Natural Hazards
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Discussions

Interactive comment on "Extreme water levels, waves and coastal impacts during a severe tropical cyclone in Northeast Australia: a case study for cross-sector data sharing" *by* Thomas R. Mortlock et al.

Anonymous Referee #2

Received and published: 12 June 2018

This manuscript offers a picture of the impact of the tropical cyclone Debbie during its landfall in Northeast Australia, from the point of view of measurements. Waves and storm surge measurements come from buoys and tidal gauges along the shore. The contribution to the water levels of waves was estimated using the Stockdon empirical relation. The impact of the storm, in terms of erosion, was measured with lidar scans. Also the extent of the flooded area was checked, and found consistent with the estimated tide + surge + wave setup and runup.

The data presented here are scientifically relevant, as they cover this storm in quite a

comprehensive way, that is positive not only to improve local risk management. Modelling tropical cyclones and their impact is still a challenge also due to the lack of measurements, and detailed descriptions of single events can help improving our models.

Furthermore, this paper is well written. Therefore I recommend it for publication on NHESS.

I have only a few comments, listed here below

- Apart from what already done, it would be nice to have the ratio between the contribution of waves to water levels (setup + runup) and significant wave height. That's because in large scale studies, where an accurate measure of beach slope is not available, the wave contribution is sometimes taken as a fixed fraction of hs.

- Is there for Debbie any offshore measurement for waves and storm tide? Maybe from satellite altimeters? If the authors could provide some deep water measurement, along or close to the track, the set of data provided here would be really complete.

- Pag 5, line 20, how can the authors be sure that the tidal gauges don't measure some wave setup? This would be possible in such extreme conditions. It would lead to an overestimation of wind setup, and the application of Stockdon would lead to an overestimation of total water level.

- formula (2): I would suggest either to indicate with beta the slope, either to put tan beta in parenthesis.

- pag 6, line 33: is it possible that with such extreme Hs, at 35m depth you already significant wave breaking? In this case you would be underestimating Hs.

- formula 8: wouldn't it more proper to call this measure the "total energy released per unit coast length"

- pag 12, line 30: just as a matter of speculation, is it possible that the overestimation could be also due to a contribution of wave setup in the mesurements of some gauge,

then the authors would re-add this contribution estimating r2%?

- the figures are generally nice, but adding clear legends would make them more clear.

- figure 1: the meaning of the symbols and lines is clear only after reading the description. It would be nice to have a legend explaining what the dots and patterns are.

- figure 2: legend missing

- figure 3: the legend should explain also what the dashed lines represent

- figure 4: given the orientation of the coast, I believe it would be clearer to show A B and C in the right side, D in the left side of the figure (maybe write on the top East and West, rather than North and South)

- figures 5 and 6, I would write the name of the location in the figures after A B C and D

- figure 6, legend is missing

- figure 8: add legend, and write the name of the location close to the panel id

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