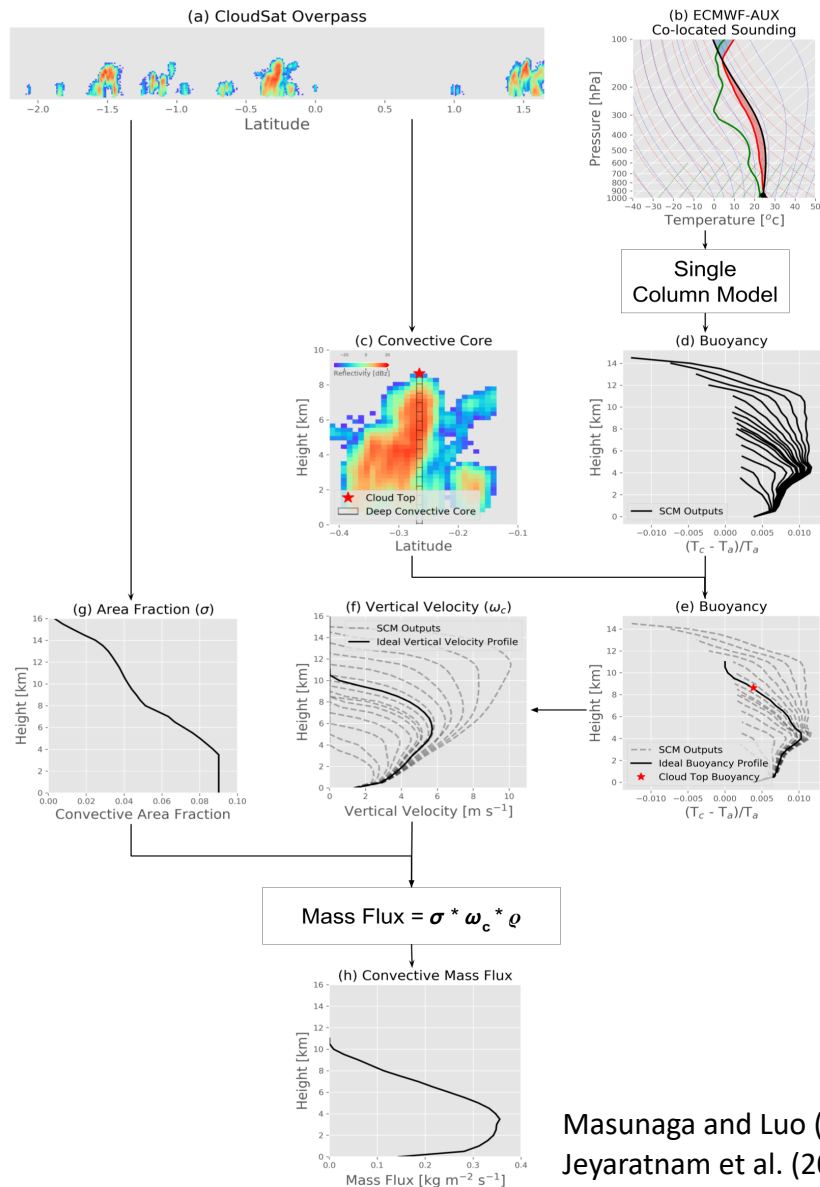


## Flowchart for the convective mass flux algorithm



## Developing A Satellite-Based Convective Mass Flux Dataset and Evaluating Cumulus Parameterization in GISS E-3

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(MAP project: 80NSSC17K0197)

Most current GCM cumulus parameterization schemes are based on the concept of convective mass flux. Yet, no global observations of this critical parameter exist at this time. To fill the vacuum, we developed a novel, satellite-based approach to retrieve convective mass flux (Masunaga and Luo 2016). Comparisons with collocated, ground-based radar wind profiler observations at an Amazon site showed generally good agreement (Jeyaratnam et al. 2020).

Here, we use the new dataset to evaluate cumulus parameterization in GISS E-3. Comparisons show that GISS-E3 overestimates convective intensity (or vertical velocity), but underestimates convective mass flux. This is the first time, to our knowledge, that convective mass flux in GCM cumulus parameterization has been evaluated against global satellite observations. These results will guide us to improve the cumulus scheme.

