

Earth Syst. Sci. Data Discuss., community comment CC1
<https://doi.org/10.5194/essd-2021-345-CC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on [essd-2021-345](https://doi.org/10.5194/essd-2021-345)

Barbara Mauz

Community comment on "MIS 5e sea-level history along the Pacific coast of North America" by Daniel R. Muhs, Earth Syst. Sci. Data Discuss.,
<https://doi.org/10.5194/essd-2021-345-CC1>, 2021

I truly enjoyed reading this well-written paper. It exemplifies how to review a subject and how to link early ideas to today's thinking. Notwithstanding, after around half of the text I was puzzled.

With the Walis project aims in mind, i.e. standardising model-independent approaches for determining sea-level index points: what exactly is the RSL indicator here? Is it a marine terrace, a coral terrace, a shoreline angle? Ok, the angle is a clear concept and easy to identify in the field (unless it is covered by slope deposits as depicted in Fig. 3) but how is the spatial relationship defined between the fossil dated, the terrace surface and the shoreline angle? In Fig. 3 a "simple" and a "complex" case of a marine terrace is depicted and the terrace deposit is composed of pebbles and (transported?) molluscs fossils. The complex case would be the one where an additional terrace forms above the lower one, hence the subsiding coast is the complex example. What about uplifting coasts and reef platforms? None of the U-series dated corals was in primary growth position suggesting that the sample was collected from the subtidal reef slope or interior platform. Fig. 6 illustrates the method approach using photos from the LACMIP locality – how does this approach relate to WALIS? How do pholads allow to estimate max shoreline angle elevation? I do not find the terms 'bench' and 'pholads' in Rovere et al.

Does this affect the data presented in the WALIS database? In record ID3832 (arbitrarily selected) the indicator is 'marine terrace' (sensu Rovere, I guess), the coral used for dating (*Porites panamensis*) was found in 3.1 m elevation (Table S1; no uncertainty), the shoreline angle is at 8.7 ± 1.6 m (this is a 18% error; the elevation measurement technique is given as 'not reported'), RWL is -0.03 m and IR is 1.06 m and, logically, WALIS calculates the sea level to have been at 8.73 ± 1.68 m. According to the IUCN database *Porites panamensis* occurs on coral reef communities growing on rocky substrates, at depth ranging 0 - 36 m. Following Hallmann et al. who followed Hibbert et al. 2016, 2018, this database (together with OBIS) is regarded as being the standard for coral-based SLIPs in WALIS – am I wrong? Daniel Muhs indicates 0 - 10 m for all corals in the study area following Glynn and Ault (2000) who focused on coral life history and population dynamics since the closure of the central-American seaway. There is no explanation as to how one of the key parameter in WALIS, that is the RWL, was inferred or calculated and it looks as if the tidal range, albeit minor, was not taken into consideration at all.

No doubt, ocean currents, ENSO cycles, the virtual absence of extended rocky shelves and

the geological history of the north-central American coast, all together control the shape of marine terraces, reef assemblages, reef construction, growth and shape. I feel that 'marine terrace' does not describe the sea-level indicator(s) that occur on the north-central American coast.

Lastly, I feel the paper would benefit if Figs 3, 18, 19, 21, 28, 36a include a key and/or a scale and if standards for numbers are followed: value and corresponding uncertainty must have the same number of digits.