Zhou, X., L. Wu, Q. Liu, and Y. Zheng, 2020: Influence of low-level, high-entropy air in the eye on tropical cyclone intensity: A trajectory analysis. J. Meteor. Soc. Japan, 98, 1231-1243. https://doi.org/10.2151/jmsj.2020-063.

Plain Language Summary: Whether the high-entropy eye air can substantially increase tropical cyclone (TC) intensity through mixing with eyewall air and enhancing eyewall convection is still a scientific issue. This study quantitatively evaluates the relative importance of the entrainment of this air by trajectory analysis. The result suggests that the low-level, high-entropy air from the eye has little direct influence on TC intensity by providing relatively small mass and thermodynamic contributions.

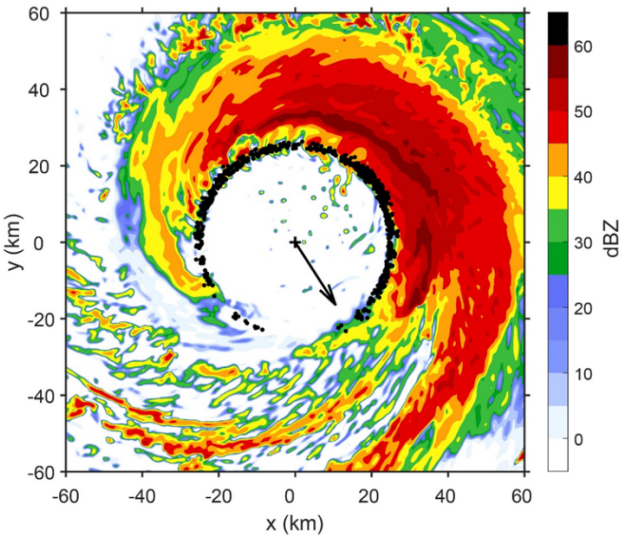

Figure 1. Entrance locations of eye air parcels (black dots) initially at 0.5 km and enter the eyewall and the simulated 0.5-km radar reflectivity (dBZ, shading) at 24 h with the vector of vertical wind shear (arrow).

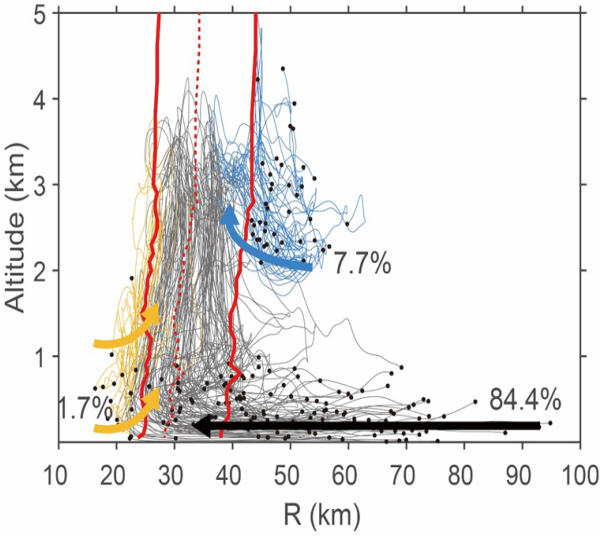

Figure 2. A subset of the backward trajectories of the eyewall air parcels (184) that are initially at 3 km. The colors of the trajectories indicate the three types of their origins: from the boundary inflow (black), the low-level eye (yellow) and middle-level environment (blue), which are also schematically shown by thick arrows.

- The entrainment occurs favorably on the quadrants of enhanced eyewall convection and is enhanced in the presence of small-scale disturbances in the inner edge of the eyewall.
- The eye air from the low-level, high-entropy reservoir accounts for 5.8% of the equivalent potential temperature change below 3 km and 4.5% of the total mass transport at 3 km in the TC eyewall.