Climate of the Past
Discussions

Interactive comment on "Low-resolution Australasian palaeoclimate records of the last 2000 years" *by* Bronwyn C. Dixon et al.

Bronwyn C. Dixon et al.

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General comments

This is a very clearly written manuscript, making a convincing case for compiling multiple low-resolution archives of past environmental/climate change in the Australasian region. The paper could be useful for future palaeo-studies in the region and could inspire research teams to produce similar compilations for other regions.

Specific comments

Which calibration curve was used for the terrestrial sites, SHCal13? Make this clear within the methods.

Response: SHCal13 was used for terrestrial sites, and Marine13 was used for marine sites. This selection will be clarified in the methods section.

For the marine sites, how were marine dR values and their uncertainties estimated, e.g. using http://calib.org/marine/ ? Which data-points were used to estimate dR values for each site? Please provide this information as supplementary information or at your NOAA archive, so that others can replicate your findings.

Response: Marine dR values and uncertainties were taken from the original publications. This will be clarified in the methods section. An additional column in table 1 will provide links to the NOAA archive of the original publication, so that others can easily find the original dR values.

p1 line 16, what are progressive Bayesian techniques?

Response: The word 'progressive' will be removed for improved clarity of the abstract.

p2 line 4, but one could argue that during this recent time, human impact might have affected more of the proxy records. Could this potentially be a problem in some of your sites?

Response: Yes, it is possible that human impact has affected the proxy records during this time. This point will be clarified in the introduction of the manuscript. However, there is potential for human impact at longer time scales, particularly in regions of the world with long occupation histories. The authors argue that the chronological constraints available for palaeoclimate records during the last 2000 years provide a vital opportunity to investigate potential human impacts at individual sites as well as investigation of climate signals. Within New Zealand, human impact is only recognised during the last millennium (Horrocks et al., 2007, McGlone and Wilmshurst, 1999)(Horrocks, M., Nichol, S. L., Augustinus, P. C. & Barber, I. G. 2007. Late Quaternary environments, vegetation and agriculture in northern New Zealand. Journal of Quaternary Science, 22, 267-279.; Mcglone, M. S. & Wilmshurst, J. M. 1999. Dating initial Maori environ-

mental impact in New Zealand. Quaternary International, 59, 5-16.). For this reason, comparison of records from the first millennium CE versus the second millennium CE could highlight potential human impact on palaeoclimate proxies.One of the selection criteria for high-quality records in this study is 'a demonstrated relationship between the proxy(ies) and at least one climate variable, as stated in a peer reviewed publication'. It is the assumption of this study that this criterion will identify the records where the climate signal is stronger than any potential human impact. In many records, the climate signal and human impact can be independently identified through a multi-proxy approach and/or lab-based theoretical investigations of proxy-climate relationships. The high quality records are available in their entirety on the NOAA data center. Individual researchers may make the choice to exclude the most recent section of any given record, which is the time period most likely to have human impacts.

p6 line 12, don't forget to list the error associated with having non-dated levels, and thus requiring an age-model that provides realistic estimates of uncertainties (as you explain later, on p7 lines 16-24). Perhaps cite Bennett, K.D. 1994 (The Holocene 4, 337-348), Telford et al. 2004 (Quat. Sci. Rev. 23, 1-5), and Trachel & Telford 2016 (The Holocene doi:10.1177/0959683616675939).

Response: A sentence discussing the age uncertainties in sedimentary records, as contained within undated layers, and the need for age modelling to estimate interpolation uncertainty will be added. The suggested references will be included.

Perhaps cite Flantua et al 2016 (Climate of the Past 12, 387-414) for another recent compilation of regional chronologies.

Response: Although there is some similarity between the approaches, the authors feel that Flantua et al., (2016) does not support any of the specific points made in this paper. Future work could discuss the similarities and differences between the PAGES2k regions, but such a comparison is outside the scope of this paper.

p8, line 18, Bacon does not exclude outliers but deals with them through using student-

t distributions for all dates as default (not student-t tests) - these distributions look much like normal distributions but have wider tails. As a result even dates that seem outlying to our eyes (i.e. lying far away from the model and neighbouring dates) will often still fit the age-model (probability distribution >0 at the age-model at the depth of said date).

Response: The authors acknowledge the incorrect and unclear information concerning the identification and treatment of outliers within the BACON package. This section will be updated and clarified for more correct information about outliers in this study.

Language

p12 lines 22-24, check sentence

p13 line 12, associated & line 18, influenced

p17 line 29, Indonesian

p18 line 11, shown

p22 line 4, renewed efforts to renewed efforts to

p25 line 24, diversity

p26 line 25, Past Global Changes (not glocal)

Response: The authors acknowledge the typos identified by reviewer #2. The manuscript will be carefully edited by all coauthors in order to identify and correct these, and any additional, typographic errors.

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