Evaluating Clouds in Climate Models

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Meaningful comparisons of climate model output with observational data are sometimes difficult to achieve because, unlike numerical weather prediction models, climate models do not predict the specific sequence of weather that any location is expected to experience.   Thus comparisons of climate model output with observational data are inherently statistical. Typically, the observational data and model output are aggregated (e.g., averaged) over a sufficiently long period of time that the influence of individual weather events becomes small.   However, when differences between the aggregate observations and aggregate model output are detected, it can be difficult to determine the source of the differences or to determine a corrective action.

One approach to dealing with this complexity is to aggregate both the observational data and model output as a function of the atmospheric state or cloud regime. In this presentation we will examine clouds in the Multiscale Modeling Framework (MMF) climate model using a combination of instrument simulators and a neural-network-based atmospheric classification technique. While the talk will largely focus on the MMF model, the analysis techniques can be applied to other climate models.