Comparison with observations shows cloud simulations improving

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Climate projections, such as those used by the Intergovernmental Panel on Climate Change, rely on models that simulate physical properties that affect climate, including clouds and water vapor content. Clouds and water vapor are difficult to simulate in global climate models because they are affected by small-scale physical processes, and cloud feedback on climate is therefore a large source of uncertainty in climate predictions.

A new study finds that model simulations of vertically averaged cloud water amount have improved in recent years. Jiang et al. develop a quantitative scoring method to evaluate the accuracy of 19 climate models at various vertical heights between the surface and the tropopause (16 to 18 kilometers (10 to 11 miles) in altitude) over the tropical oceans (30 degrees North to 30 degrees South). They compare the models' simulated multiyear mean of cloud water content and water vapor with observations made using several NASA satellites.

Many of the new models, which were submitted to phase 5 of the Coupled Model Intercomparison Project (CMIP5), have attempted to improve representation of clouds using finer-scale simulations. The authors find that more than half of the models did show improvement over previous models from CMIP3 in simulating the amount and distribution of clouds and water vapor over the tropical oceans. In addition, they find that the models simulated boundary layer water vapor amounts accurately. However, there are large differences among the models and between the models and observations at high altitudes in the

upper troposphere.

More information: “Evaluation of cloud and water vapor simulations in CMIP5 climate models using NASA "A-Train" satellite observations” *Journal of Geophysical Research-Atmospheres*, doi:10.1029/2011JD017237, 2012

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