

Sea Level Trends for Planning at Timucuan Ecological and Historic Preserve

National Park Service (from Maria Caffrey)

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Historical Trends

Historical sea level trends along the Atlantic coast show that sea levels are rising at a faster rate than global average sea level (IPCC 2007; NOAA tides and currents 2012; Figure 1). In comparison to the rest of the state of Florida, Timucuan has not been in the path of many storms since 1842 (Figure 2). Most of the recorded storms are relatively low intensity events (tropical storms or tropical depressions; Table 1, Figure 3) although two hurricane-strength storms have occurred within 10 miles of the preserve over the past two centuries (1888, 1928).

Future Projections

Sea level projections are based on global sea level estimates (Table 1). These numbers do not include changes in storm surge. IPCC reports (2012) have found that storm intensity is likely to increase in the future, although there is no statistically significant data that suggests the number of storms is going to increase. This means that while the number of storms and their paths may not change, it can be expected that storm surges will increase as storm intensity increases.

References

- Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Eds. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Intergovernmental Panel on Climate Change (IPCC). 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Eds. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley. Cambridge University Press, Cambridge, UK, and New York, NY, USA.
- International Best Track Archive for Climate Stewardship (IBTrACS). 2012. Data center: <http://www.ncdc.noaa.gov/oa/ibtracs/index.php?name=ibtracs-data> [accessed 05/04/12].
- National Oceanic and Atmospheric Administration (NOAA) Tides and Currents. 2012. Sea level trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html> [accessed 05/04/12].
- Vermeer, M., Rahmstorf, S. 2009. Global sea level linked to global temperature. PNAS 106: 21527–21532.

Table 1. Timucuan Ecological and Historic Preserve storm and sea level trends.

	Mean	Range	Units	Source
Historical				
Sea level, Mayport, 1928–2010	2.40	2.11–2.74	mm/yr	NOAA tides and currents (2012)
	0.9	0.8–0.11	in/yr	
Number of tropical storms, depressions, and subtropical storms to directly strike TIMU, 1842–2011	10	n/a	number	IBTrACS (2010)
Number of tropical storms, depressions, and subtropical storms paths within 10 miles of TIMU, 1842–2011	25	n/a	number	IBTrACS (2010)
Number of hurricanes to directly strike TIMU, 1842–2011	1	n/a	number	IBTrACS (2010)
Number of hurricanes paths within 10 miles of TIMU, 1842–2011	2	n/a	number	IBTrACS (2010)
Projected¹				
<i>IPCC B1 scenario (lower emission)</i>				
Sea level by 2020	5	3–8	cm	Vermeer and Rahmstorf (2009)
	2	1–3	in	
Sea level by 2050	30	22–38	cm	Vermeer and Rahmstorf (2009)
	12	9–15	in	
Sea level by 2100	95	72–122	cm	Vermeer and Rahmstorf (2009)
	37	28–48	in	
<i>IPCC A1B scenario (medium emission)</i>				
Sea level by 2020	5	2–8	cm	Vermeer and Rahmstorf (2009)
	2	1–3	in	
Sea level by 2050	31	24–39	cm	Vermeer and Rahmstorf (2009)
	12	9–15	in	
Sea level by 2100	115	88–147	cm	Vermeer and Rahmstorf (2009)
	45	35–58	in	
<i>IPCC A2 scenario (higher emissions)</i>				
Sea level by 2020	5	3–8	cm	Vermeer and Rahmstorf (2009)
	2	1–3	in	
Sea level by 2050	30	23–38	cm	Vermeer and Rahmstorf (2009)
	12	9–15	in	
Sea level by 2100	115	89–146	cm	Vermeer and Rahmstorf (2009)
	45	35–57	in	

¹ Projections reported here are based on sea level heights above 2012 values. The projected sea levels listed here do not include a 9 cm (3.5 in) projected rise in sea levels between 1990 and 2012 estimated by Vermeer and Rahmstorf (2009). Numbers were originally reported in centimeters (cm). Values were converted to inches (in) and rounded to the nearest whole number.

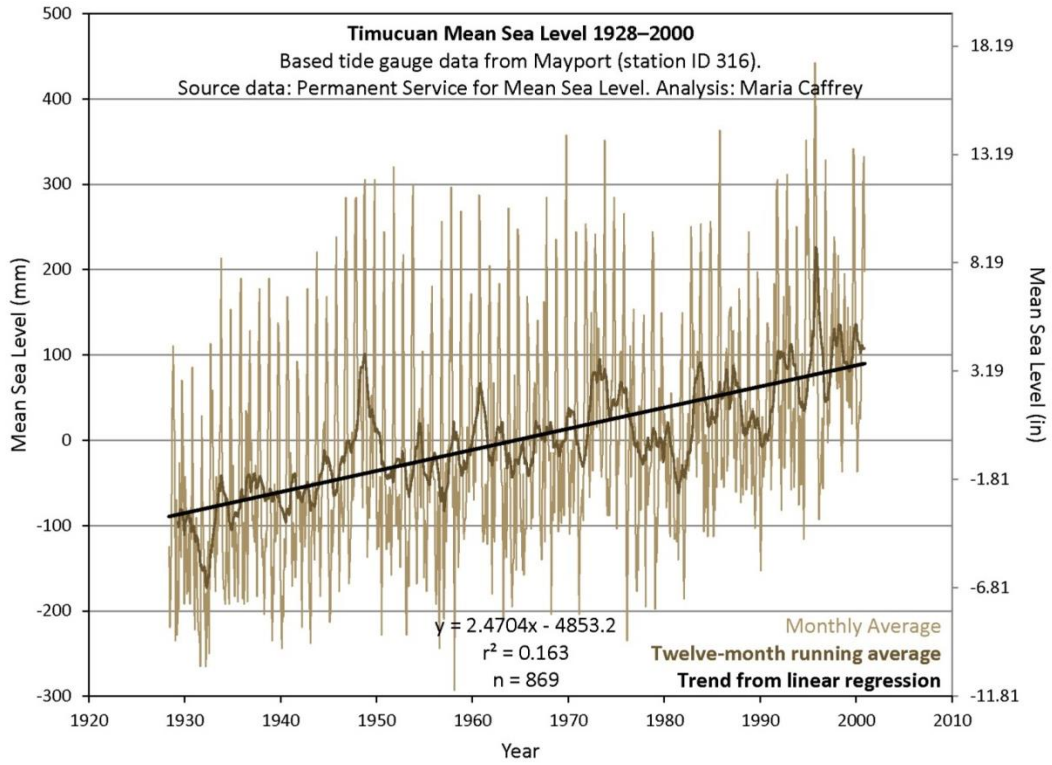


Figure 1.

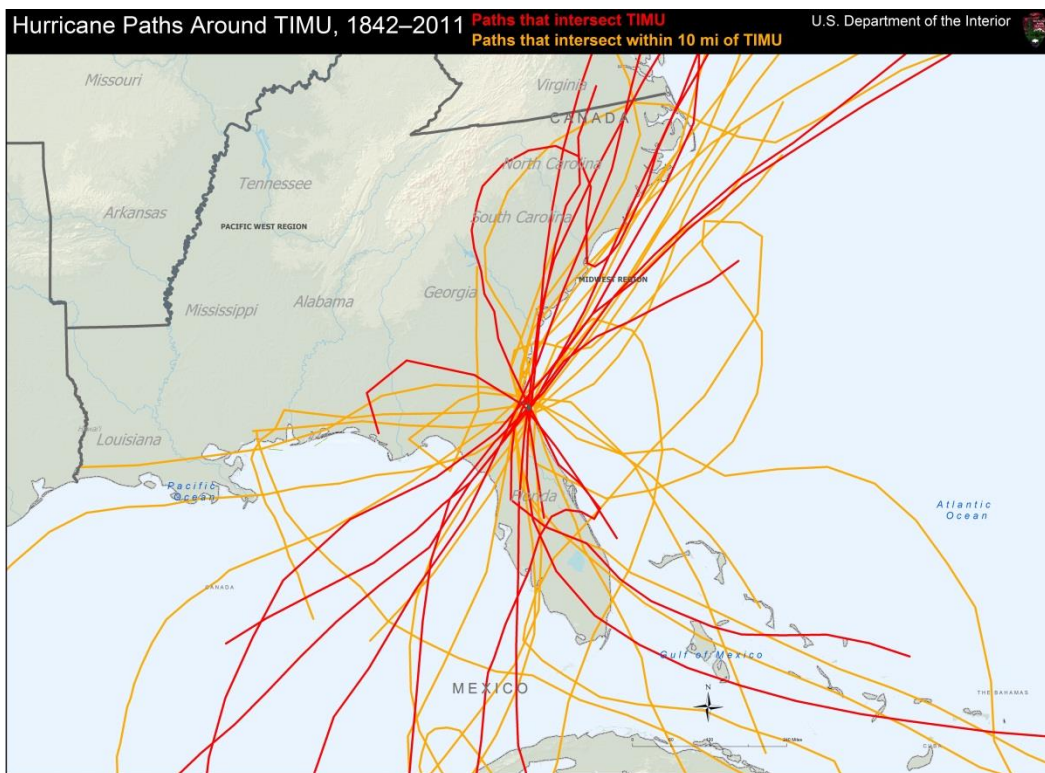


Figure 2.

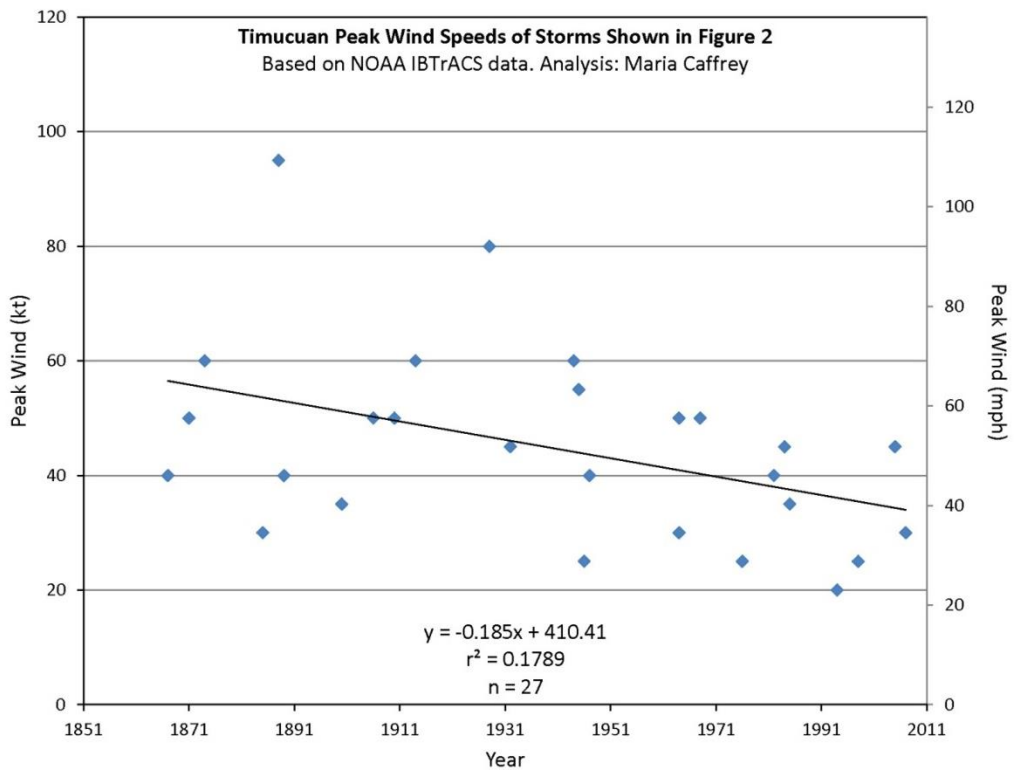


Figure 3.