specific comments: p. 2, l. 4: "more plausible Precambrian stromatolite analog" - more plausible compared to what? p. 3, l. 25-27: What does it mean that prokaryotes dominate? What about unicellular eukaryotes in such environments? p. 4, l. 9: Which coastline, please specify. p. 4, l. 26-35: It is not clear which sites this information refers to. p. 8, l. 31-32: This is a rather vague statement: Why should these factors then be considered?

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Reply: These comments are accepted]

Discuss., <https://doi.org/10.5194/bg-2017-188>, 2017.

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