

## ***Interactive comment on “Economic damage and spill-overs from a tropical cyclone” by Manfred Lenzen et al.***

**Anonymous Referee #1**

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### **General comments**

In general the writing is okay, but there are few logical gaps in some paragraphs. Some terms are not described and explained in sufficient detail. The manuscript is not very well structured, which leads to redundancy in some parts and makes it hard to follow in other parts. From my point of view the adopted methodology to estimate the indirect damage is sound. However the description and explanations of the methods should be more extensive. Graphics and tables are only partly clear and not all of them support the understanding of main contents. Results are innovative as, to my knowledge, there are no studies dealing with indirect consequences of tropical cyclone per sector on a regional scale. Also the authors attempt to include the infrastructure damage in the estimation of the indirect consequences. However, the presentation of the results

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could be improved. In addition the results are not discussed sufficiently. Especially the reliability of the estimates of the direct damage should be addressed. The conclusions of the manuscript are only partly supported by the results. In general, I think the topic is appropriate for publication in NHESS, but the manuscript needs some major revisions.

### **Specific comments**

#### **Introduction**

- From my point of view the introduction could be improved by a general reorganization. At the moment two thirds of the introduction is a review/summary of the event based on newspapers and government papers followed by a paragraph describing the methods used in the study without giving an introduction to the methods. I suggest to combine section 1 and 2. With a clearly defined review of the event and a review of input-output analysis.
- Please check how media should be cited. In the current version it is hard to check which references are cited, since the names cited in the text are not listed in the reference list.
- Pg. 3 line 65-66: Please clarify that the cyclone names are no citations.
- Pg. 4 line 89: It is not clear at this point what spill-overs are. Please clarify.
- Pg. 5 line 146-149: Please be a bit more specific about the novelty of your research. From my point of view the novelty is not the applied method (which was applied before in e.g. Schulte in den Bäumen 2015, as you mention as well) but rather the case-study as this method was not applied to cyclones before.

#### **Methods**

- Pg. 6 line 156-164: This paragraph could rather be shifted to the introduction. I suggest to give a short overview of section 3 instead.

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- From my point of view an explanation of the basic input-output equation and a clear naming of the symbols used in the formulas would help readers who are not so familiar with the methodology (e.g.  $A$  is named “matrix of input coefficients” in line 183 and “production recipe” in line 244).
- Pg. 6 eq. 1: Please give more information about the calculation of the Gamma-matrix.
- Pg. 6 eq. 2: For me this equation is not quite clear. Please elaborate a bit further why you max the sum of the vector of the post-disaster consumption possibilities  $y_1$ . Also I could not find information about this equation in Steenge and Bockarjova (2007).
- Pg. 7 line 193: I could not find further details to the suggested input-output approach in Supplementary Information S2. Please give more information about the approach.
- Pg. 8 line 229-230: “the reduction of total industry output (in 2017 compared to 2016)” How is the total industry output 2017 calculated?

#### Data

- Pg. 15 Fig. 1: Please include unit labels in map and the source of the satellite image
- Please explain what superior means in this context. What makes superior economic data superior?

#### Results and Discussion

- From my point of view this Section does not seem to be very well organized. In addition not all of the figures and tables are helpful and supporting. A discussion

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of the results, e.g. a comparison with results from other studies or a discussion of the reliability of the direct damage estimations is missing entirely. Also it should be more emphasized that the presented results are results produced by a model (at least the indirect damage) and might not necessarily fit to the damage which really occurred in the regions.

- Pg. 14 line 3-10: From my point of view these two paragraphs do not belong here. I suggest a short overview of Section 4 at this point.
- Pg. 14 line 3: Please indicate if these numbers are results from your models.
- Pg. 14 line 8: Please explain the term “full-time equivalent”
- Pg. 14 line 20-21: “. . .detailed products and supply-chains (Section 3.3).” Please be more specific about this reference.
- Pg. 17 line 70-71: “. . .detailed structural path analysis. . .” Please be more specific about this analysis. How did you apply it? What does the analysis exactly do? Etc. Also this should be mentioned in Section 3.
- Fig. 2: Please choose a different color for “Rest of QLD” than white. At a first look it is a bit confusing with the free space at the bottom of the plots.
- Fig. 3: Please improve this figure. Currently it is very hard to get information about the damage to different industries. Hence at least for the value added this is basically the same information as shown in Fig. 1. Also it is not clear what the threshold  $\theta$  means? Please clarify.
- Table 4 and 5: How do you differentiate between the direct and indirect impacts? Since the direct effects are included in the estimation of the indirect effects
- Table 5 is not mentioned in the text.

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## Conclusions and outlook

- Pg. 21 line 148-150: "...Our approach can be applied to other regions, and ultimately extended to include impacts well beyond employment and value added, such as wider environmental or social consequences of disasters ...". From my point of view this is not sufficiently supported by the results.
- Pg.21 line 167-169: "...For example, about 1200 employees providing services to coal mines were affected by Cyclone Debbie, however this impact is currently not mentioned in the disaster recovery planning. ...". This is hardly shown in the results.

## Technical corrections

- Please be consistent with the abbreviations you introduce. E.g. in line 246 you write "...input-output (IO) databases." although IO was already introduced.
- Please mention and explain all figures and tables included in the manuscript also in text
- Pg. 11 line 245: "... (IELab; (Lenzen et al., 2014))." A bracket is missing
- Pg. 11 line 249: "different regions (Tukker and Dietzenbacher, 2013); see (Leontief, 1953) for an account of MRIO theory)." A bracket is missing
- Pg. 21 line 151: "...broader environemntal ...". please correct typo.
- Pg. 22 line 176: There are two references for Koks et al. 2016. Please indicate which one is cited here.

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