

# **ADVANCES AND ISSUES IN UNCERTAINTY QUANTIFICATION FOR COASTAL FLOOD HAZARDS**

Taylor Asher

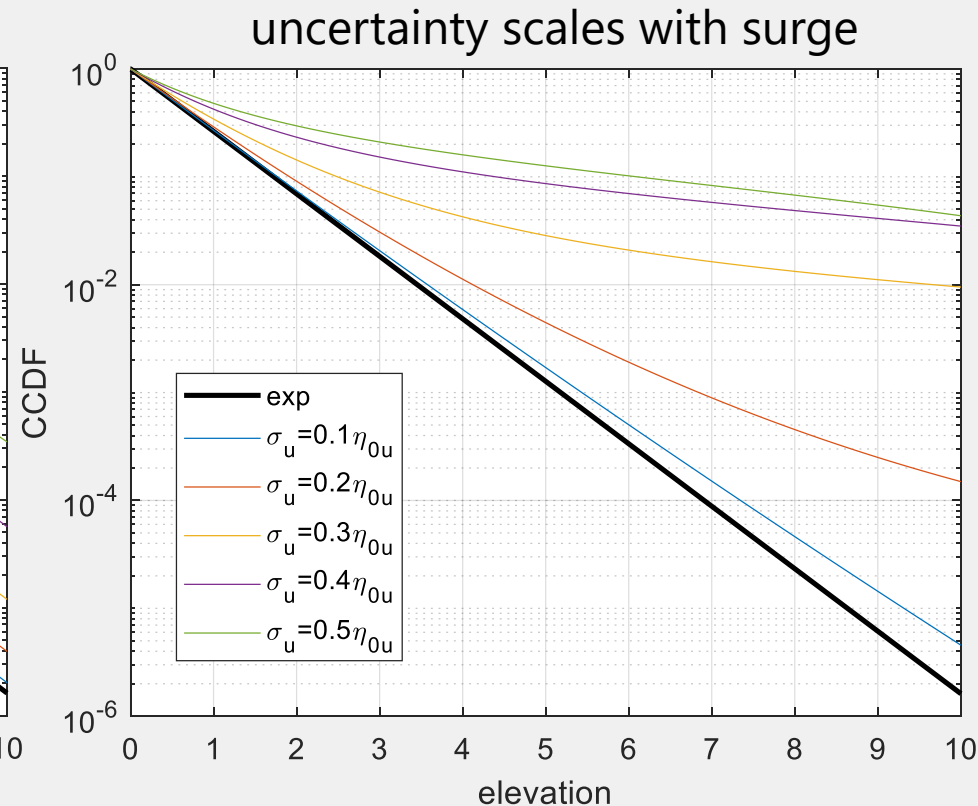
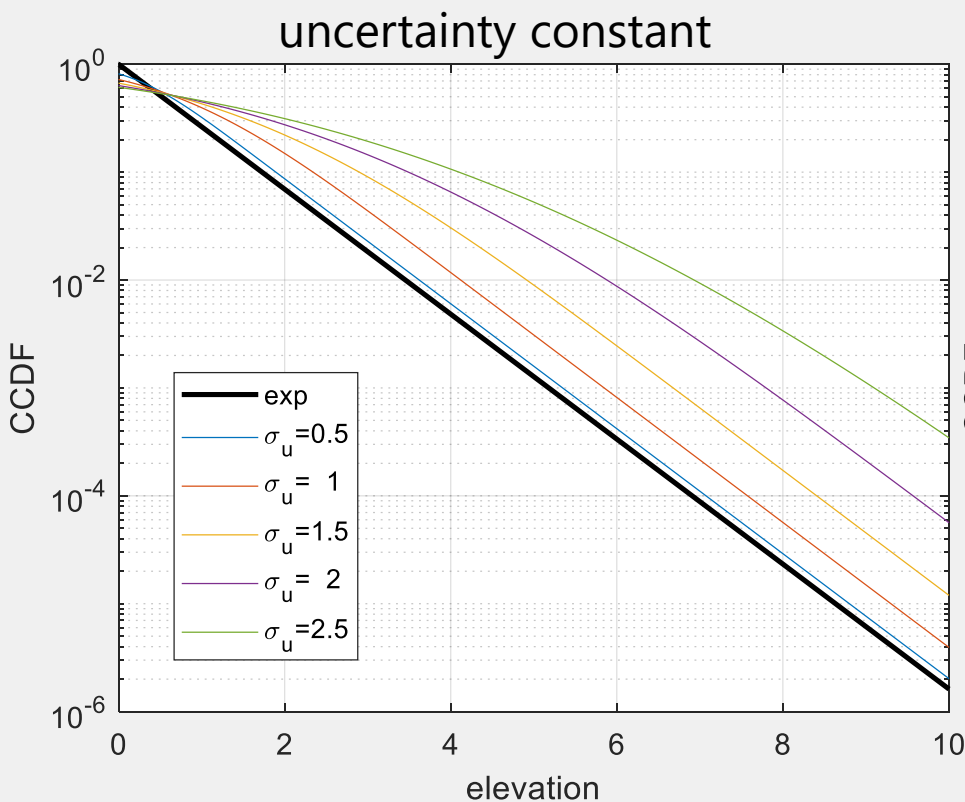
Jennifer L. Irish

Donald T. Resio

July 31, 2018

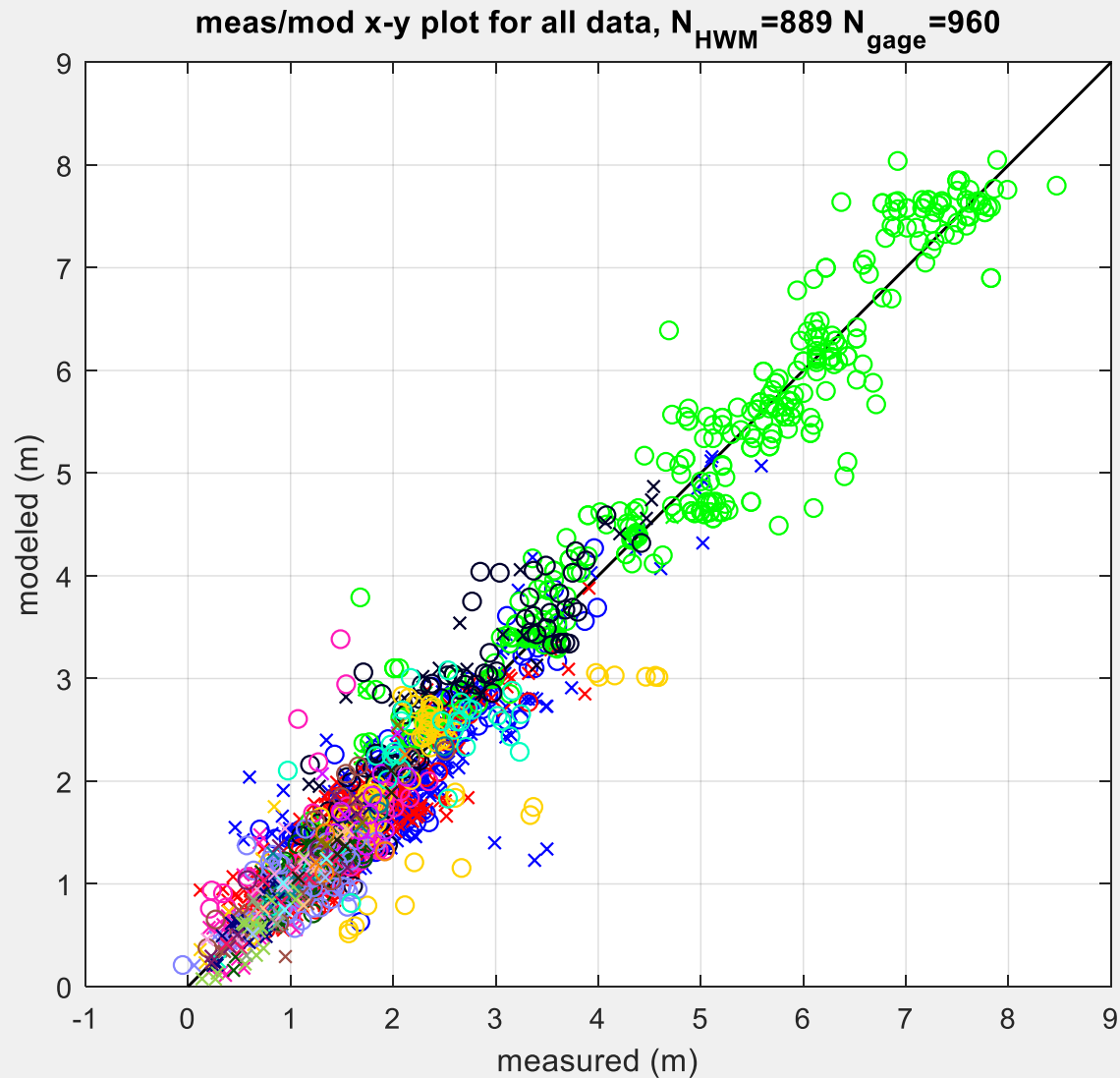
# Effects on Surge Hazard

- Uncertainty affects hazard estimates
- Even unbiased errors change mean hazard
  - Often, substantially for “extreme” hazards

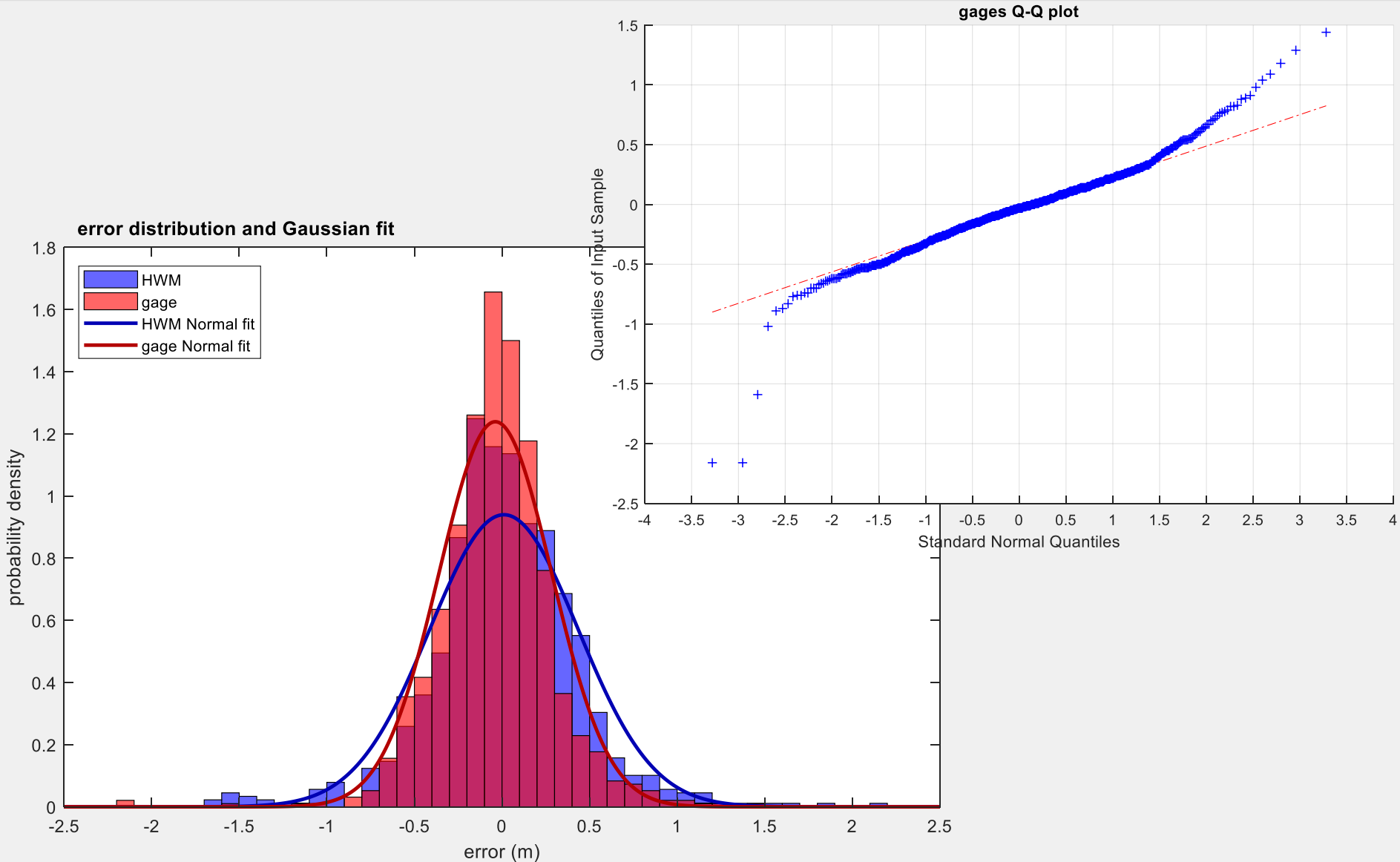


# Surge Model Skill

- 24 storms
- 7 studies
- 1849 obs.
- All ADCIRC
  
- 0.37 m RMSE
- 0.27 m MAE
- -0.014 m bias

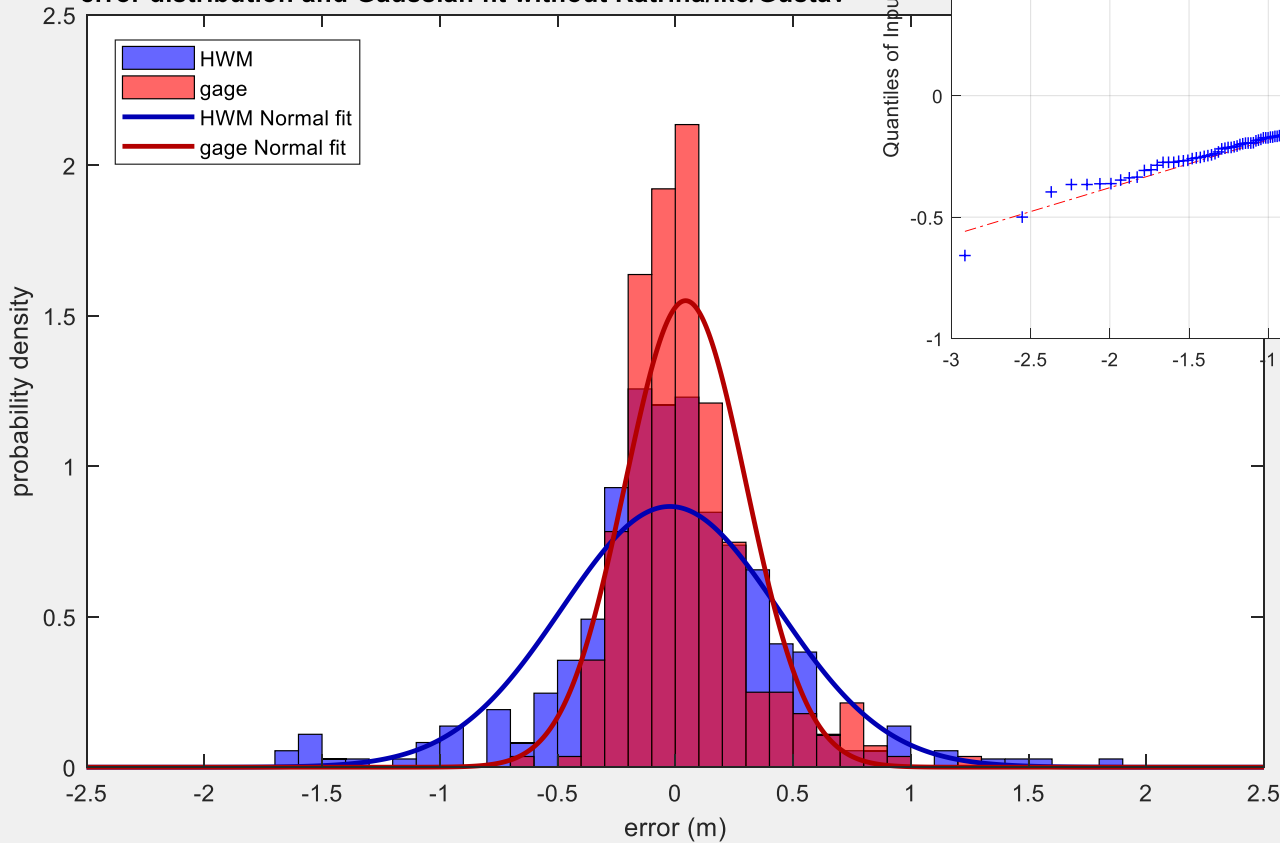


# Surge Model Skill

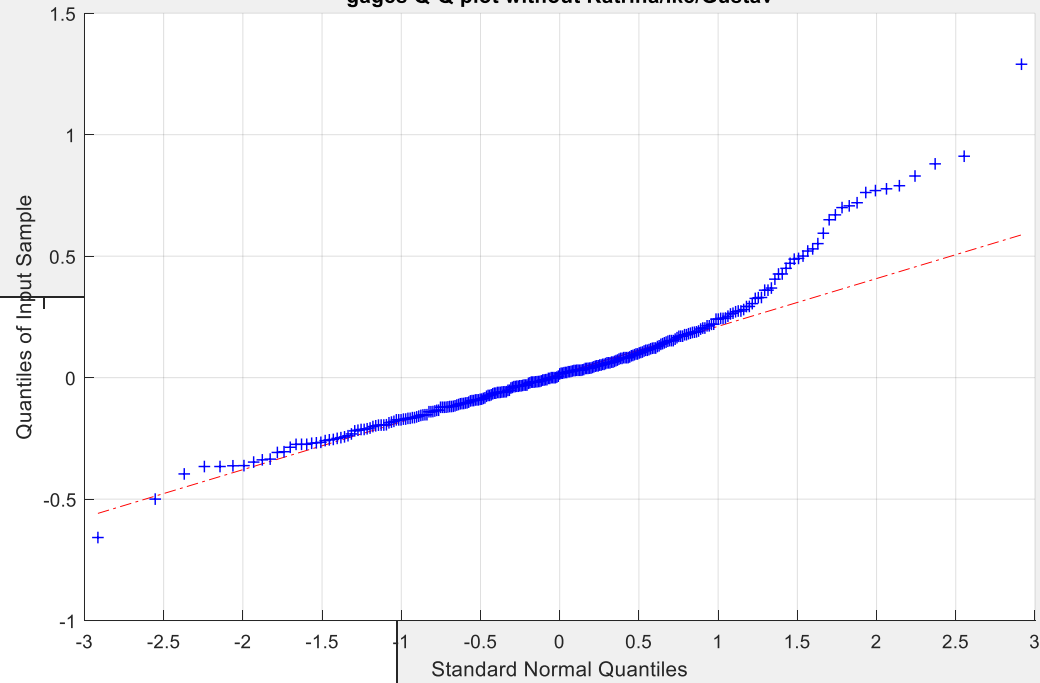


# Surge Model Skill

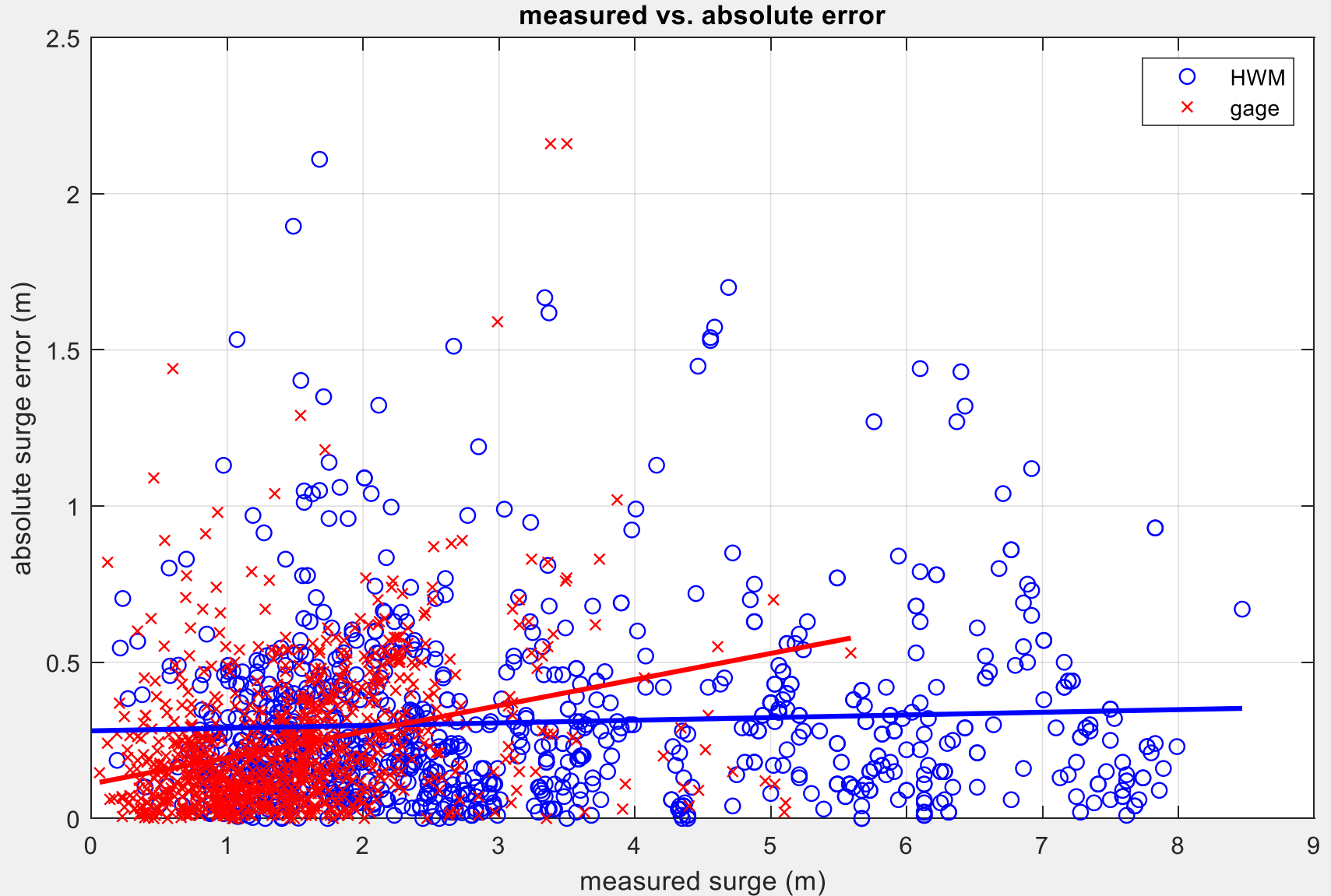
error distribution and Gaussian fit without Katrina/Ike/Gustav



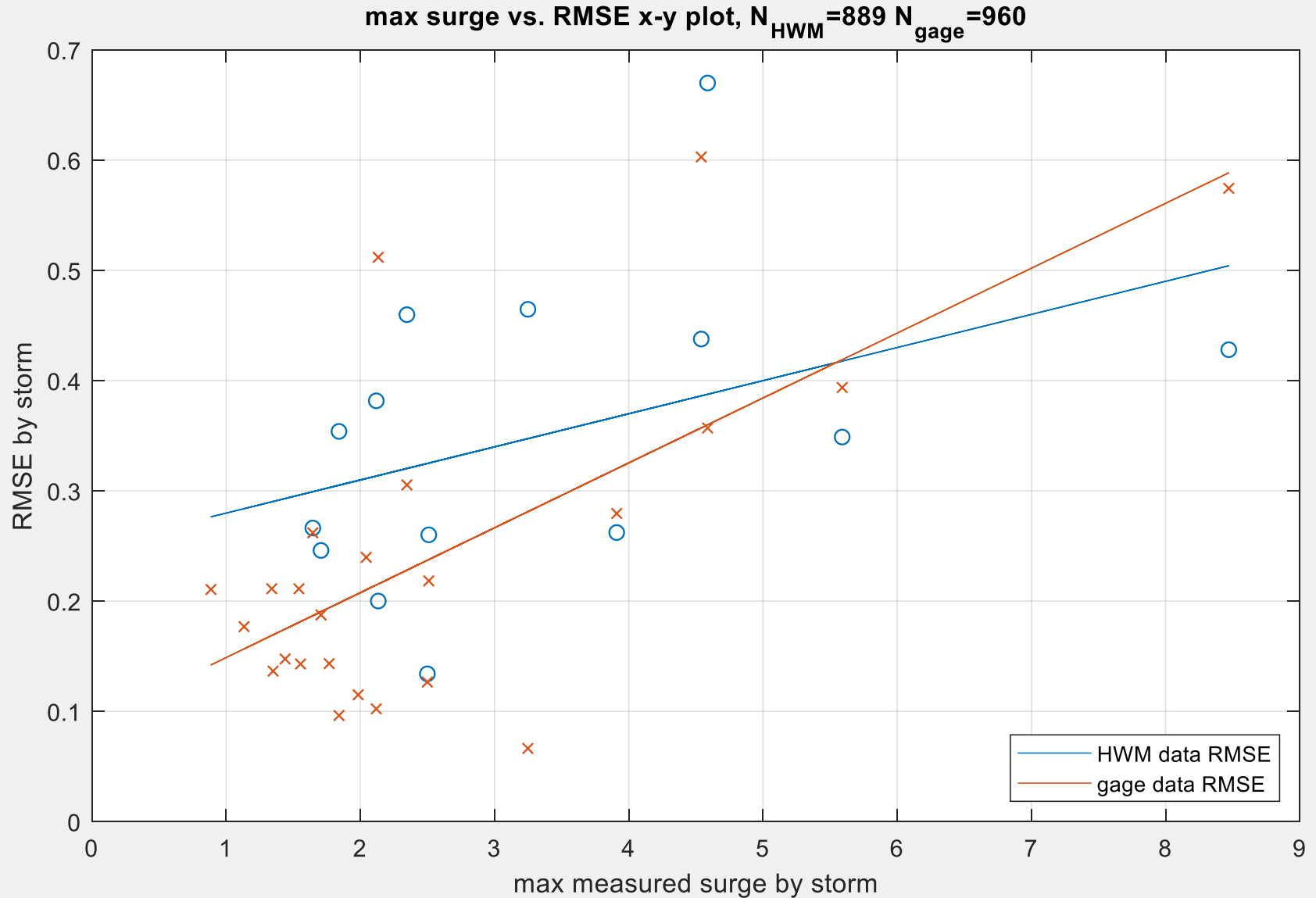
gages Q-Q plot without Katrina/Ike/Gustav



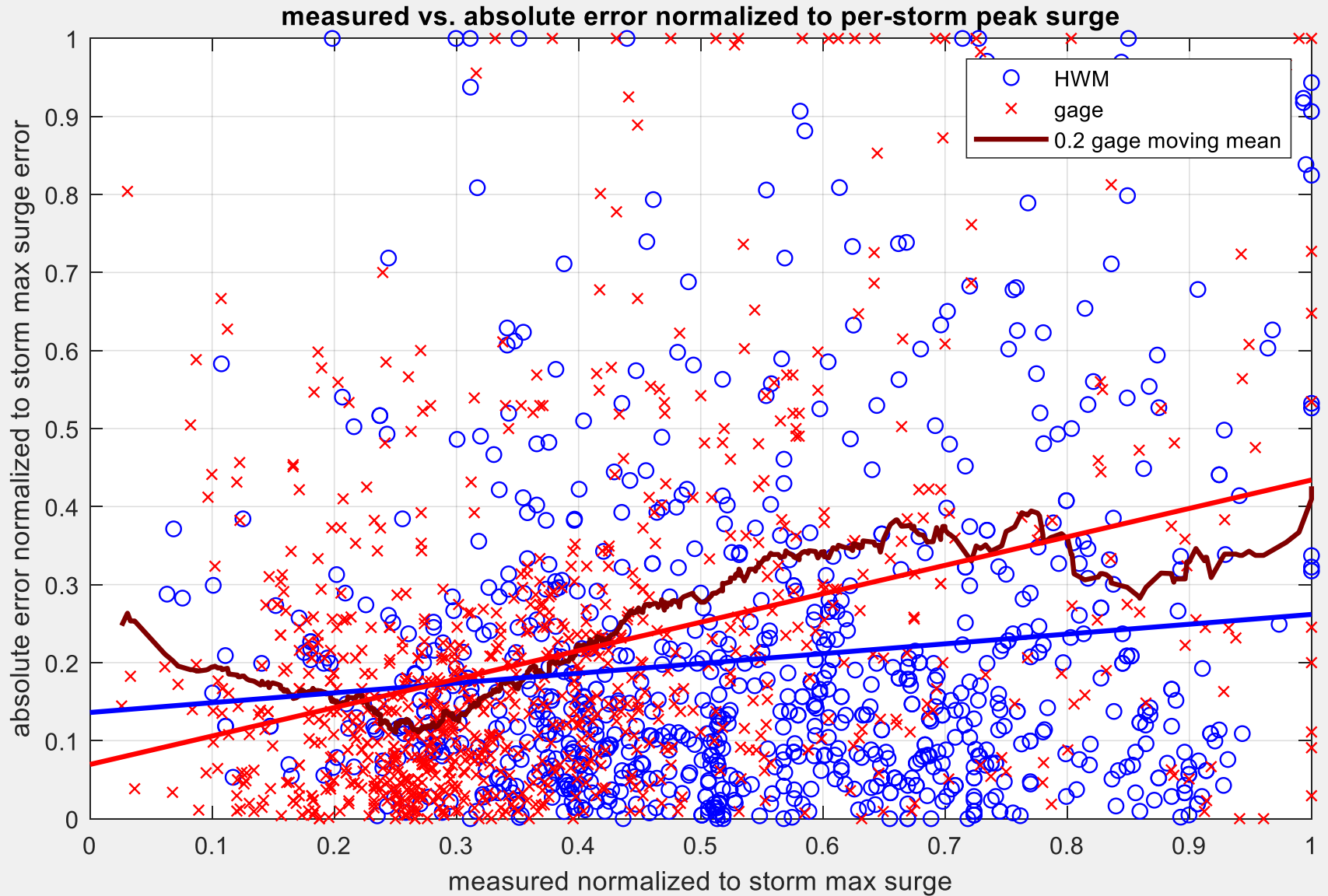
# Surge Error Scaling



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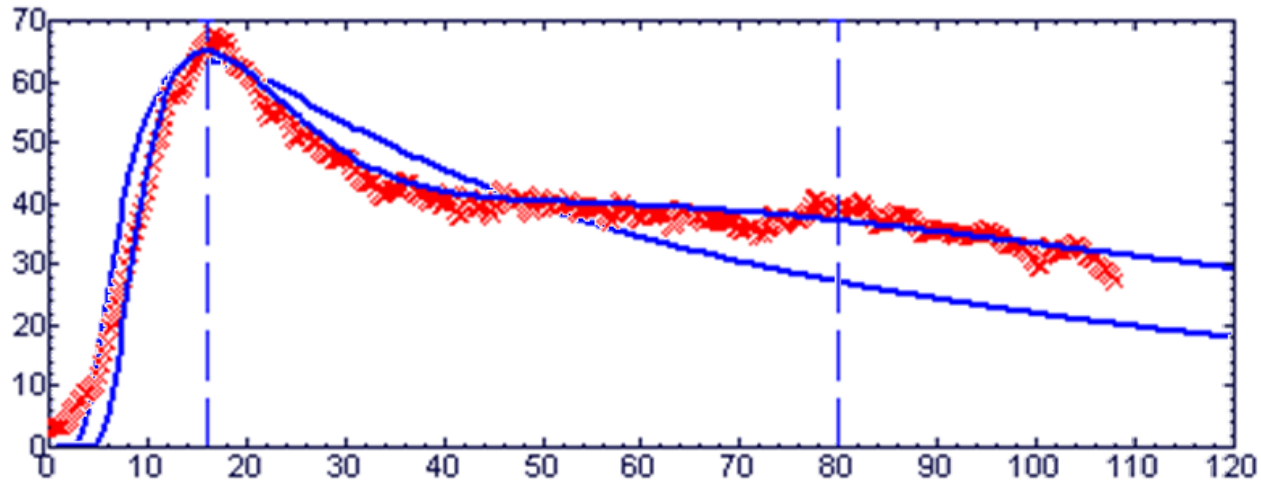
# Surge Error Scaling



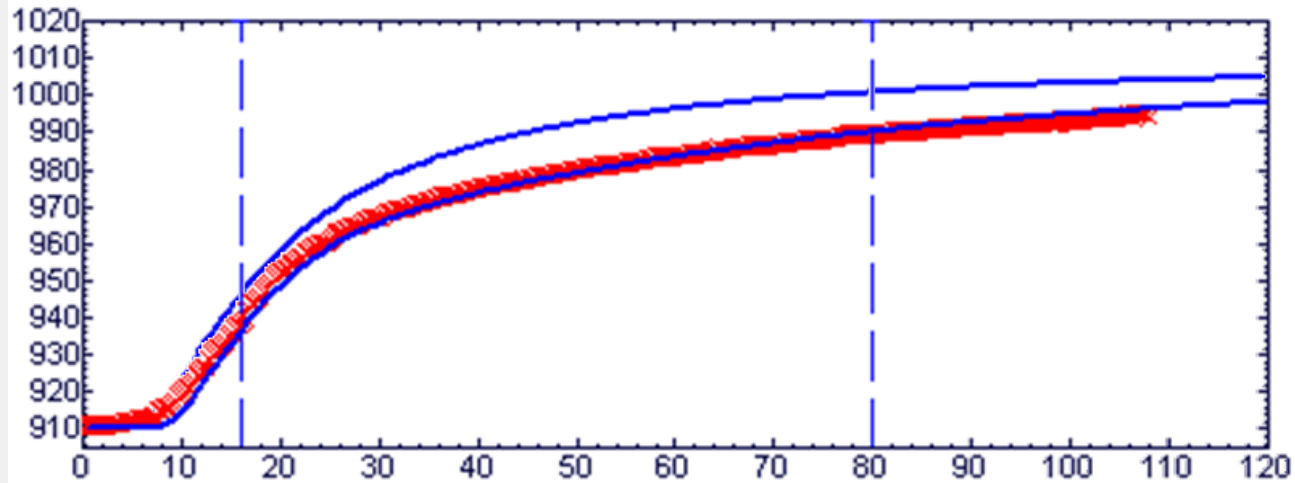


# Uncertainty in Meteorology

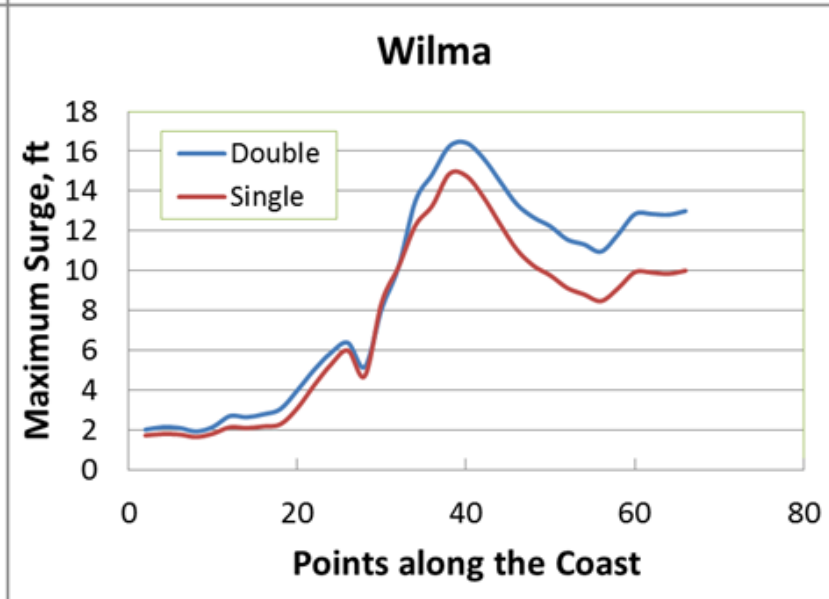
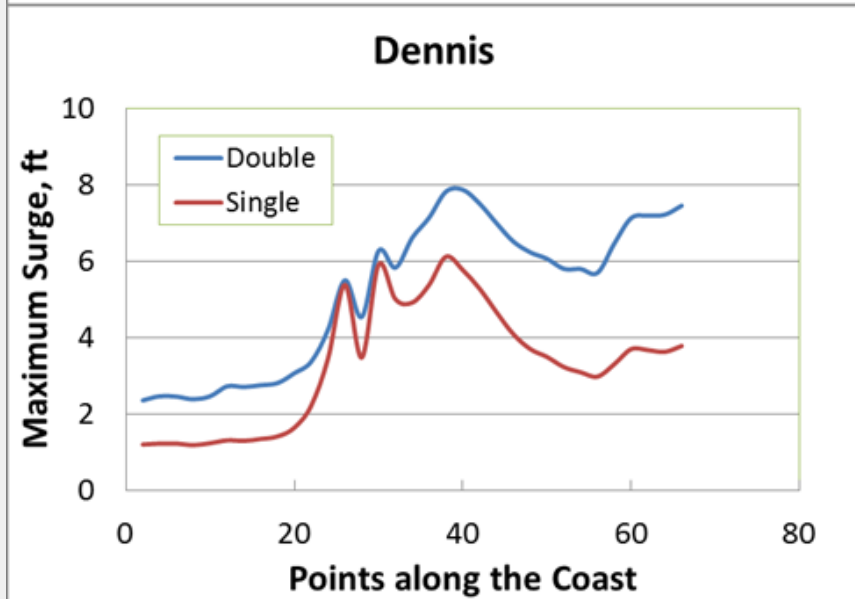
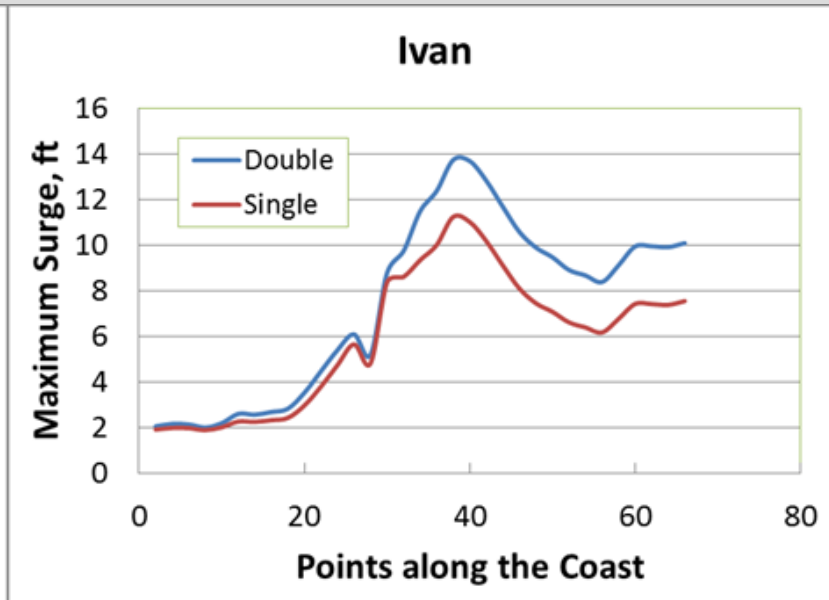
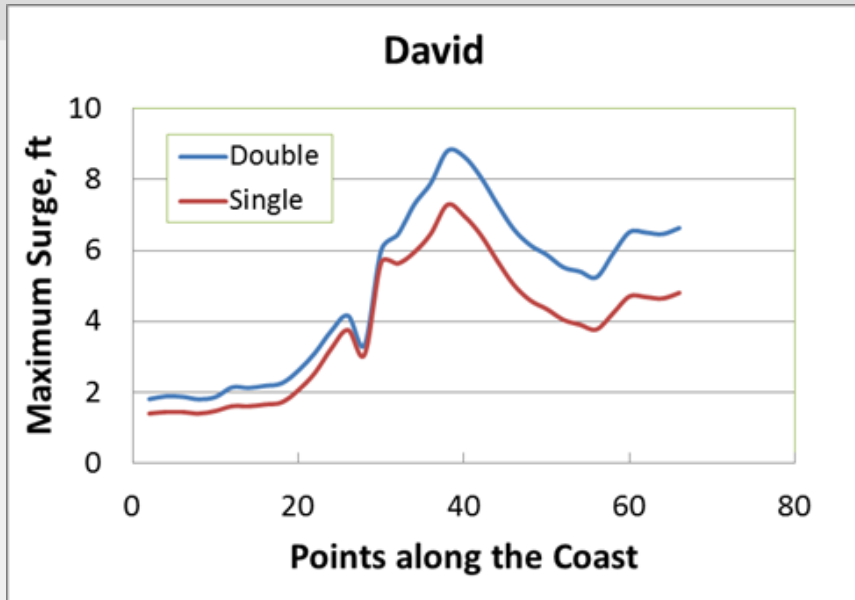
Flight Level Tangential Wind (m/s) vs Radius (Nmi)



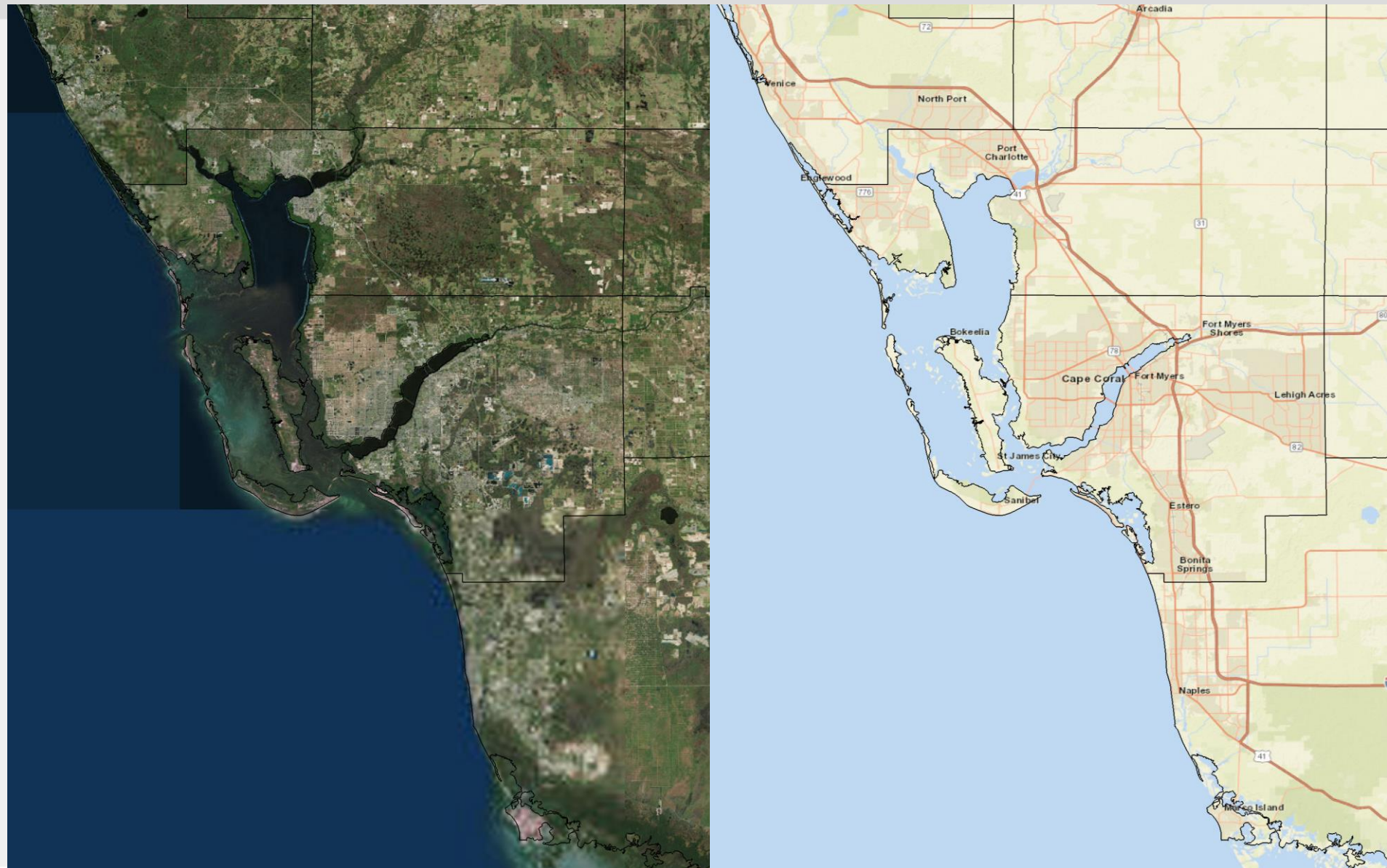
Sea Level Pressure (mb) vs Radius (Nmi)



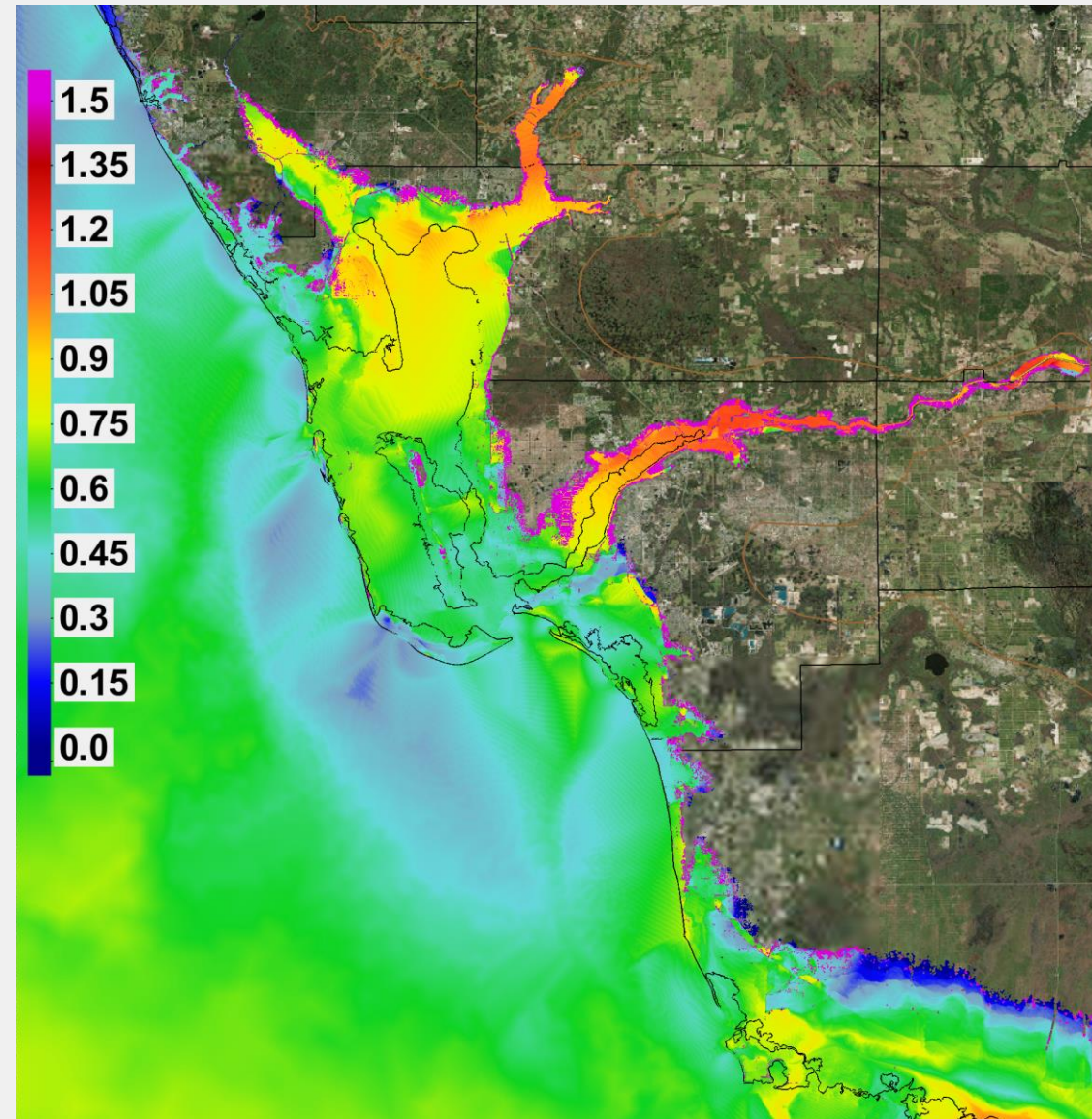
# Uncertainty in Meteorology



# Single-Double Uncertainty Effects



# Single-Double Uncertainty Effects

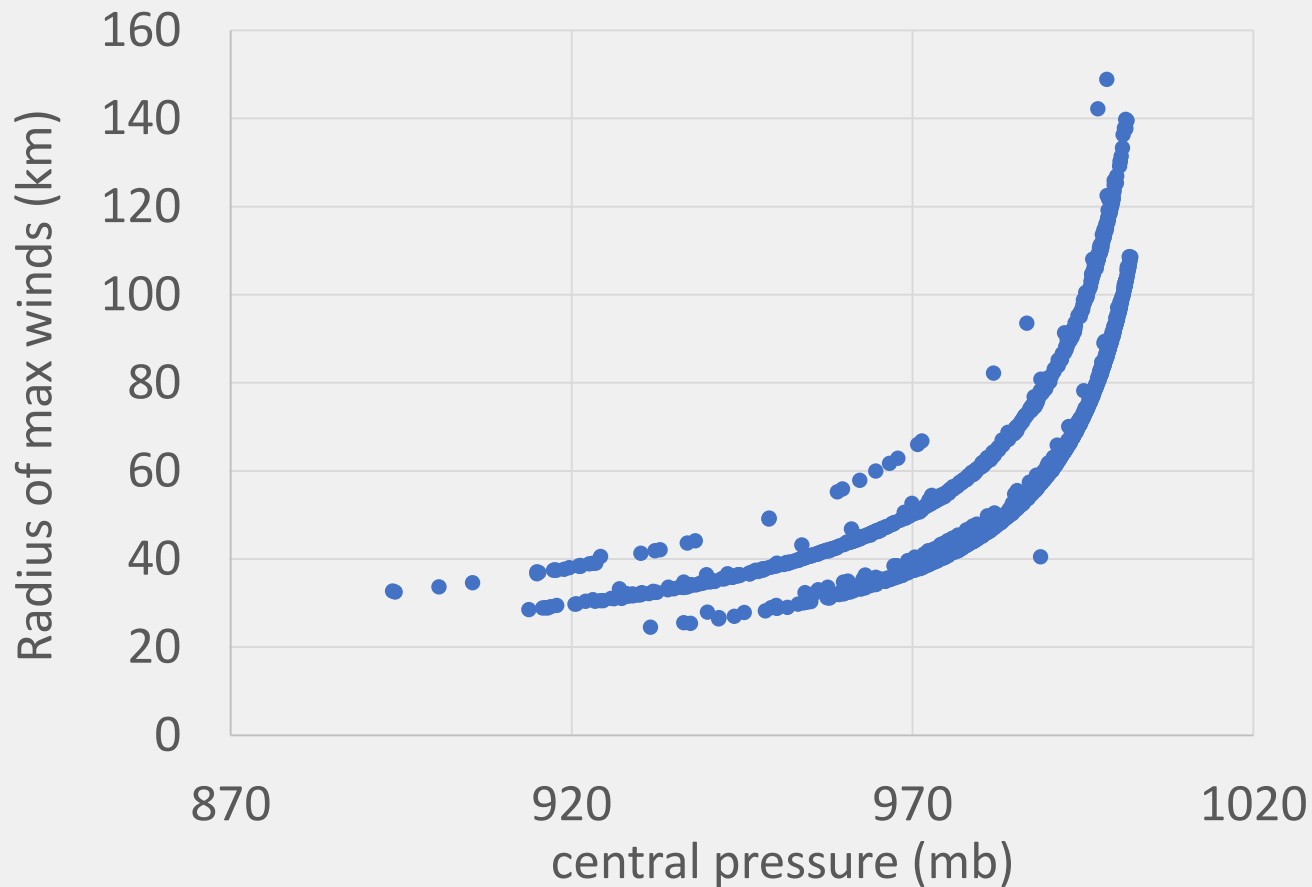


Increase in 500-year mean surge hazard (meters) due to uncertainty

→10%-40% increase in hazard

# Uncertainty in Meteorology

- There's no such thing as a free lunch



**END**

**Questions?**

