

## ***Interactive comment on “Tracking an Atmospheric River in a Warmer Climate: from Water Vapor to Economic Impacts” by Francina Dominguez et al.***

### **Anonymous Referee #2**

Received and published: 16 August 2017

#### 1. Does the paper address relevant scientific questions within the scope of ESD?

This manuscript focuses on a single weather event and its hydraulic and economic impact. The multi-model methods are then applied to RCP8.5 and RCP4.5 scenarios. The primary scientific questions presented are (1) what types of uncertainty exist and how are they quantified? (2) which type of uncertainty is most important for quantifying impacts on humans, infrastructure and economics? This in turn is applied to future scenarios.

#### 2. Does the paper present novel concepts, ideas, tools, or data?

The uniqueness of this study is the attempt to provide a full system analysis of an Atmospheric River (AR) event, the hydrologic surface response and hydraulic chan-

C1

nel and overland flow response and the economic costs associated with flooding and infrastructure damage.

The pseudo global warming (PGW) methodology is novel and computational somewhat efficient, allowing for a zoomed in study with full dynamics.

#### 3. Are substantial conclusions reached?

The analysis provides economic loss previously not performed in such a fashion.

#### 4. Are the scientific methods and assumptions valid and clearly outlined?

Most of the analysis is well done. However, there are statements regarding the amount of water associated with the AR that is not backed up by any analysis. Are the authors confident the AR plume carried 1,500 kg/(ms) and the amount of precipitation that reached the basin was 70,000 CMS?

#### 5. Are the results sufficient to support the interpretations and conclusions?

Yes.

#### 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

Yes. The descriptions of the models are well done. Error analysis of WRF precipitation is well explained, however hydrologic models calibration and verification may not be sufficiently presented.

Climate change simulations are clear and sufficient.

The HAZUS economic model is unclear with regard to the assumptions and uncertainties. The description of its setup, calibration and verification need to be further explained.

#### 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

C2

Yes.

8. Does the title clearly reflect the contents of the paper?

The title is general with regard to the impacts of ARs and would be more clear if this was presented as a case study based on the December 2007 and RCP85 and RCP45 scenarios on Chehalis River Basin.

9. Does the abstract provide a concise and complete summary? Yes.

10. Is the overall presentation well structured and clear?

Yes.

11. Is the language fluent and precise?

12. Yes.

13. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

Yes.

14. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

15. Are the number and quality of references appropriate? Yes.

16. Is the amount and quality of supplementary material appropriate? No supplementary material provided.

---

Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2017-64>, 2017.