Evaluating Precipitation Feature Characteristics in the Goddard Multi-scale Modeling Framework

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Science Questions:

- How well can the Goddard Multi-scale Modeling Framework (GMMF) simulate precipitation feature (PF) characteristics versus the Tropical Rainfall Measuring Mission (TRMM) satellite observations?
- What are the possible underlying mechanisms that account for systematic model biases?

Methodologies:

- An innovative algorithm, in close analogy to the TRMM PFs, was developed to produce simulated PFs from GMMF model output.
- One-year GMMF-simulated PFs were statistically compared against corresponding TRMM-observed PFs.

Key Findings:

- Many of the simulated PF characteristics are in reasonable agreement with satellite observations (Fig. 1).
- Four different mechanisms might account for the rainfall and PF biases in the model (Fig. 2).
- Medium to large PFs contribute the most to the model tropical precipitation biases.

Citation:

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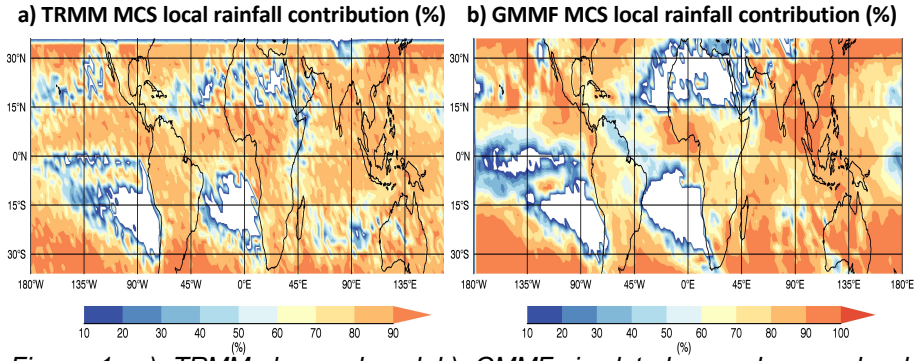

Figure 1. a) TRMM-observed and b) GMMF-simulated annual mean local rainfall contribution (%) of mesoscale convective systems (MCSs) in the Tropics and Subtropics.

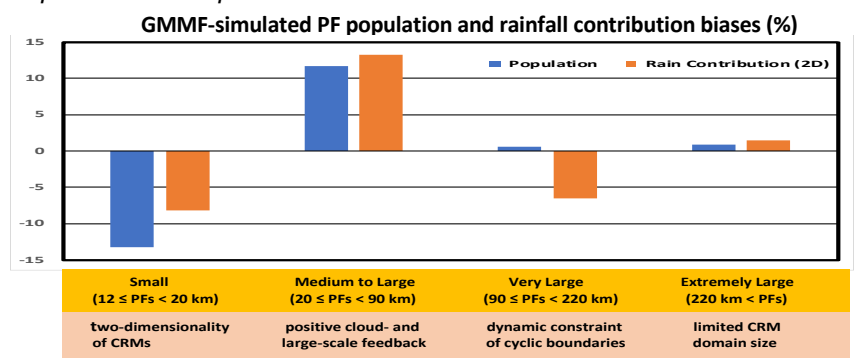

Figure 2. Annual normalized population and rainfall contribution differences (in %) between the GMMF-simulated and the TRMM-observed PFs for four size categories and four mechanisms that may account for the model biases in each category.