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Convective Bursts During Tropical Cyclone Formation and Intensification

We propose to use NASA field experiment and satellite data to investigate the structure and importance of localized intense convective cells in tropical cyclones. Of particular interest are the following:

- (i) What produces such cells given the relatively small convective available potential energy (CAPE) in the hurricane core?
- (ii) How does the tropical cyclone as a whole respond to the presence of such cells?
- (iii) What is the role of intense localized cells in tropical cyclone formation and intensification?

The proposed work extends from our previous NASA-supported results that made use of tropospheric-deep dropsondes to calculate CAPE, helicity, and the energy-helicity index. These variables gave insight into how the tropical cyclone maintains its strength in a hostile environment containing large vertical wind shear. We will extend the previous work to new storms and datasets from future field experiments. Our primary goal is to understand the fundamental mechanisms by which tropical cyclones form and intensify.