

## ***Interactive comment on “A standardized database of Marine Isotopic Stage 5e sea-level proxies on tropical Pacific Islands” by Nadine Hallmann et al.***

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This paper provides a thorough compilation of last interglacial (LIG)/marine isotope stage 5e (MIS 5e) relative sea-level (RSL) data derived from reef records on Pacific Islands covering a broad range of tectonic and oceanographic settings. The authors have done an excellent job in collecting, organizing, describing and to some extent evaluating this voluminous dataset. I have only a few comments for consideration related to the evaluation of the data and in the organization of the manuscript.

The description of RSL indicators given in Section 3 and Table 1 seems somewhat narrow keying on “the highest in situ corals”. While coral assemblages are mentioned as providing more accurate indicators of paleosea levels, this does not seem to be part of

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the final evaluation of the data, which appears restricted to assessing the depth ranges of individual species (or genera) and how precise they are in establishing past sea level positions. Additionally, there is no mention of coralline algae as important indicators of paleosea level, though realistically there is likely rare mention of coralline algae in the LIG studies examined. I would echo earlier comments by Blanchon that facies analysis is another critical component of paleosea level determination in conjunction with identification of coral-algal assemblages. Recognizing that the studies reviewed in this effort provide a broad range of sedimentological and paleoecological data, from very little to very thorough, evaluating the validity of each paleosea level determination is a daunting task. However, I think it would be worthwhile to establish what an “ideal” dataset would consist of so that studies may be evaluated based upon how close they come to achieving this ideal.

Assessing the quality of the radiometric ages based on their margin of error is a practical approach. Those ages with very narrow margins of error are predominantly more recently determined by mass spectrometric techniques and are likely the most accurate. Still, there is no mention of geochemical criteria (e.g., U and Th concentrations, initial  $\delta^{234}\text{U}$ , etc.) for evaluating closed versus open system behavior of radioisotopes. These criteria are probably only practical in evaluating more recent studies (the last 20 years or so) where this information is provided, but are extremely important in establishing quality of radiometric ages. Potential problems of recrystallization of original coral-skeletal aragonite to calcite are discussed in Section 6.6 and the authors importantly note that this information is lacking in many early studies. In previous sections of the manuscript ages are often described as ‘reliable’ or ‘accepted’ based upon a reported calcite content (indicative of recrystallization) of <3%. Calcite content is a critical first filter for U-Th ages. However, even samples that pass this mineralogic test can later be found to exhibit open-system behavior with respect to U and/or Th when precise geochemical measurements are conducted as part of the dating process (i.e., the geochemical criteria that I mention above).

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I am not sure if there are formatting guidelines that dictate the order of the different sections. However, I would recommend placing "Section 6.6 - Uncertainties and data quality" near the beginning of the manuscript, at least prior to Section 5. In reading through the paper and seeing ages or RSL indicators deemed as reliable or accepted, I kept wondering what criteria were being used. I did not encounter this info until near the very end of the manuscript. I think it would be more useful up front. Section 5 might be better titled as "Relative sea-level records", to better differentiate it from Section 3. Finally in Section 3, I was confused by the statement: "Records which had the following characteristics were excluded from the analysis: (1) those for which the difference between Max Depth and Min Depth were  $> 0,2$  m". Forgive me, but I don't understand what is being said here. Is this ecologic range?

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