

## ***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.***

**Chuki Hongo et al.**

g123001@sci.u-ryukyu.ac.jp

Received and published: 7 July 2017

We greatly acknowledge the constructive and very helpful reviews given by Referee #2 (Dr. Alberto Armigliato). All comments have been carefully addressed. Broadly, we have improved three points. Please see also supplementary PDF for our detailed response.

(1) The referee is wondering for the reasons motivating the choice of Melekeok. The original manuscript is lacking in the description. We focused on Melekeok site because of four reasons: (1) The capital of Palau is located at the Melekeok. (2) Melekeok as well as Koror was traditionally powerful village for the history of Palau (Rechebei and

C1

McPhetres, 1997 History of Palau). (3) People settle the coastal area that located a few meter above the present mean sea level. (4) We use a forecasting wave data by the Global Forecast System (GFS) model for Melekeok. We clearly describe the reasons in a revised manuscript.

(2) The referee is wondering whether water level by our wave calculation correspond to observed data of water level on the study site during recent tropical cyclones (This is a same question of Referee #1). We attempted to find an observed data of water level in Palau Islands. Unfortunately, there is no in situ observation systems for water level on shore using underwater loggers and/or radar observational systems in Palau Islands. However, local people said that the road (+2.86 m above MSL) along the shore at the study site was flooded at this event and local people had never seen for a past ca. 70 years. Although the eyewitness record was not quantitative data, our water level simulation showed the flooding event at a modeled tropical cyclone (i.e., Typhoon Bopha) (Please see new Figure 3 on our detailed reply).

(3) The referee is asking an impact of tsunami on the study reef. We are also interesting in impacts of tsunamis. We attempted to find historical records of tsunami around the study site, but the records around the Palau Islands are poor (Wolanski and Furukawa, 2007 Coral Reefs of Palau; International Strategy for Disaster Reduction, 2009). For a different research, we attempted to reconstruct past tsunamis using geological evidences (e.g., deposited reef boulders) at the study site (we have submitted our results to an international journal). According to our observations, even if some tsunamis have inundated the reef for past several thousand years, the hydraulic forces are assumed to have been lower than those associated with Typhoon Bopha. Therefore, the impact of tsunamis is beyond our research in this manuscript.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-3/nhess-2017-3-AC3-supplement.pdf>

C2

