National Aeronautics and Space Administration
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Assessment of the Vertical Structure of Radiation in Climate Models

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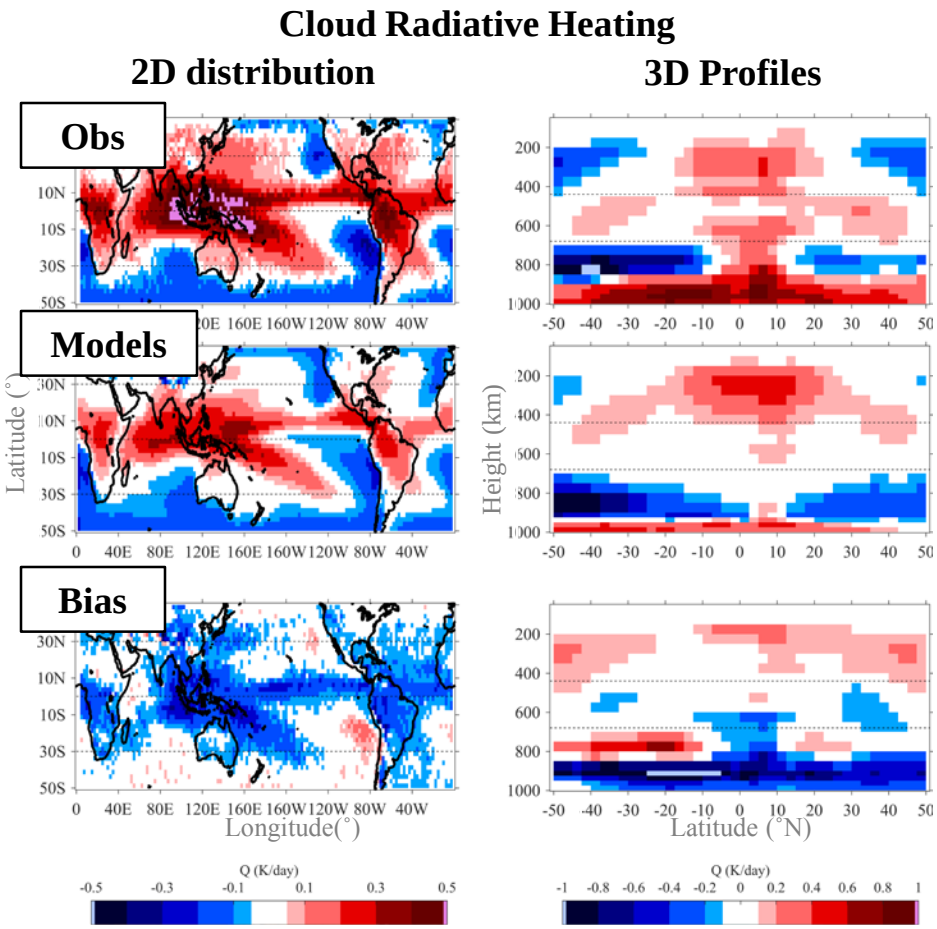

Overall too little warming in convective regions (blue shading in the bias) due to the low levels

Problem: **Radiative effects of clouds** may result in either a **warming** or a **cooling** of the atmospheric layer, generating strong changes in the general circulation. **The vertical structure of these radiative effects is still largely unconstrained in climate models**.

Here we use **CloudSat/CALIPSO** measurements to assess the **vertical structure of radiative heating in climate models**.

Finding: The models used in this study **fail to reproduce** the observed **vertical structure of the radiative heating** rates due to **clouds** (see figure). The clouds tend to produce **too little warming** in the models particularly in the **lowest levels** and in the tropics. The radiative heating rate biases highlighted in this study are likely to **cause an amplification** of the modeled **cloud biases**.

Significance: **A reduction of cloud biases** in climate models is of **first order importance** to **ameliorate** the representation of cloud-radiation interactions and **cloud-climate feedback** and thus reduce uncertainties in regards to future climate projections.

***Cesana G.**, D. Waliser, T. L'Ecuyer, X. Jiang and F. Li: "How Clouds Affect The Vertical Structure Of Radiative Heating Rates: A Multi-Model Evaluation Using A-Train Satellite Observations", submitted.*

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