Evaluation of CMIP simulations of ice and liquid water content/path

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In this presentation, we plan to discuss on our ongoing work examining GCMs within CMIP (e.g., CMIP3 and CMIP5 available at the time) and other contemporary models (e.g., ECMWF, GEOS) with respect to their representation of ice and liquid water, in both cloudy and precipitating forms - in the cases where the latter is available. This includes cloud ice and cloud liquid comparisons and the development of estimates of falling vs suspended (i.e. precipitating vs cloudy) components of the atmospheric water from A-Train satellite data - namely from CloudSat that can provide more direct and robust model-observation comparisons. The latter includes the use of cloud classification, precipitation surface flag and profile information as well comparison methodology based on the particle size distribution (PSD) information that is provided with each CloudSat retrieval. We will highlight the implications of our comparisons and findings on the potential influence of precipitating ice and liquid on the three-dimensional radiation field and the potential bias that may result in GCMs if this interaction is not represented. Part of this work is based on the development and analysis of a YOTC A-Train CloudSat-centric multi-sensor co-located data set which will also be highlighted.