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The GCSS/WGNE Pacific Cross-section Intercomparison (GPCI): evaluating the physics of climate models

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The main goal of the GCSS Pacific Cross-section Intercomparison (GPCI) is to evaluate and improve the representation of tropical and sub-tropical cloud and precipitation processes in weather and climate prediction models. The GEWEX Cloud System Study (GCSS) main goals are the understanding of the physics and dynamics of clouds and the development of parameterizations for cloud-related processes. Despite its successes, the current GCSS strategy of using only one-dimensional subsets of full weather and climate prediction models falls short of addressing the fundamental role of clouds in climate, since it does not allow for feedback to the large-scale dynamics. In GPCI, a new type of model evaluation is proposed where weather and climate prediction models are analyzed along a Pacific Ocean transect from California to the equator. This approach aims at complementing the more traditional efforts in GCSS by providing a simple framework for the evaluation of models that encompasses several fundamental cloud regimes such as stratocumulus, shallow cumulus and deep cumulus, as well as the transitions between them. Currently twenty four climate and weather prediction models are participating in GPCI. We will present results of the comparison between models and recent satellite data. In particular, we will explore in detail the potential of the Atmospheric Infrared Sounder (AIRS) instrument in terms of the evaluation of the representation of the atmospheric hydrologic cycle in climate and weather prediction models.