

Interactive comment on “Wind regimes during the Last Glacial Maximum and early Holocene: evidence from Little Llangothlin Lagoon, New England Tableland, eastern Australia” by James Shulmeister et al.

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Please note that the attached paper file includes revisions for all three reviews. The new supplemental data is attached to the reply to referee 2.

We thank the reviewer for a very constructive and helpful review. In response to his general points – some additional text has been added in the intro and discussion to highlight the long-running debate on the westerlies in Australia. Secondly we have now added particle size information into the supplementary data to assist in the interpretation of our data. We have made minor changes to Figure 1 that should make it

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easier to read. On the technical comments we have added further information about the sediments in the lake at LLL during the LGM to the supplementary data and cited a regional pollen record to show that the east coast at this latitude was not arid.

Line 179 Calling this a dunefield is confusing. We have relabelled it as a lunette, as suggested by the referee.

Line 186. Plotted on Figure 1. Raw particle size analysis data are added as "Supplementary Figure 1"

Line 198. "on" changed to "and". This removes the need for hyphenation.

Line 201 'convex-up' has been hyphenated as requested.

Line 210/211. Actually all the reflectors discussed in the text are visible in the figures. We have revised the figure captions to highlight this.

Line 219/223 (revised lines 225-228). "the entire landform was formed during the LGM". We acknowledge that this is misleading and it was not our actual intent to imply this when writing the paper. We have changed the text to state that the lunette was active during the LGM and to explicitly state that the original formation of the lunette was likely much earlier.

We did not attempt to date the surficial sediments above ~30 cm owing to the confounding effects of bioturbation and other disturbance on single grain OSL results. Landforms that have long been stable show an apparent age that decreases towards the surface. Below ~30 cm, the consistency of the OSL results strongly suggests an apparent age related to depositional events. We expect that deeper coring of the sandy lunette dune at Little Llangothlin may reveal a longer depositional history that may (or may not) be contemporaneous with ages of up to 70 ka for nearby lunettes and dunes (informally reported in Beck et al., 2015).

Beck, W., Haworth, R., and Appleton, J.: Aboriginal resources change through time in New England upland wetlands, south-east Australia, *Archaeol Ocean.* 50, 47-57,

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2015.

Line 221 (225 in revised version) the pedogenesis is quite secure so we have added the word 'strongly' before suggest.

Line 240. (243 in revised) barrier has been replaced with "sand and gravel berm".

Line 289 sand drift direction from Fryberger. Without undertaking a full modern drift potential analysis it is very easy to demonstrate that most sand blowing winds would occur in winter. This has now been demonstrated in the text (revised lines 304-316) and added to the caption of Fig 4

Line 292 – clarified to outline that the poor sorting is not unexpected.

Line 310-312. (314-317) We have a pollen paper coming from LLL but it is in revision and the lunette paper has now overtaken the pollen work en route to publication. A quick summary of our unpublished sedimentary data are now provided to support the concept of a full lake and we have added a citation for the survival of rainforest through the LGM at this latitude in eastern Australia.

Line 318. Clause added to highlight that winter westerlies occur at Stradbroke Island today.

Line 319. "Several records of varying quality showing high lake levels at the LGM." The records suggested all have caveats. We cannot use Lake Urana, because lake levels are controlled by the position of the Murrumbidgee palaeochannels. If the main flow of the Murrumbidgee was still routed along Yanco Creek, then Urana would be full from overflow along Colombo Creek.

Line 320. "Unless you provide a pdf or similar this is not substantiated". We have chosen to present the OSL data in radial plots, which like probability distribution functions, show the error on individual ages as well as the central ages. Radial plots are the standard means of visually representing OSL data. We appreciate that they are not always easy to interpret for readers unfamiliar with OSL data, but they are an effective

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way to evaluate single-grain results in this age range. A brief introduction to reading the radial plots is included in the figure caption.

In addition, statistical analysis of the single grain OSL results has been conducted using the Finite Mixture Model of Galbraith and Green (1990). This identifies individual populations of single-grain doses and the proportion of sample (and the range) contained within each population. The results of the Finite Mixture Modelling are shown in Table S2 and indicate two dominant dose populations for the lunette samples. (But note the comment in the Discussion about a weak third peak at 4.5 ka in EVA-1230.)

Line 325. Disturbance and bioturbation factors that may have mixed sand grains between depositional layers include bioturbation and other soil forming processes, aeolian and other geomorphic processes, and disturbance by humans or fauna.

Line 335 (341) changed from 'dune' to 'foredune'.

Line 340. Reinfelds et al (2015) has now been included. The increased snowpack is unproven but quite reasonable and likely to divert water to overland flow filling up the lagoon. Hesse et al., 2003 has also been cited to support arguments for reduced evaporation under lower temperatures.

Line 351. Inclusion of Page et al., 1996. This ref we think should be Page et al., 1994. We would prefer not to cite this Lake Urana reference as the ages are very insecure – they are TL and, if correct, significantly older than our site.

Line 355-356 (revised 363-364). We agree that this is an over-interpretation of our data. The sentence on the westerly jet has been deleted. We have also highlighted that the LGM supports either no change or northward displacement but does preclude a poleward contraction of the westerlies in this sector.

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/cp-2016-41/cp-2016-41-AC1-supplement.pdf>

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