

## ***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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We would like to thank Barbara Mauz for her comments on our review of MIS 5e reef deposits from tropical Pacific Islands.

We agree that tropical Pacific islands are a key area for sea-level reconstruction. As stated in section 7 ‘Future Research Directions’, “*RSL change reconstructions require the combination of reliable radiometric ages and elevation measurements, as well as an accurate estimate of palaeo-water depths deduced from the modern distribution of relevant reef communities*”. However, our newly compiled database (Hallmann and Camoin, 2020), which is based on data from about 300 published papers and

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284 data points from 35 studies concerning MIS 5e, has demonstrated that most of the studies that have been carried out on tropical Pacific islands do not satisfy these requirements, thus hampering the accurate reconstruction of LIG RSL history. In the reviewed studies, potential sea-level indicators are restricted to corals that are generally identified at the genus or family levels and no modern analog quantitative information is reported. In addition, sedimentological and morphological data are barely described, thus hampering the accurate reconstruction of the relevant reef systems.

Mauz' comment: *“the sea-level indicator is a coral-reef terrace; its IR is determined from the average water depth of a single coral species; the two selected databases (OBIS, IUCN) used to determine the average water depth provide similar, but in some cases also very different minimum and maximum living ranges for individual species. As a result, the IR of the indicator range from 2.7 m to 30.0 m. For the Yucatan peninsula Simms (2020) uses the same indicator and determines an IR ranging 1.0 – 9.1 m because his corals grow in Atlantic waters and he follows Hibbert et al. (2016)”*, does not refer to a specific coral taxon, so that the issue cannot be precisely identified. The depth range of 2.7 m to 30.0 m that is indicated suggests that this could concern *Porites lutea* (see Table 2 in our manuscript). However, Simms (2020) uses depth ranges published in Hibbert et al. (2016) for *Montastrea annularis*, *Acropora palmata* and *Acropora cervicornis* (derived from the OBIS database), but does not refer to *Porites lutea*.

We have summarized the best estimates of palaeo-water depth intervals for corals that were quoted in the literature, based on the OBIS and other databases (e.g., IUCN) that list modern counterparts from the whole Indo-Pacific region. IUCN reports only the maximum and minimum depths for each species, based on published data. OBIS is a more detailed database, which allows to define distribution curves and to predict

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the depth ranges at which the relevant species can be found with the highest probability.

No study related to LIG reef systems from the tropical Pacific islands includes a detailed description of *in situ* reef assemblages that is required to more accurately constrain palaeo-water depths, as it has been demonstrated over the last two decades by the pioneer works of Montaggioni et al., 1997; Cabioch et al., 1999a, b and Camoin et al., 1999 (see review in Camoin and Webster, 2015). This therefore implies that the "RSL from single coral" description scheme needs to be improved and that there is no "one fits all" approach when it comes to sea-level data standardization, especially when data is older and not all metadata is reported. We agree with Alessio Rovere that "*‘remote’ indicative meaning (i.e., based only on hydrodynamic considerations), should only be adopted only when no quantitative data on modern analogs is available*".

In section 7 of our review, we state that "*Future research directions may therefore require to revisit LIG reef records from tropical Pacific islands, especially the key ‘reference sites’ (e.g., Papua New Guinea, Hawaii, Vanuatu), in order to collect the missing information that is crucially needed to reconstruct properly LIG RSL changes*". We note that Alessio Rovere stated in his comment that "*(. . .) when all the data will be standardized within a single database, it will be relatively easy for any end-user to back-calculate paleo RSL from the primary data using different indicative ranges for selected proxies, in case better modern analog data or better interpretations will become available*". This demonstrates that the standardized MIS 5e database provides an excellent tool for future LIG sea-level research as any missing information can be added to the WALIS database at a later stage for a more accurate reconstruction of MIS 5e RSL changes.

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