Drivers of tropical circulation

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The tropics are the engine of the atmospheric general circulation, and their response to warming helps set Earth's climate sensitivity. Our group aims to better understand the tropical heat budget, its link to the circulation system, and how these respond to warming. We focus on process understanding and the interplay between the tropical circulation and its different diabatic drivers such as radiation, microphysics, and surface fluxes. The understanding of the system's sensitivity will be crucial in reducing the uncertainty in this globally important region - a prerequisite for more tightly constraining global climate sensitivity and hence the range of possible and plausible climate futures. To analyse these question we combine high-resolution modelling with observations from dedicated field campaigns and satellite measurements.
Current focus of the group is (a) microphysical controls on cloud, radiation, and tropical circulation, (b) diabatic processes in the upper troposphere, and (c) spatial organization of precipitation in shallow convection.