Deconstruction of a science paper's data-evidence basis

Wei-Ming Tsai

MPO/ATM 624

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My Paper

- Reexamining the Nonlinear Moisture-Precipitation Relationship Over the Tropical Oceans

  » *Rushlely S. S., Kim D., Bretherton, C. S., & Ahn, M.-S, 2018, GRL*

- Size of evidence set:
  - 4 figures, 0 tables, 2 magic-number (in-text) results

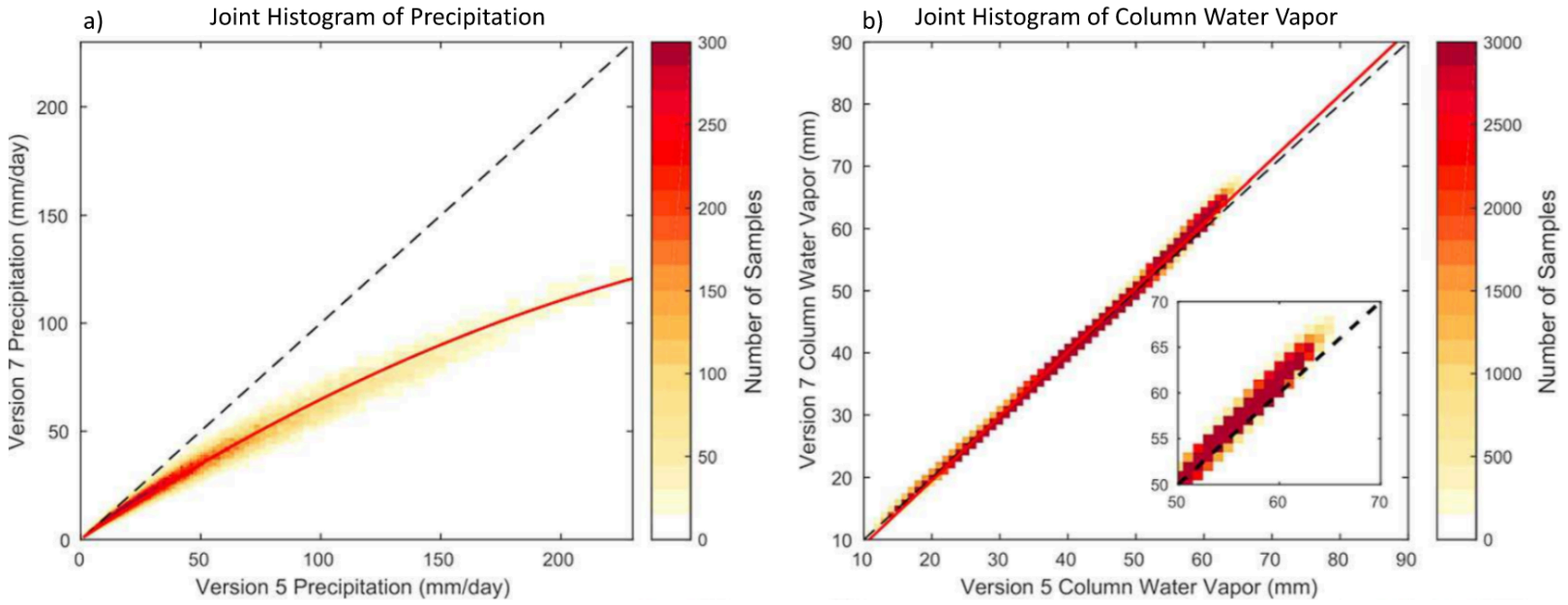
Instructions

1. Copy each figure, table, or # into a slide of this powerpoint
2. Categorize it according to the list at EVIDENCE_TYPES.md on the course repo
3. If none of those categories quite fit, expand EVIDENCE_TYPES.md in your fork, and make a pull request! Try to follow the outline there, to keep our ideas compact and coherent. I may suggest edits before final PR acceptance.
4. Finally, put the Abstract on a last slide. Annotate it with little figure thumbnails connected to each claim or account of nature, to show how those are rooted in the figures (and thus in data).
5. Put your .pptx in your fork of the class repo, and make a pull request.

Figure 1

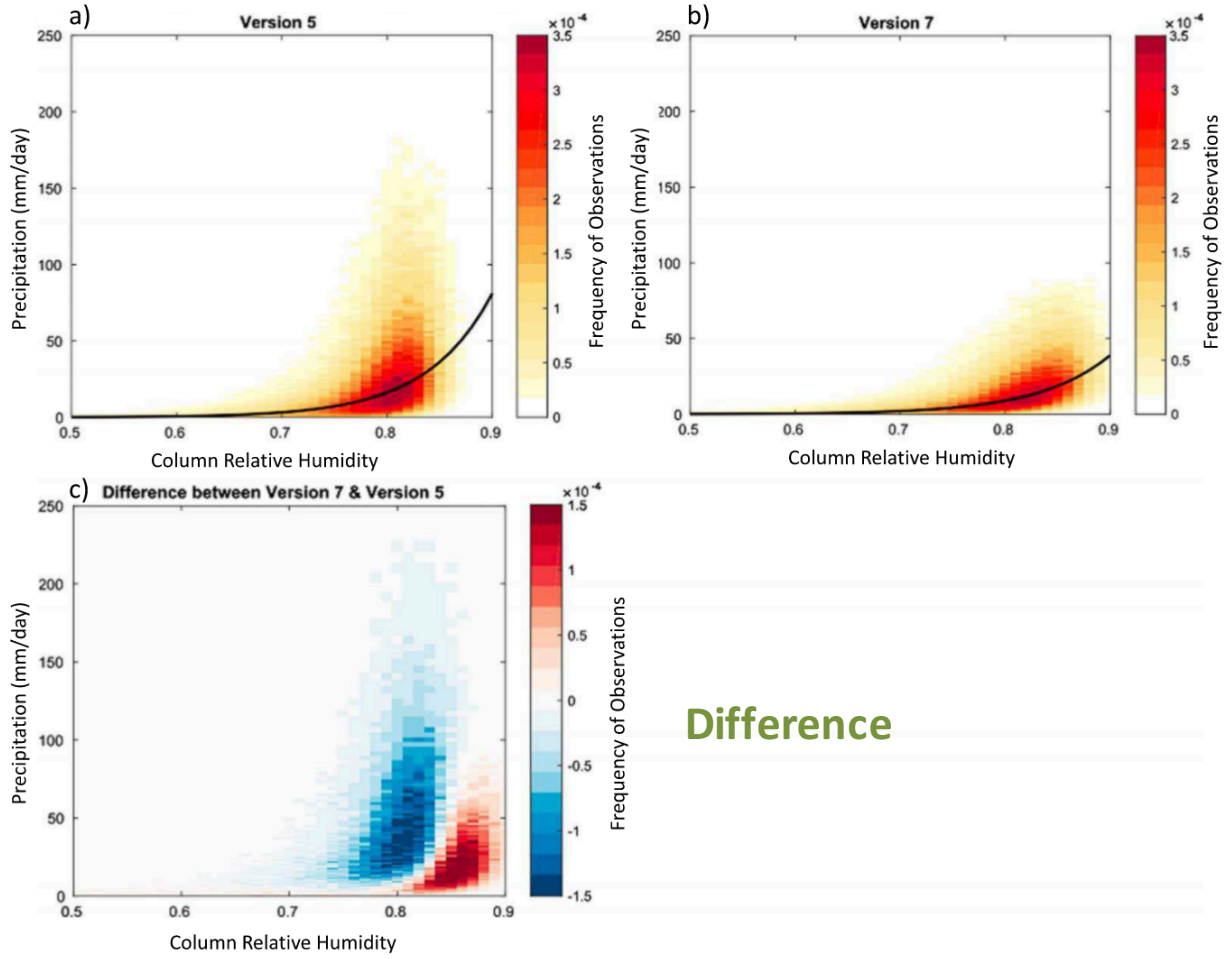
Difference

Similarity



- "Relationship is claimed to exist here": difference & similarity / "Row display of data"
- Presenting comparison of parameters between two versions to indicate biases.

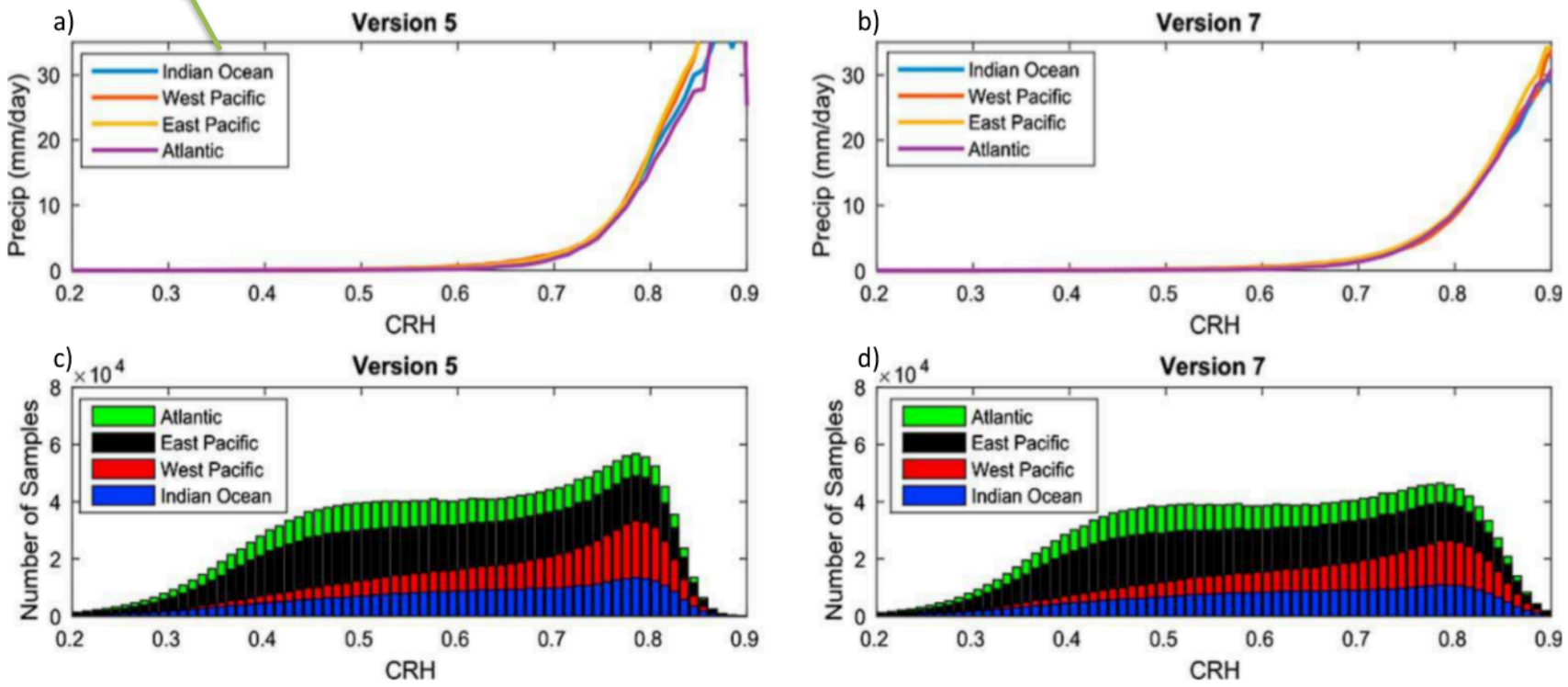
Figure 2



- "Relationship is claimed to exist here": difference
- Variations in the derived relationship (fitting curves) between parameters among data versions.

Figure 3

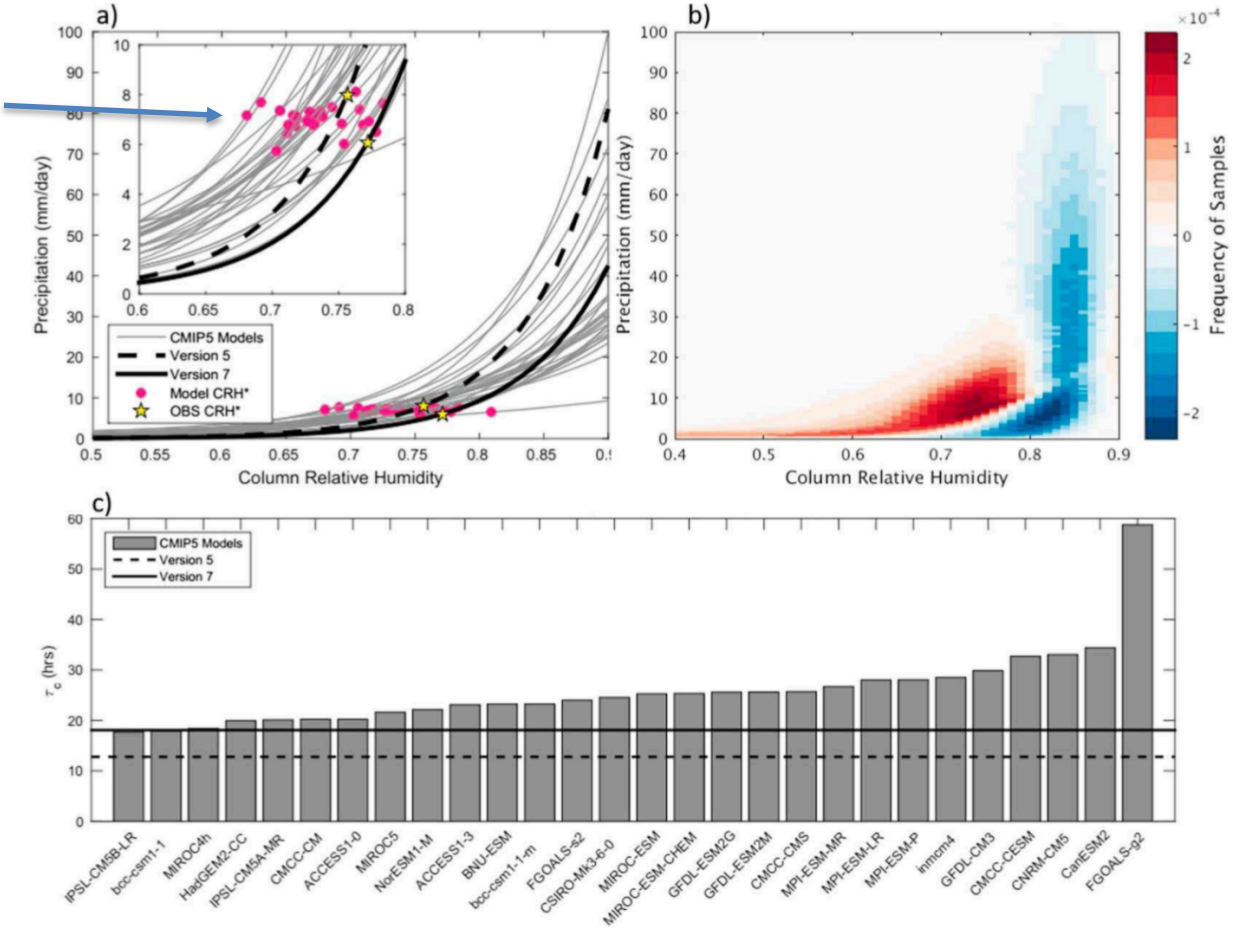
Regional analysis



- "Relationship is claimed to exist here" / "Summary display of row data"
- Down-scaling to specific regions. Parameter relationships over these regions show differences between versions.

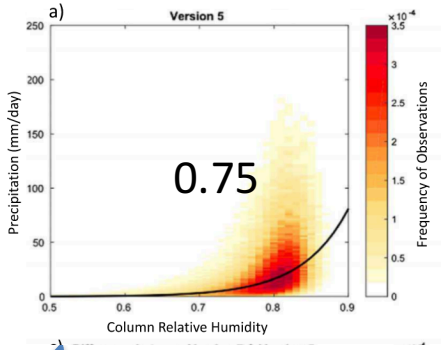
Figure 4

Overestimate in models



- "Relationship is claimed to exist here": Parameter relationship is examined among models.
- "Feature is claimed to exist here" : Model biases lead to deficiency of presenting observed features.

The Abstract, and how figures support its claims



Abstract Bretherton et al. (2004) used the Special Sensor Microwave Imager (SSM/I) version 5 product to derive an exponential curve that describes the relationship between precipitation and column relative humidity (CRH) over the tropical oceans. The curve, which features a precipitation pickup at a CRH of about 0.75 and a rapid increase of precipitation with CRH after the pickup, has been widely used in the studies of the tropical atmosphere. This study reexamines the moisture-precipitation relationship by using the version 7 SSM/I data, in which several biases in the previous version are corrected, and evaluates the relationship in the Coupled Model Intercomparison Project phase 5 (CMIP5) models. In the revised exponential curve derived using the updated satellite data, the precipitation pickup occurs at a higher CRH (~0.8), and precipitation increases more slowly with CRH than in the previous curve. In most CMIP5 models, the precipitation pickup is too early due to the common model bias of overestimated (underestimated) precipitation in the dry (wet) regime.