

## ***Interactive comment on “Projecting the risk of damage to reef-lined coasts due to intensified tropical cyclones and sea level rise in Palau to 2100” by Chuki Hongo et al.***

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We would like to thank Prof. Lucien Montaggioni for your time spent and we greatly acknowledge the constructive and very helpful reviews. All comments have been carefully addressed. Broadly, we have improved two points. Please see also supplementary PDF for our detailed response.

(1) The reviewer is wondering a capacity of arborescent *Acropora* typified by gracile branching colonies to resist higher water energy. We agree about the comment and this was not fully explained in the original manuscript. We clearly describe a reason to assess future reef production rates of corymbose *Acropora* facies than arborescent

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*Acropora* facies by 2100. Future sea-level rise is predicted to range from 0.24 m to +0.30 m by 2050, and from +0.44 m to +0.98 m by 2100 (Church et al., 2013). It means that future reef crest will be characterized by a high wave energy condition. The arborescent *Acropora* will less contribute to reef formation by 2100 because of the corals are overturned and broken under the high wave energy conditions. In contrast, the corymbose *Acropora* facies at a high-wave energy condition is composed of robust *Acropora* corals and it contributes to reef formation. Therefore, we estimate a reef production rate for corymbose *Acropora* by 2100, based on the analysis of reef drillcore and future sea-level rise.

(2) The reviewer is wondering a relationship between upward reef growth and its porosity, especially the reviewer surprise a sentence of “our results indicate no significant upward reef growth in response to changes in WLs” in page 9 Line 15. We clearly explain the sentence. This sentence indicates that there is no significant change in WLs between a degraded reef and a healthy reef. This can be explained by the nature of coral reefs, which are porous structures characterized by a high degree of water permeability. It implies that sea water permeates through the reef framework due to porosity, even if the reef crest is characterized by a three-dimensional structure. Therefore, there is no relation of water level between a degraded reef and a healthy reef.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-3/nhess-2017-3-AC1-supplement.pdf>

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