A new unified boundary layer and convection parameterization in the E3SM model: The multi-plume Eddy-Diffusivity/Mass-Flux (EDMF) approach

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The goal of this project is to reduce key biases related to the atmospheric boundary layer and, in particular, related to boundary layer clouds in the DOE E3SM model, by implementing, and evaluating, a new unified boundary layer and convection parameterization based on the multi-plume Eddy-Diffusivity/Mass-Flux (EDMF) approach. This is a turbulence and convection parameterization that can be considered fully unified, since it is able to represent convective processes from boundary layer convection (dry and cloudy) to deep moist convection with one single parameterization. The project is focused on boundary layer and shallow convection regimes over both ocean and land. In this presentation, we will discuss results from recent implementations of EDMF in E3SM, the coupling of EDMF with other turbulence and convection parameterizations in E3SM, and from novel diagnostics using the DOE ARM MAGIC datasets.