

Interactive comment on “Blooms of cyanobacteria in a temperate Australian lagoon system post and prior to European settlement” by P. L. M. Cook et al.

Anonymous Referee #1

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The manuscript by Cook et al. is very interesting and addresses the causes of cyanobacteria blooms in a temperate lagoon system. The study is well done and uses dated sediment cores with the analysis of proxies related to eutrophication and algal production. The sediment data are combined with historical archives on settlement and development of the basin. The authors describe the environmental history of the basin and the impact of humans. The manuscript will make an important contribution and supports previous related work on the occurrence of cyanobacteria in low salinity coastal marine ecosystems.

I have no large concerns regarding the significance of the contribution or the scientific

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quality, however, the paper needs some organization of the discussion to add structure, but more important to increase its readability and impact. The manuscript needs topical headings instead of one large discussion section. Perhaps the sections could be at the start of discussion (Impact of settlement), top of page 18841 (Eutrophication and cyanobacteria blooms), and then page 18842 line 1 regarding 3 key factors – this section is the key to the discussion. With this revision the manuscript will become a valuable contribution to the literature.

Specific comments

Sediment dating – It is not clear how the CIC model was “modified” (page 18834, line 21). Why not use a CRS model? It seems like it might be more appropriate given the changes in sedimentation rates. I don’t think the dates will change significantly enough to change the interpretation, but it will be more correct. However, my other concern with sedimentation rates are changes in sediment mixing through time. The most serious potential change in sedimentation rates could occur with the appearance of large sediment mixing polychaetes with increases in salinity, or the contrary e.g. the loss of organisms with oxygen depletion.

Pigments – Were samples shielded from light during the freeze-drying process or handling prior to pigment analysis? Studies have clearly shown the importance of protection from light (L&O Methods, 2005, 3:477–487).

Section 3.2 – How were the three broad zones determined? What program (C2, R) or what procedure was used to delineate the zones?

Page 18841, line 5. “calibrate” – not sure that is what you mean. Please rewrite.

“Cyanobacterial” is used several times. I think the more correct form is simply “cyanobacteria”