Update on the E3SM NGD-Atmospheric Physics Project

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The presentation will provide an update on recent progresses made in the E3SM Next Generation Development (NGD) Atmospheric Physics Project. This NGD project is created to continue improving the current model’s representation of atmospheric physics and enhance the model’s capability to address uncertainty in predicting future changes and enable scientists to address questions across the Water cycle, Biogeochemistry (BGC), and Cryosphere campaigns. One focus of the development work is to address model shortcomings and deficiencies responsible for major model biases in the E3SM Atmosphere Model v1 (E3SMv1) including the substantially underestimated stratocumulus clouds, large regional precipitation biases over both land and ocean, and too strong Aerosol Indirect Effect (AIE) among others. Poor scale-awareness of model cloud parameterizations is also being addressed. Another focus is to enhance the capability of E3SM to simulate the climate response to scenarios of interest by implementing an interactive atmospheric chemistry in E3SM and improving the coupling of aerosols, atmospheric chemistry, and BGC. The development work will address the combined problems of scientific accuracy, scale-awareness, and computational efficiency.