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Plain Language Summary: The inner core structure of a tropical cyclone (TC) is generally described as an axisymmetric vortex in the vicinity of a hydrostatic and gradient wind-balanced state. However, this schematic can sometimes be oversimplified. Recent studies have documented small-scale features of the inner core, structural changes in TC rapid intensification, secondary eyewall formation, and eyewall replacement cycles using observational data, and idealized and sophisticated models. In line with the progress in understanding the inner core structure, several operational agencies have recently analyzed TC structural changes using their subjective analyses or diagnostic tools, contributing to disaster prevention. We also discuss potential impacts of climate change on the inner core structure, for which further work is required to reach a solid conclusion.

Environmental humidity Wevenumber-1.2 component Classification Long-lived ERC Rapid intensification Radius of maximum winds Atmosphere-ocean-wave-land LES Finger-like features Supergradient wind Mesovortices Barotropic instability Roll vortex Developing stage **Mesoscale descending inflow Wobble** Moat Absolute angular momentum Vertical wind shear Stationary band complex Rainband Deep eye clouds Eyewall Boundary layer Eyewall replacement cycle Fine-scale & novel features Eye Secondary eyewall formation SST Double warm cores Tropical cyclone Inner and outer eyewalls Initial size Landfall **Ekman theory** Dry tropical cyclone Inner core structure Filamentation **Operational RMW/ERC evaluation Global warming influence Operational tools** Delayed extratropical transition More symmetric **Deeper eyewall Regional climate models Radar Scatterometry SAR SMAP SMOS** Microwave Visible/Infrared CI numbers Inconsistent results for size change Enhanced rainfall in the core **M-PERC Statistical-dynamical model SHIPS** Lightning MIMIC RIPA Eye-RMW relationship Pseudo global warming method

Figure 1. A wordcloud for keywords of this review article.

- This article is designed to assist in organizing the available information on the TC inner core structure and motivate further research for a broader community.
- To build upon existing reviews of the TC inner core structure, the review largely focused on literature published since 2018. However, for better understanding, we begin with basic TC dynamics and conventional theories if needed and refer some studies published before 2018.