Modeling Cloud Dynamics for Accurate Climate Prediction

Lopez-Gomez, I., Cohen, Y., He, J., Jaruga, A., & Schneider, T. *A generalized mixing length closure for eddy-diffusivity mass-flux schemes of turbulence and convection.* Journal of Advances in Modeling Earth Systems (2020) 12, e2020MS002161. https://doi.org/10.1029/2020MS002161

Cohen, Y., Lopez-Gomez, I., Jaruga, A., He, J., Kaul, C. M., & Schneider, T. *Unified entrainment and detrainment closures for extended eddy-diffusivity mass-flux schemes.* Journal of Advances in Modeling Earth Systems (2020) 12, e2020MS002162. https://doi.org/10.1029/2020MS002162

Scientific Achievement

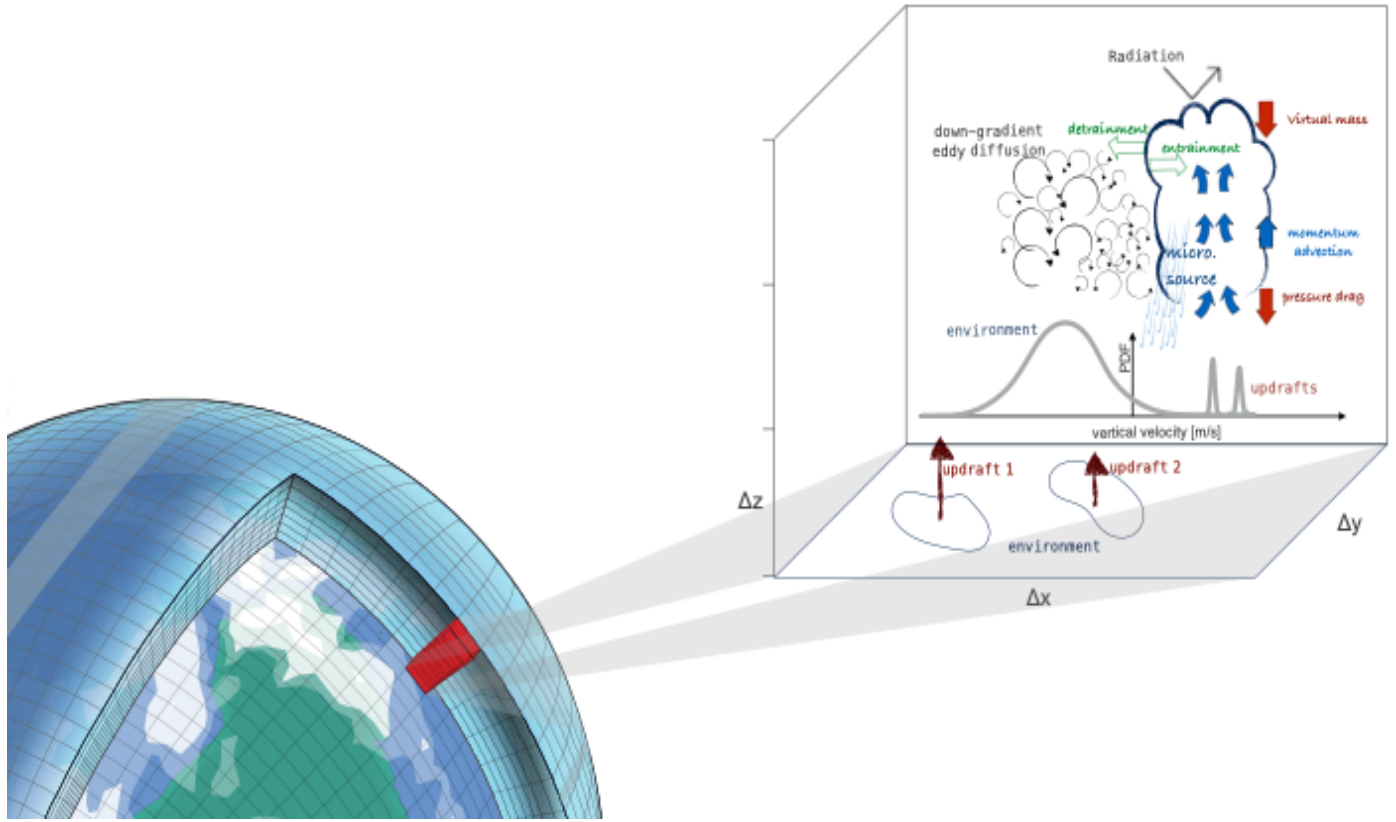
- We developed a mathematical model that represents clouds in climate models faithfully.

Significance and Impact

- The leading source of uncertainty in climate projections can be traced back to the inability of climate models to represent clouds. Our model provides a way forward.

Technical Details

- The model is tested for stratocumulus, cumulus and cumulonimbus clouds.
- The model is time-dependent and captures well the diurnal cycle of convection.



A sketch of some of the processes captured by the proposed cloud model, including turbulence and convection. The box represents a single column within a climate model. Climate models rely on simplified mathematical models to represent all processes that have a scale smaller than the column width. *Image courtesy the author (Schneider Research Group).*

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