

Climate Change Summary, De Soto National Memorial, Florida

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Climate Trends for the Area within Park Boundaries

- Average annual temperature has warmed at a statistically significant rate of 1°C per century (Figure 1).
- Total annual precipitation has declined at a rate of 7% per century, but the trend has not been statistically significant (Figure 2).
- Models project substantial future warming and increases in precipitation (Figures 1-2).

Table. Historical and projected changes (data Daly et al. 2008, IPCC 2013; analysis Wang et al. in preparation). The table only gives central values. Figures 1-2 show the uncertainties.

	1950-2010	2000-2050	2000-2100
Historical			
temperature	+1°C/century (+1.8°F.)/century		
precipitation	-7%/century		
Projected (compared to 1971-2000)			
Low emissions (IPCC RCP 4.5)			
temperature		+1.6°C (+2.9°F.)	+2.1°C (+3.8°F.)
precipitation		+6%	+7%
High emissions (IPCC RCP 6.0)			
temperature		+1.4°C (+2.5°F.)	+2.5°C (+4.5°F.)
precipitation		+5%	+4%
Highest emissions (IPCC RCP 8.5)			
temperature		+2.1°C (+3.8°F.)	+3.8°C (+6.8°F.)
precipitation		+5%	+4%

Potential Future Vulnerabilities for Central Florida

- The number of days with a maximum temperature >35°C (95°) in the area of the park may increase 30-40 days per year by 2100 (Ingram et al. 2014).
- Ground-level ozone concentrations may increase (Ingram et al. 2014).
- See information on sea level rise from Maria Caffery.

Figure 1. Temperature.

Historical and projected average annual average temperature for the area within park boundaries. For projections, each bar shows one standard deviation above and below the average of up to 33 climate models. (Data: Daly et al. 2008, IPCC 2013. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

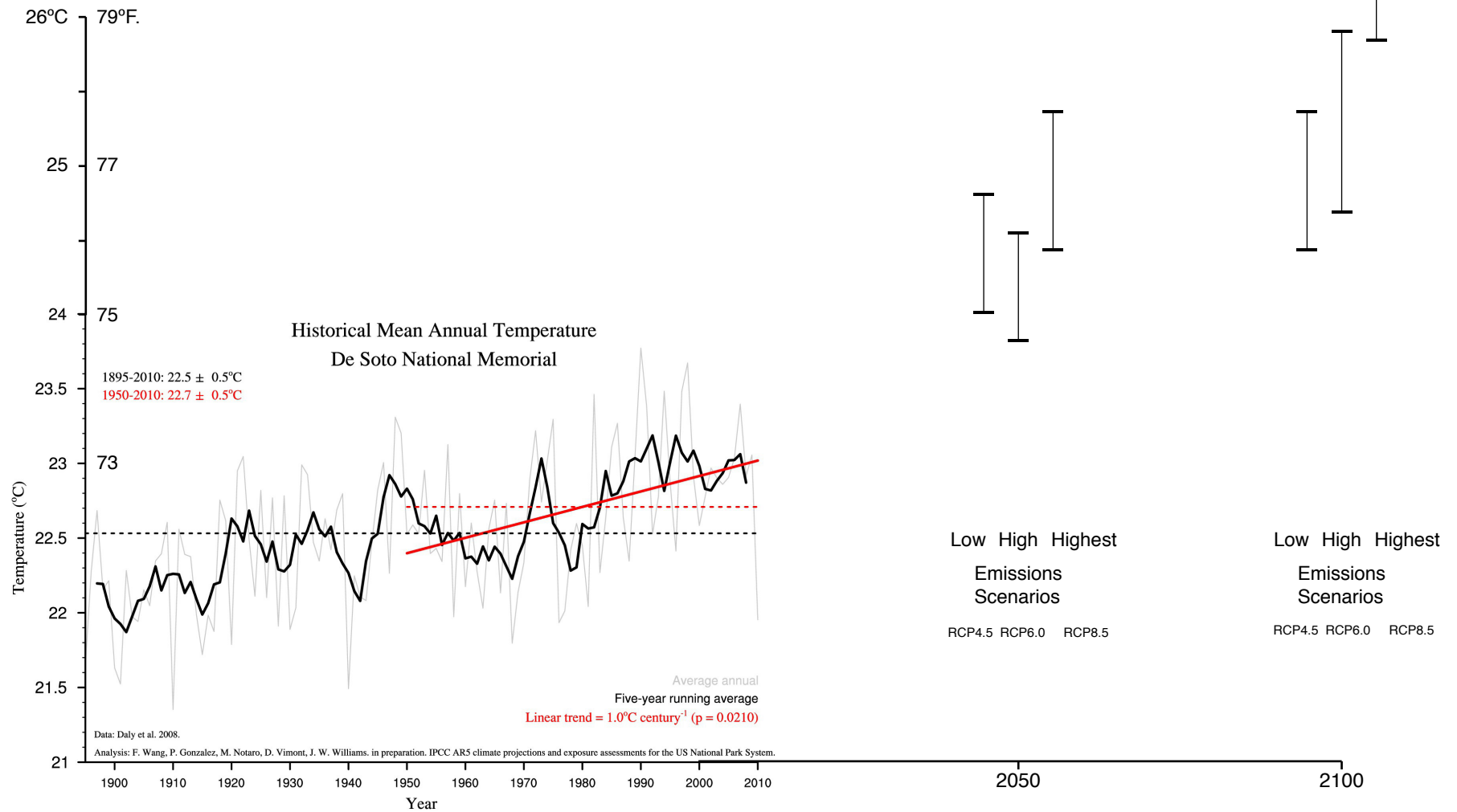
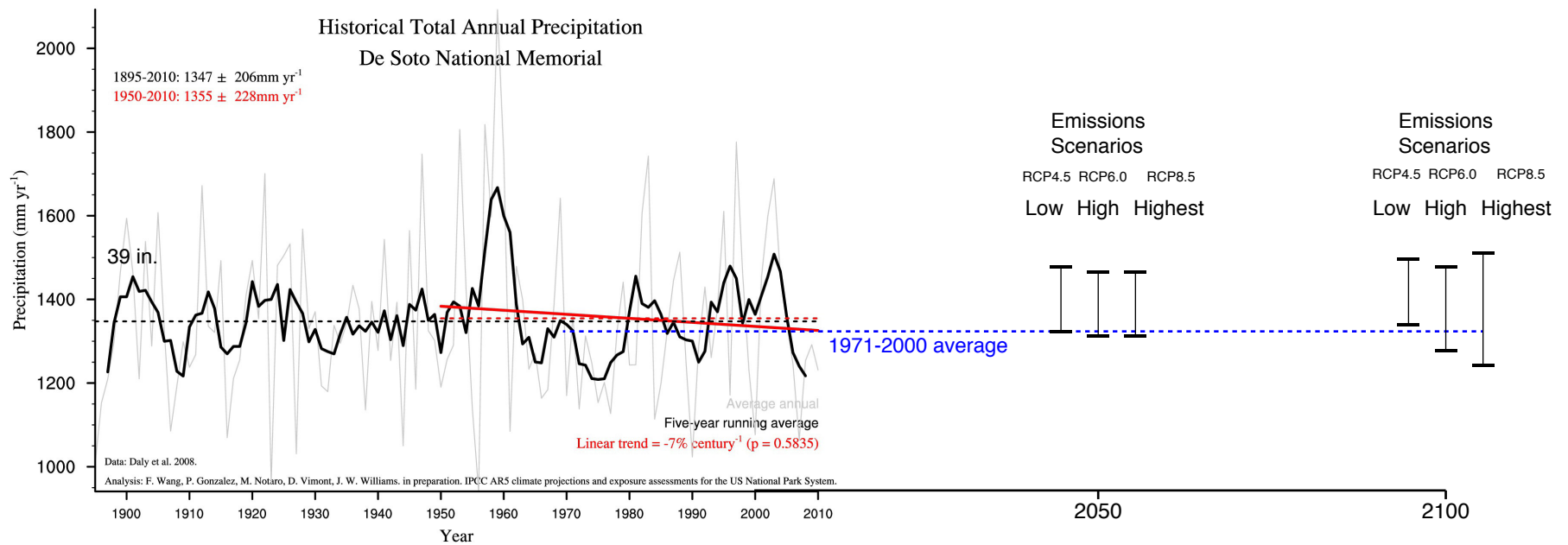


Figure 2. Precipitation.

Historical and projected annual total precipitation for the area within park boundaries. For projections, each bar shows one standard deviation above and below the average of up to 33 climate models. (Data: Daly et al. 2008, IPCC 2013. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).



References

- Daly, C., M. Halbleib, J.I. Smith, W.P. Gibson, M.K. Doggett, G.H. Taylor, J. Curtis, and P.P. Pasteris. 2008. Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States. *International Journal of Climatology* 28: 2031–2064.
- Ingram, K.T., K. Dow, L. Carter, and J. Anderson. (eds.) 2014. *Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability*. Island Press, Washington, DC.
- Intergovernmental Panel on Climate Change (IPCC). 2013. *Climate Change 2013: The Physical Science Basis*. Cambridge University Press, Cambridge, UK.
- Wang, F., P. Gonzalez, M. Notaro, D. Vimont, and J.W. Williams. in preparation. Significant exposure of U.S. national parks to historical and projected climate change.