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Observed Increases in North Atlantic Tropical Cyclone Peak Intensification Rates

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Quickly intensifying tropical cyclones (TCs) are exceptionally hazardous for Atlantic coastlines. An analysis of observed maximum changes in wind speed for Atlantic TCs from 1971-2020 indicates that TC intensification rates have already changed as anthropogenic greenhouse gas emissions have warmed the planet and oceans. Mean maximum TC intensification rates are up to 28.7% greater in a modern era (2001-2020) compared to a historical era (1971-1990). In the modern era, it is about as likely for TCs to intensify by at least 50 kts in 24 hours, and more likely for TCs to intensify by at least 20 kts within 24 hours than it was for TCs to intensify by these amounts in 36 hours in the historical era. Finally, the number of TCs that intensify from a Category 1 hurricane (or weaker) into a major hurricane within 36 hours has more than doubled in the modern era relative to the historical era. Significance tests suggest that it would have been statistically impossible to observe the number of TCs that intensified in this way during the modern era if rates of intensification had not changed from the historical era.