

Characterizing Long Island's Extreme Precipitation and Its Relationship to Tropical Cyclones

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Annual Mean Precipitation (mm/day)

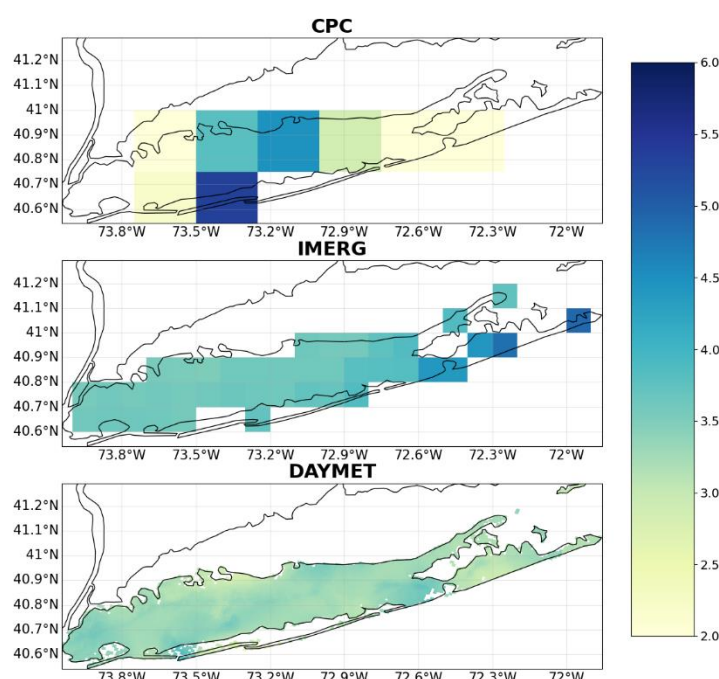


Figure S1. Annual average daily precipitation (mm/day) over Long Island for (top) CPC, (middle) IMERG, and (bottom) DAYMET, using three different time periods (CPC from 1948–2020, IMERG from 2001–2020, and DAYMET from 1980–2020).

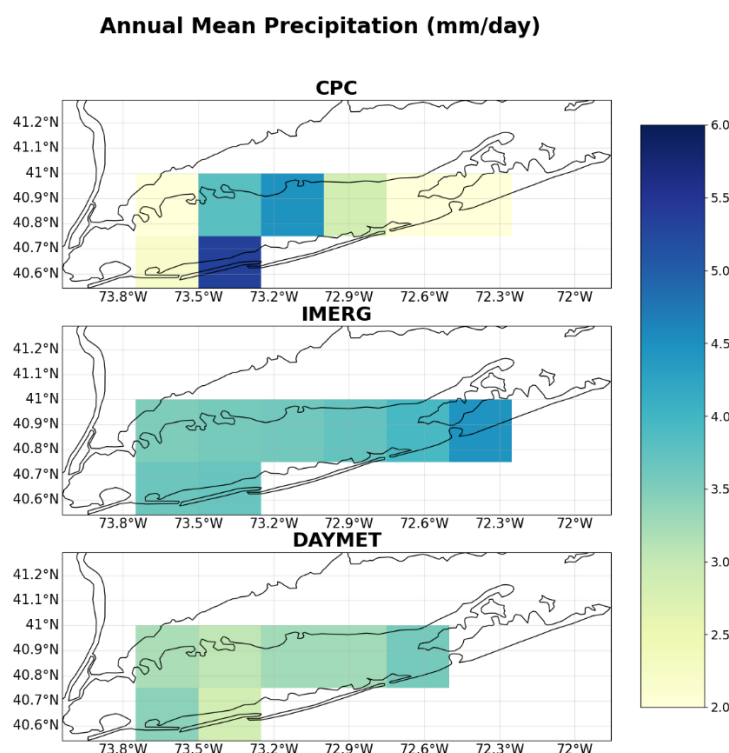


Figure S2. Annual average precipitation (mm/day) over Long Island for (top) CPC, (middle) IMERG, and (bottom) DAYMET for the common time period of 2001–2020, with all datasets re-gridded to the CPC grid spacing.

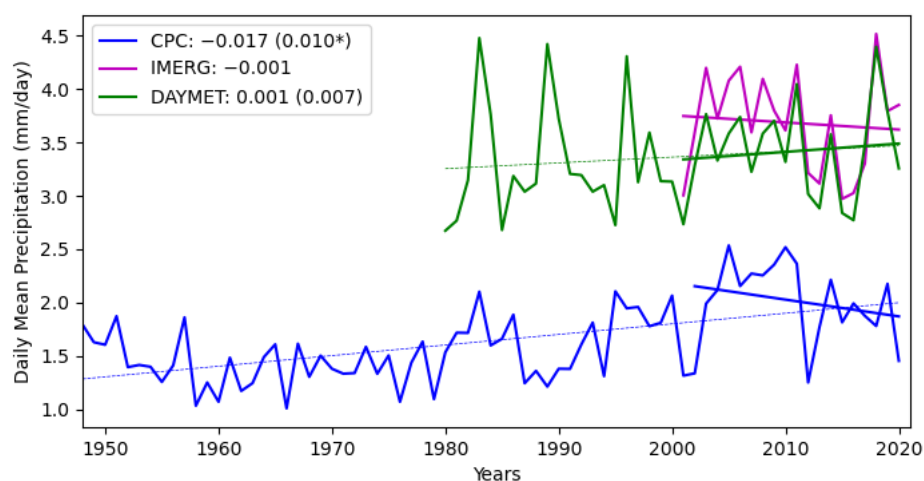


Figure S3. Time evolution of annual average daily precipitation (mm/day) averaged over LI for (blue) CPC, (pink) IMERG, and (green) DAYMET, with trends plotted for both the common time period (bold lines) and the full dataset time periods (dashed lines). The trends calculated using the Mann Kendall test (for the common time period followed by the full time period, in mm/day per year) are shown in the legend, with statistical significance at the 95% confidence interval denoted by a star.

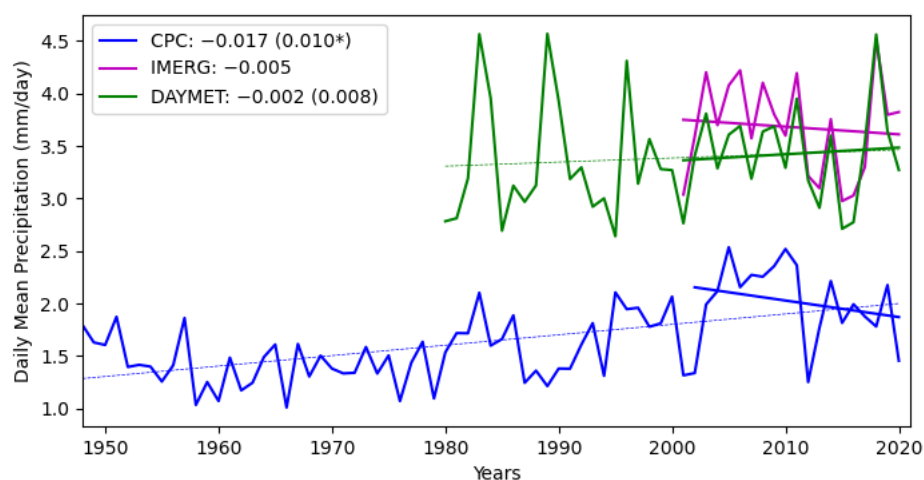


Figure S4. Time evolution of annual average daily precipitation (mm/day) averaged over LI for (blue) CPC, (pink) IMERG, and (green) DAYMET, with trends plotted for both the common time period (bold lines) and the full dataset time periods (dashed lines). All datasets are re-gridded to the CPC grid spacing. The trends calculated using the Mann Kendall test (for the common time period followed by the full time period, in mm/day per year) are shown in the legend, with statistical significance at the 95% confidence interval denoted by a star.

Annual Mean 95th Percentile Precipitation (mm/day)

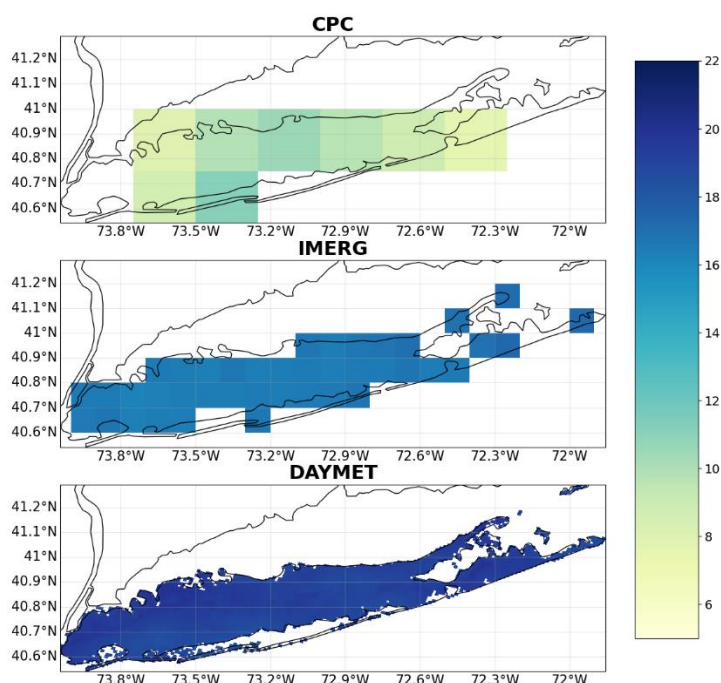


Figure S5. Annual average 95th percentile precipitation (mm/day) using the full time period for (top) CPC, (middle) IMERG, and (bottom) DAYMET.

Annual Mean 95th Percentile Precipitation (mm/day)

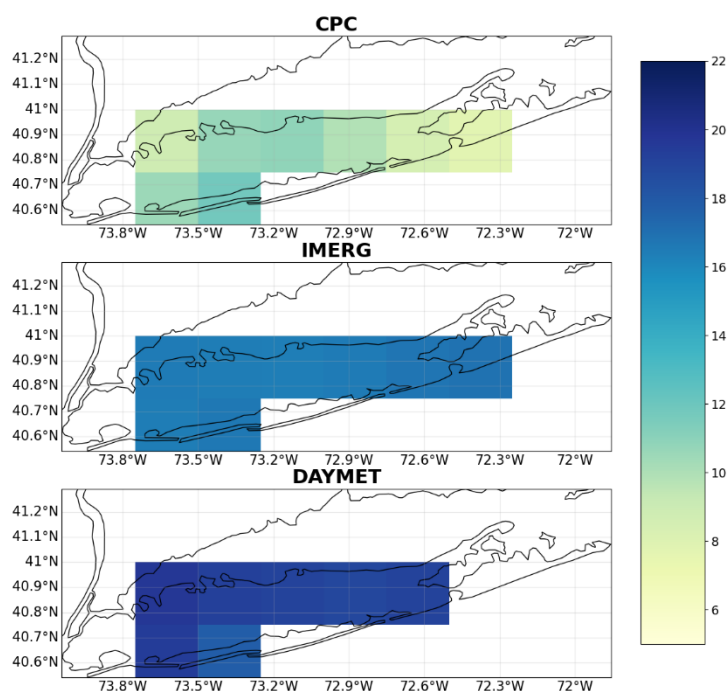


Figure S6. Annual average 95th percentile precipitation (mm/day) using the common time period (2001–2020) for (top) CPC, (middle) IMERG, and (bottom) DAYMET. All datasets are re-gridded to the CPC grid spacing.

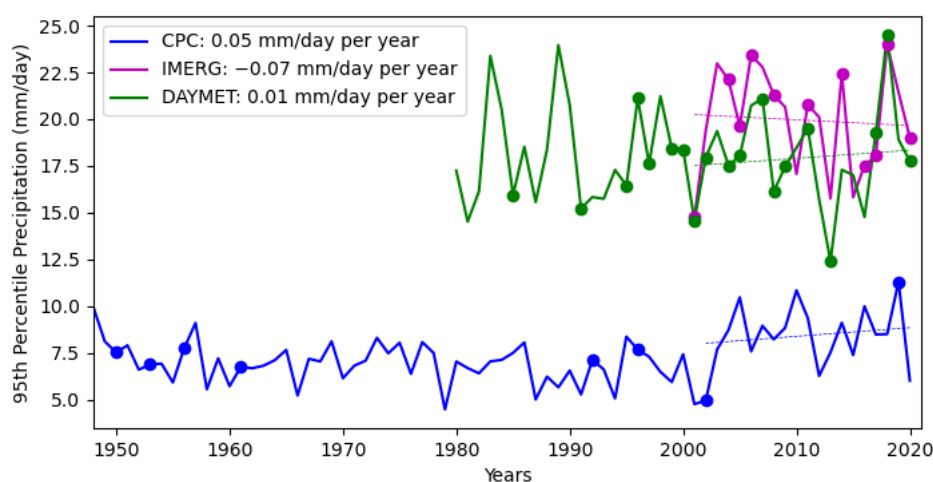


Figure S7. Time evolution of 95th percentile precipitation (mm/day) averaged over LI for (blue) CPC, (pink) IMERG, and (green) DAYMET. All datasets are re-gridded to the CPC grid spacing. Regression lines are only plotted for 2001–2020. Dots on the line plots show years when at least one TC passed within a great-circle distance of 5° from the center of Long Island and contributed to an extreme precipitation event.

Percentage of 95th Percentile Events Related to TCs

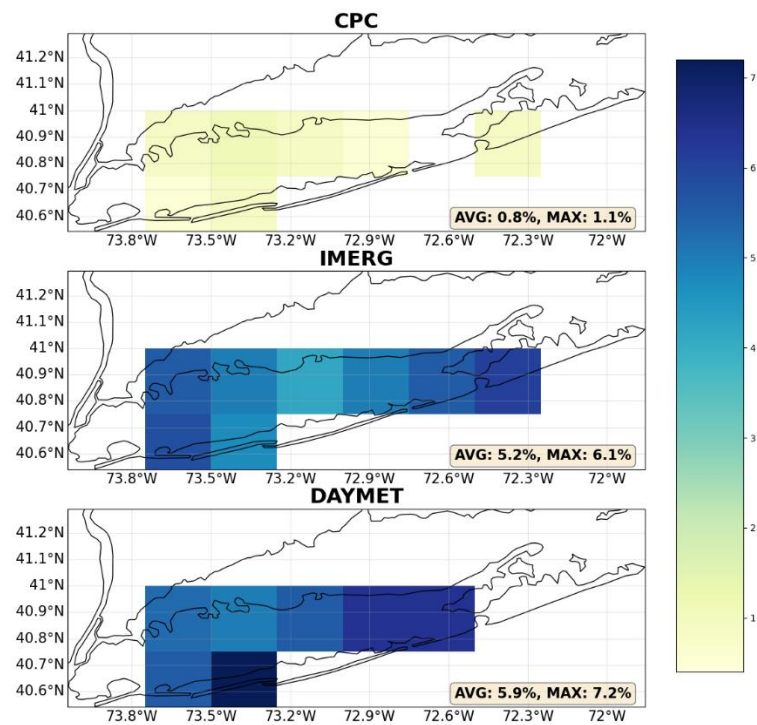


Figure S8. The percentage of 95th percentile precipitation events due to TCs for the common time period (2001-2020) for (top) CPC, (middle) IMERG, and (bottom) DAYMET. All datasets are re-gridded to the CPC grid spacing.

Percentage of 95th Percentile Events Related to TCs

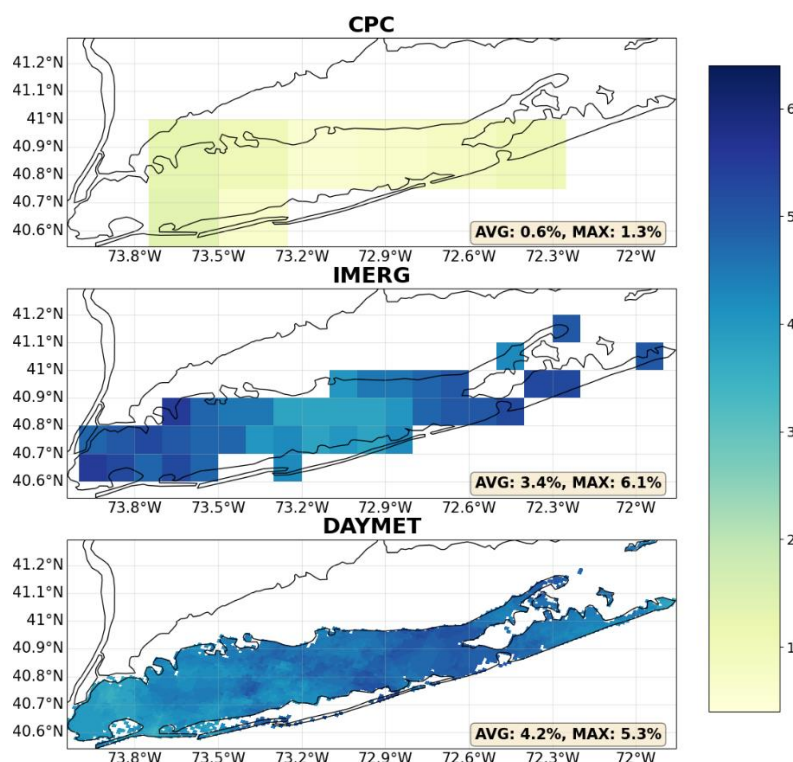


Figure S9. The percentage of 95th percentile precipitation events due to TCs on Long Island for the entire time period for (top) CPC, (middle) IMERG, and (bottom) DAYMET.

Tracks of TCs Passing Near Long Island

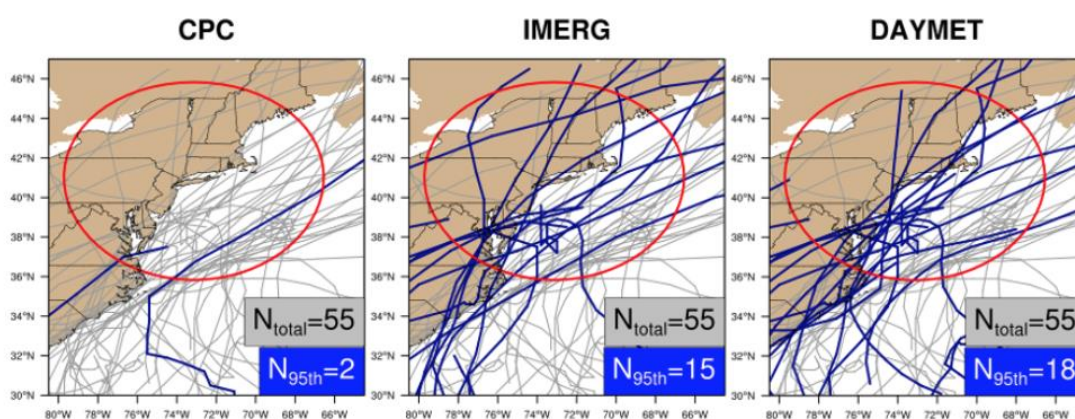


Figure S10. For 2001–2020, the blue tracks show the TCs that caused 95th percentile precipitation events on Long Island, while the grey tracks show TCs that passed through the red circle (5° circle around the center of Long Island) but did not cause 95th percentile precipitation events. The grey boxes show the total number of tracks that passed within the red circle, and the blue boxes show

the number of tracks that contributed to 95th percentile precipitation events (i.e., the number of blue tracks). All datasets are re-gridded to the CPC grid spacing.

Tracks of TCs Passing Near Long Island

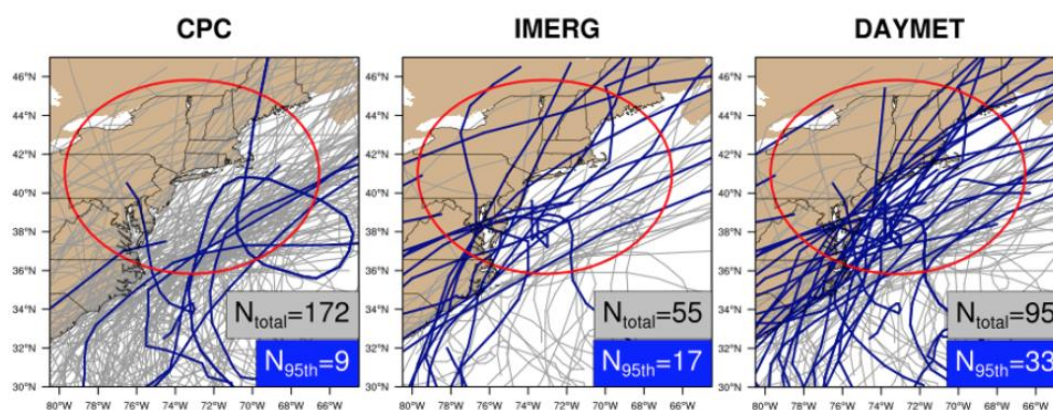


Figure S11. Using the full time period of each dataset, the blue tracks show the TCs that caused extreme precipitation events on Long Island, while the grey tracks show TCs that passed through the red circle (5 ° circle around the center of Long Island) but did not cause extreme precipitation events. The grey boxes show the number of tracks that passed close to Long Island, and the blue boxes show the number of tracks that contributed to extreme precipitation events.

Table S1. Relation of Extreme Precipitation on Long Island with TCs using *Rx1day* as the extreme precipitation metric.

Calculation Method:	CPC (1948-2020)	IMERG (2001-2020)	DAYMET (1980-2020)	CPC (2001-2020)	DAYMET (2001-2020)
Extreme Precipitation Events on Long Island, Caused by TCs					
Spatially averaged over Long Island	1.4%	10.5%	14.6%	0%	26.3%
Maximum point on Long Island	2.7%	21.1%	22.0%	5.3%	36.8%