

US Major Hurricane Droughts

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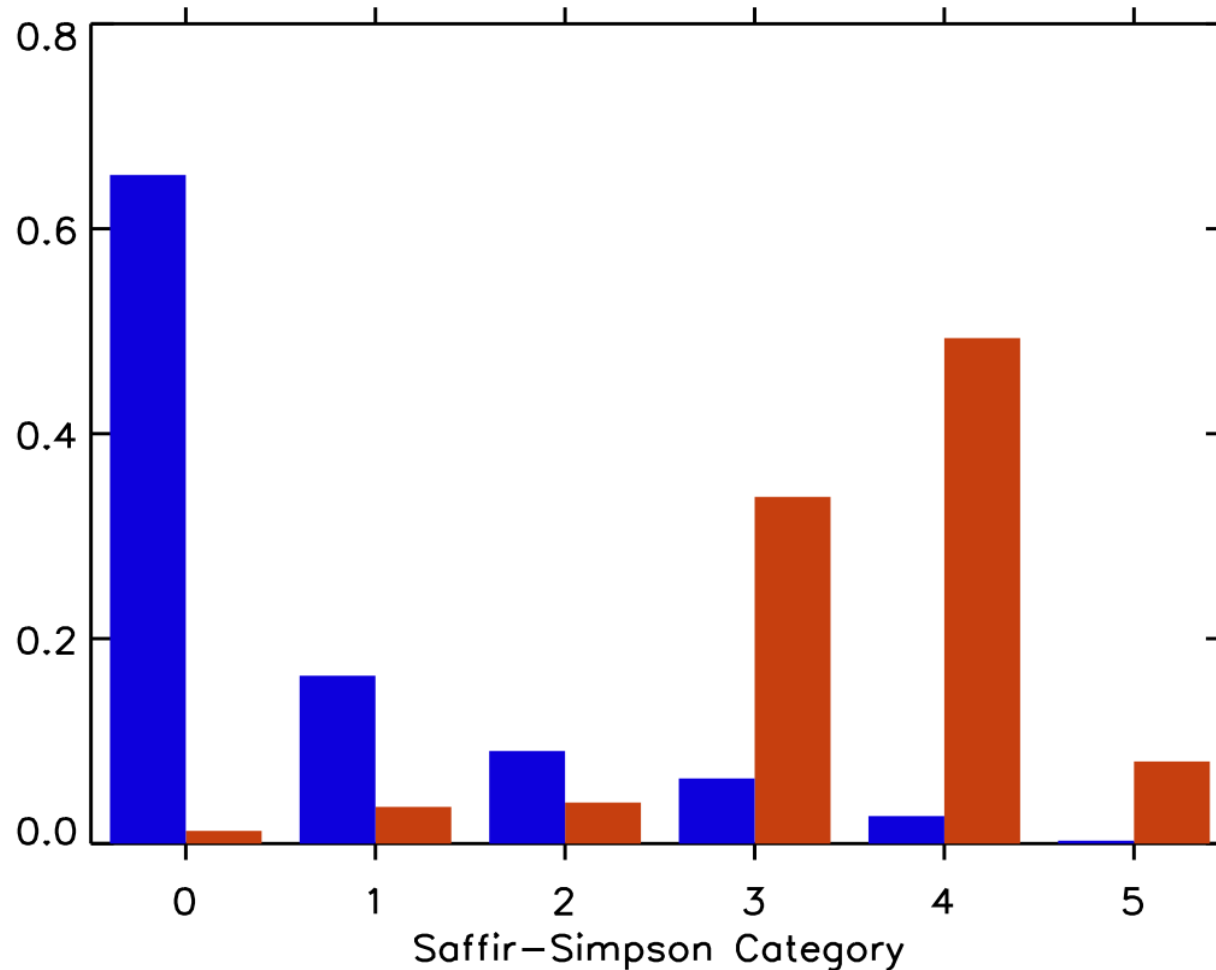
Hall and Hereid, Geophys. Res. Lett., 2015

NASA Scientific Visualization Studio



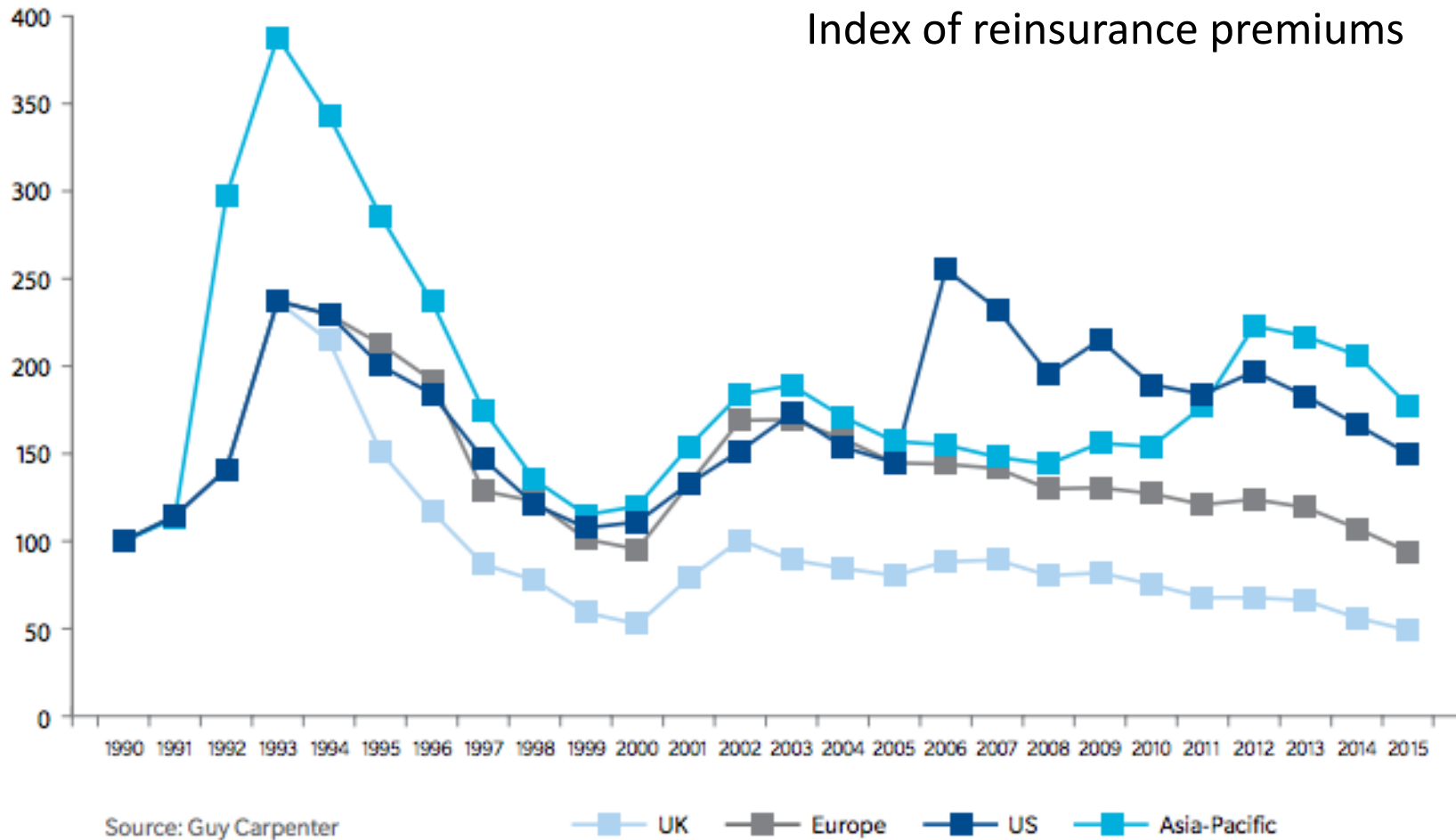
Major = Saffir Simpson Scale Category 3 and up (max wind speeds > 178km/hr)
Arbitrary threshold. But damage $\sim V^3$.

US landfalls and dollar loss by category.



Loss data from Blake et al (2011) using Pielke et al (2007) population and wealth normalization.

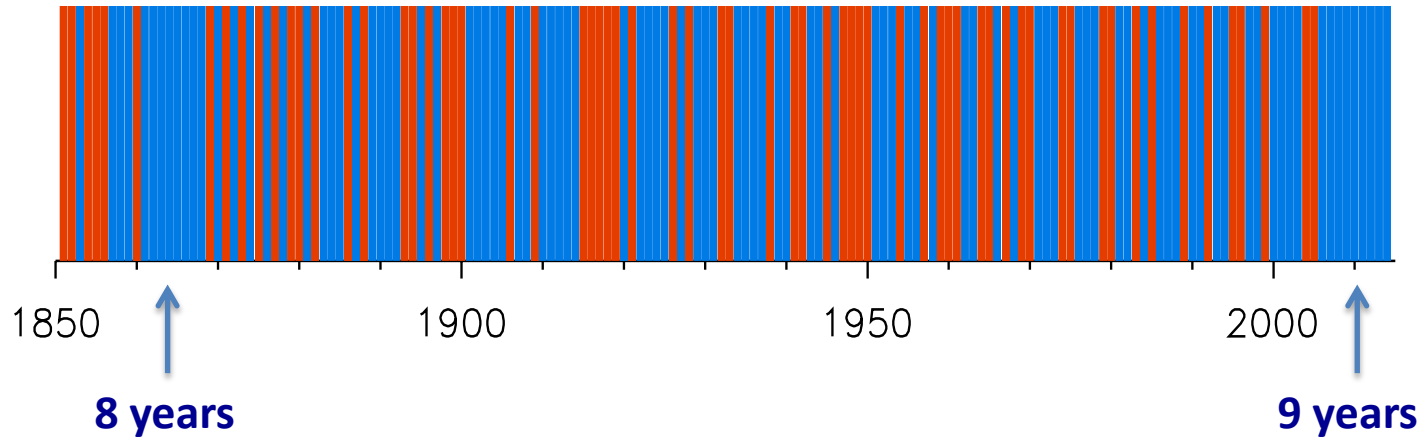
Insurance During this Period



What are the odds of 9-year major landfall “drought”?

What if anything does it say about subsequent years?

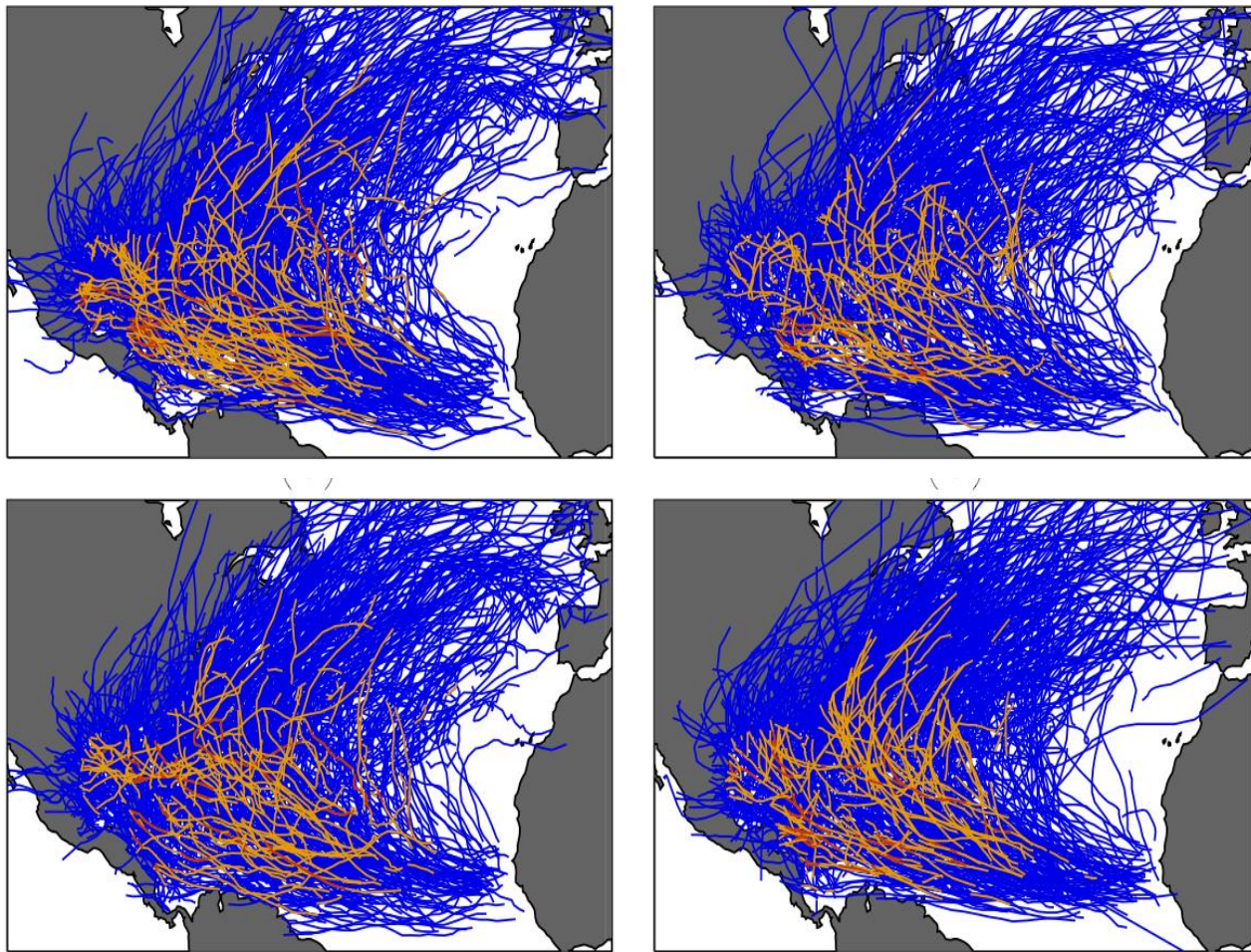
Years **with** and **without** Cat3+ landfalls.



Several ways to estimate the odds of a gap like the current 9 years:

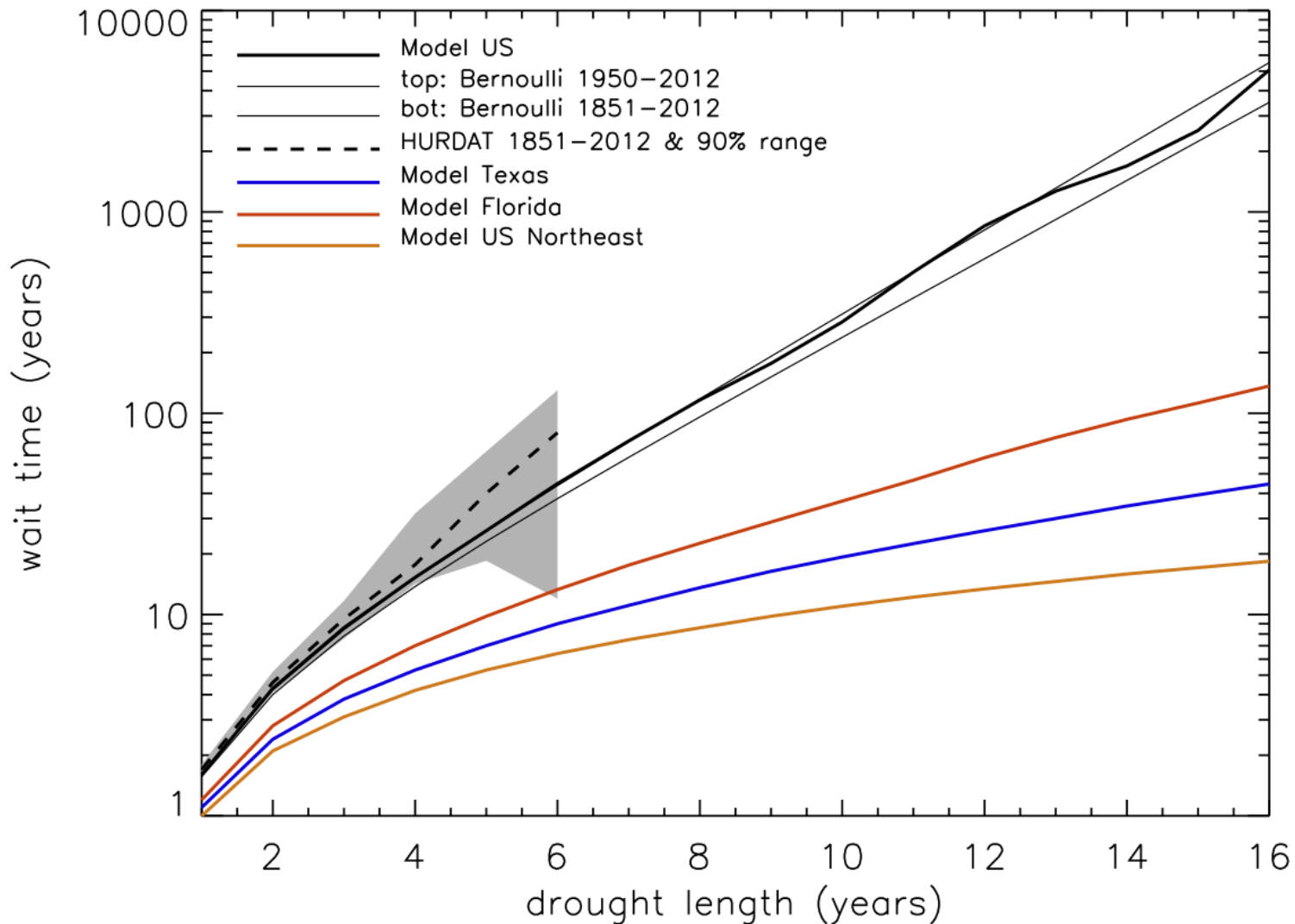
- The most elaborate: Use a statistical track model (e.g., hazard part of catastrophe model, used by reinsurers). Generate large set of synthetic hurricanes whose statistics match historic hurricanes. Count landfall “droughts” in the synthetic set.

Statistical hurricane model: Stochastic simulations of hurricanes birth to death.
Independent variables SST and ENSO.
1000 simulations of 1950-2012 to create large event set.

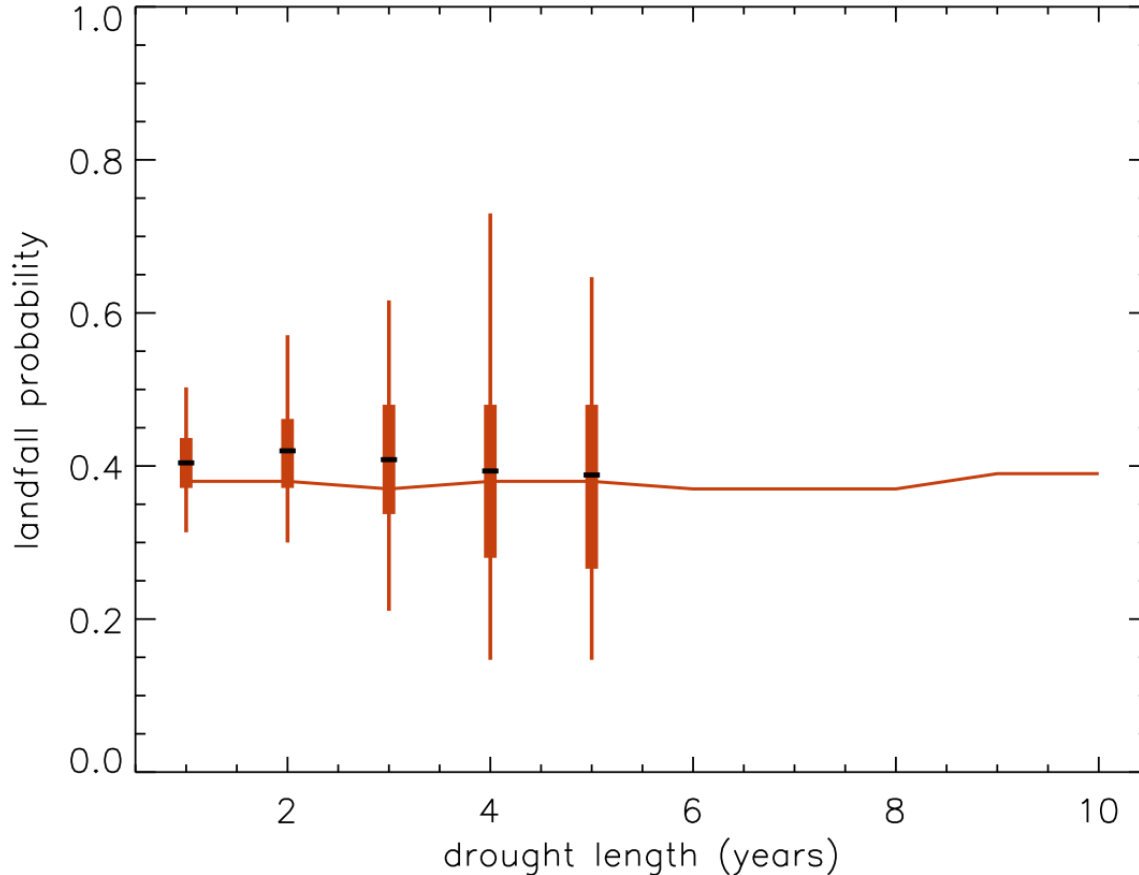


Hall and Yonekura, J. Clim. 2013

“Wait Time”: how long to wait on average to get an N-year drought?



Probability of major landfall next year, given a current N-year drought?



No dependence of P on drought length. Each year forgets the previous year (Bernoulli Process) at least for rare intense events.

Note: closer to season (like now!) we start to have some skill at probabilistic forecasting, though maybe not for major landfalls.

USA's 10-year hurricane drought is dumb luck

Current 9-year US major landfall drought is unprecedented in historical record (177 years wait time).

But, no evidence for change in odds with drought length.

2005-2014 have been average-to-above by several measures:

- **Accumulated cyclone energy.**
- **Total annual number Cat3+ hurricanes.**
- **Major landfalls nearby in Caribbean (Cuba, Hispaniola, Mexico).**