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Human influence on tropical cyclone intensity

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Recent assessments agree that tropical cyclone intensity should increase as the climate warms. Less agreement exists on the detection of recent historical trends in tropical cyclone intensity. We interpret future and recent historical trends by using the theory of potential intensity, which predicts the maximum intensity achievable by a tropical cyclone in a given local environment. Although greenhouse gas-driven warming increases potential intensity, climate model simulations suggest that aerosol cooling has largely canceled that effect over the historical record. Large natural variability complicates analysis of trends, as do poleward shifts in the latitude of maximum intensity. In the absence of strong reductions in greenhouse gas emissions, future greenhouse gas forcing of potential intensity will increasingly dominate over aerosol forcing, leading to substantially larger increases in tropical cyclone intensities.