

Deep convection and tropical cyclone intensification

Advances in forecasts of tropical cyclone (TC) intensity, and rapid intensity change (RI) in particular, lag advances in TC track forecasts. Multiscale interactions, ranging from the environmental to the microscale, are a major reason for this challenge. The most successful RI forecast guidance, the RI index, is based largely on environmental-scale fields. This technique generally explains about 35% of the skill in RI forecasts. What is uncertain is the extent to which processes smaller than the environmental scale can explain the remainder of the RI forecast skill and, in particular, what role deep convection (alternatively known as “hot towers” and “convective bursts”) may play in governing these intensity changes.

This talk will address four specific questions pertaining to the role of deep convection in TC intensification:

- 1) What is the importance of deep convection in TC intensification?
- 2) Is there a preferred location of deep convection for TC intensification?
- 3) What controls this location?
- 4) Can this process be predicted, or at least nowcasted?

These questions will be examined by presenting recent and ongoing research, with a particular emphasis on recent airborne data analysis.