

Water Level Verification of Versions 1 and 2 of the Extratropical Surge and Tide Operational Forecast System for the Middle Texas Coast

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ESTOFS Model Characteristics

Version 1

- Implemented 09/28/2012
- ADCIRC East Coast tidal database grid (EC2001)
- Coastal resolution 3-5 km
- 254K nodes
- GFS 55 km forcing
- Does not allow inland flooding

Version 2

- Implemented 04/25/2017
- Hurricane On-Demand Forecasting System grid (HSOFS)
- Coastal resolution 200 m
- 1.8M nodes
- GFS 13 km forcing
- Allows inland flooding

Coastal Flooding Impacts

- Spring/Fall peak
- Usually lasts several days
- Restricted beach access
- Flooding of roads/property
- Businesses affected
- Economy/Tourism \$\$



Sandfest 2016
Thursday, April 28th, 2016

High Risk for Rip Currents Today
Coastal Flood Advisory in effect through Midnight Tonight



Water up to the Dunes



How “accurate” are ESTOFS water level forecasts during coastal flooding events along the Middle TX Coast?

Does Version 2 perform better than Version 1?

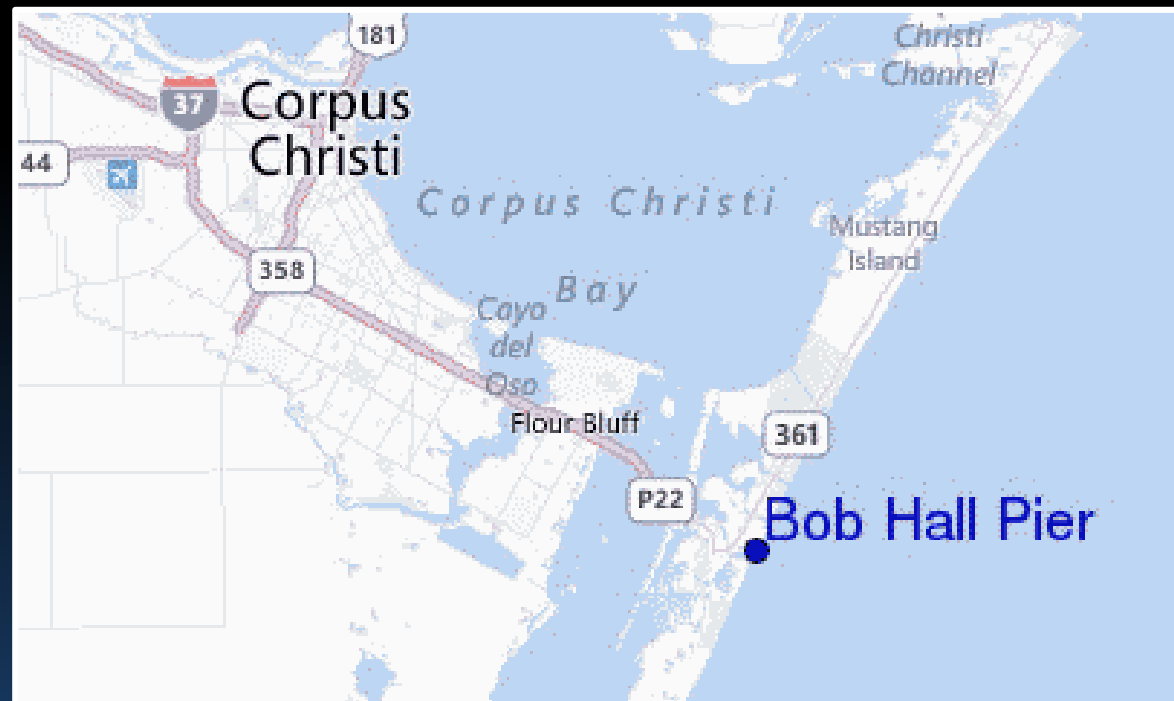
Study parameters

- **09/26/2015 – 04/02/2017 (Version 1)**
- **04/27/2017 – 09/15/2018 (Version 2)**

- Bob Hall Pier
 - NWLON

- Tide + Surge

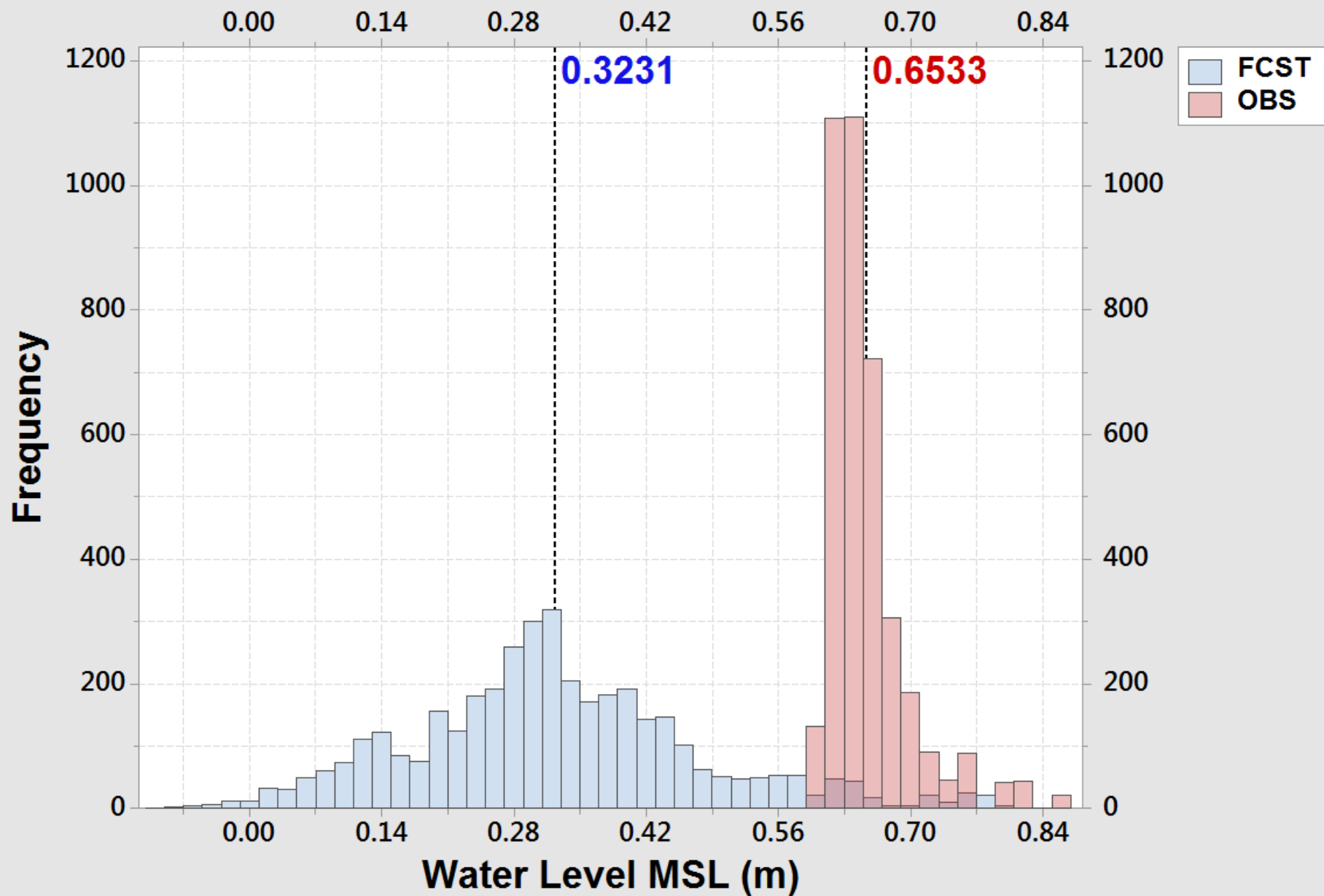
- Coastal Flooding
 - ≥ 2 ft MSL



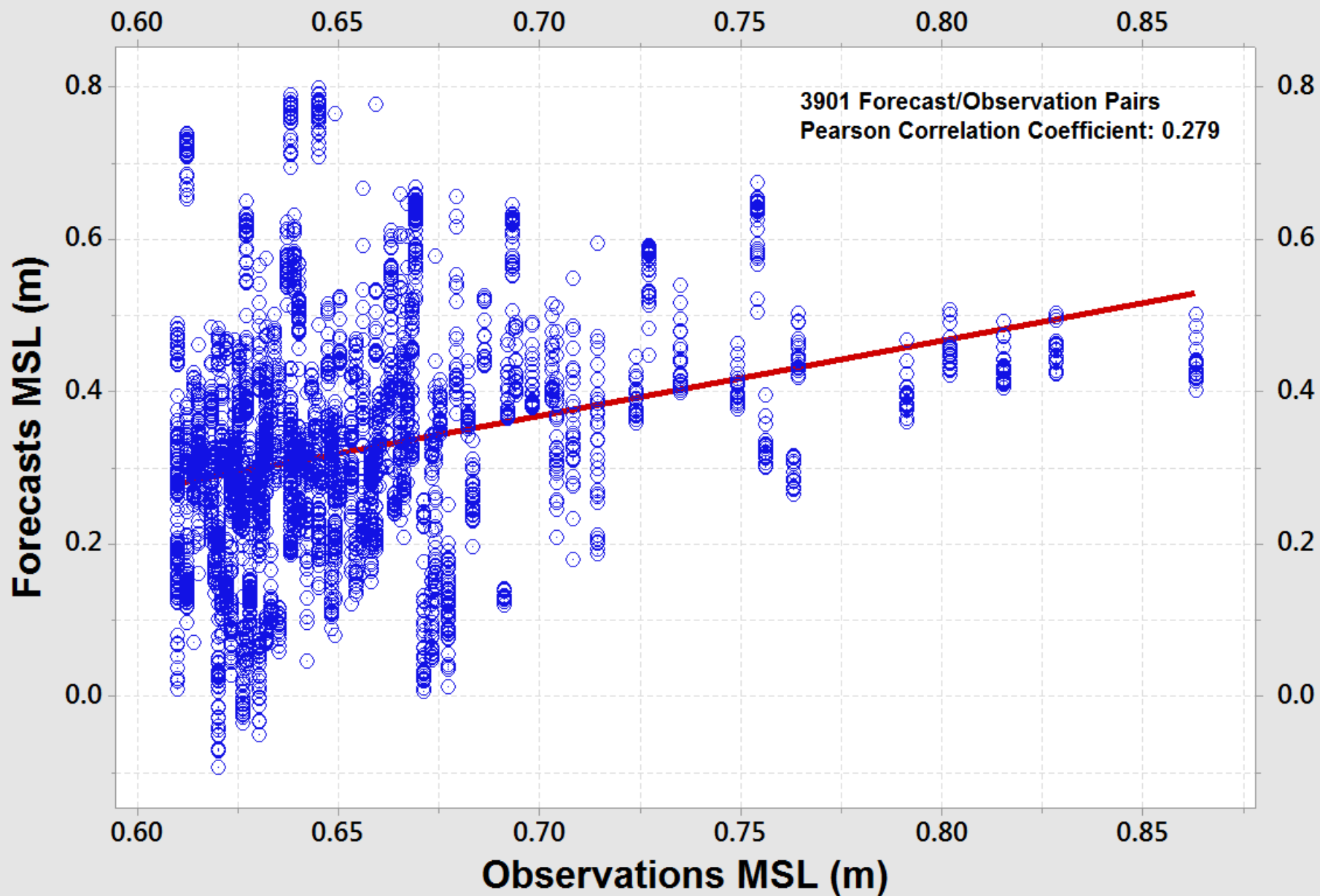
Study parameters

- “Pure” extratropical events.
 - Events involving Tropical Cyclones in the W Gulf were NOT used.
- Used all 4 runs/day, when available.
- Goal was to have forecasts thru at least 1-2 days associated with each observation.
- 370 Total Observations
- 8223 Total Forecasts

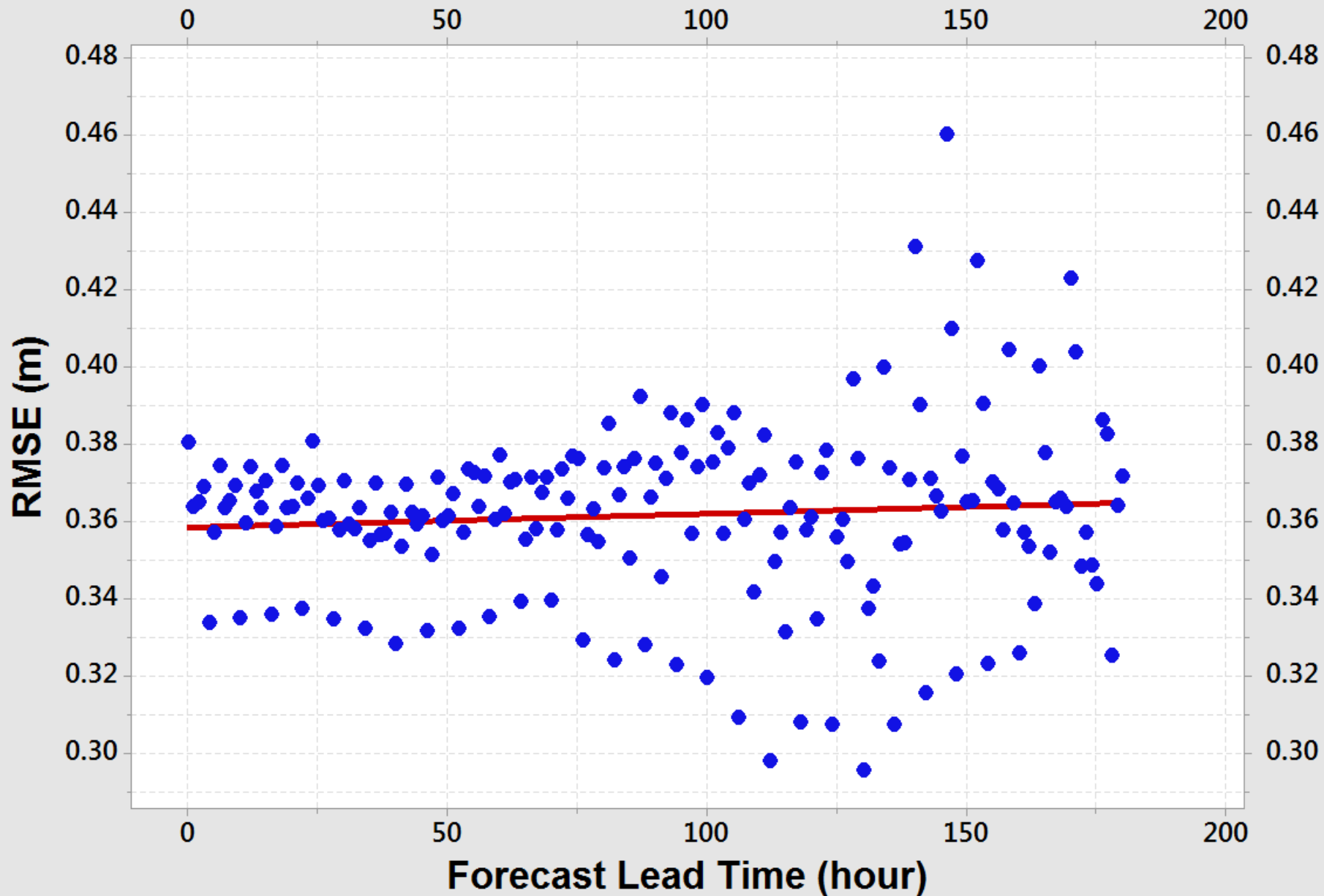
Water Level Observations and ESTOFS Version 1 Forecasts for Bob Hall Pier



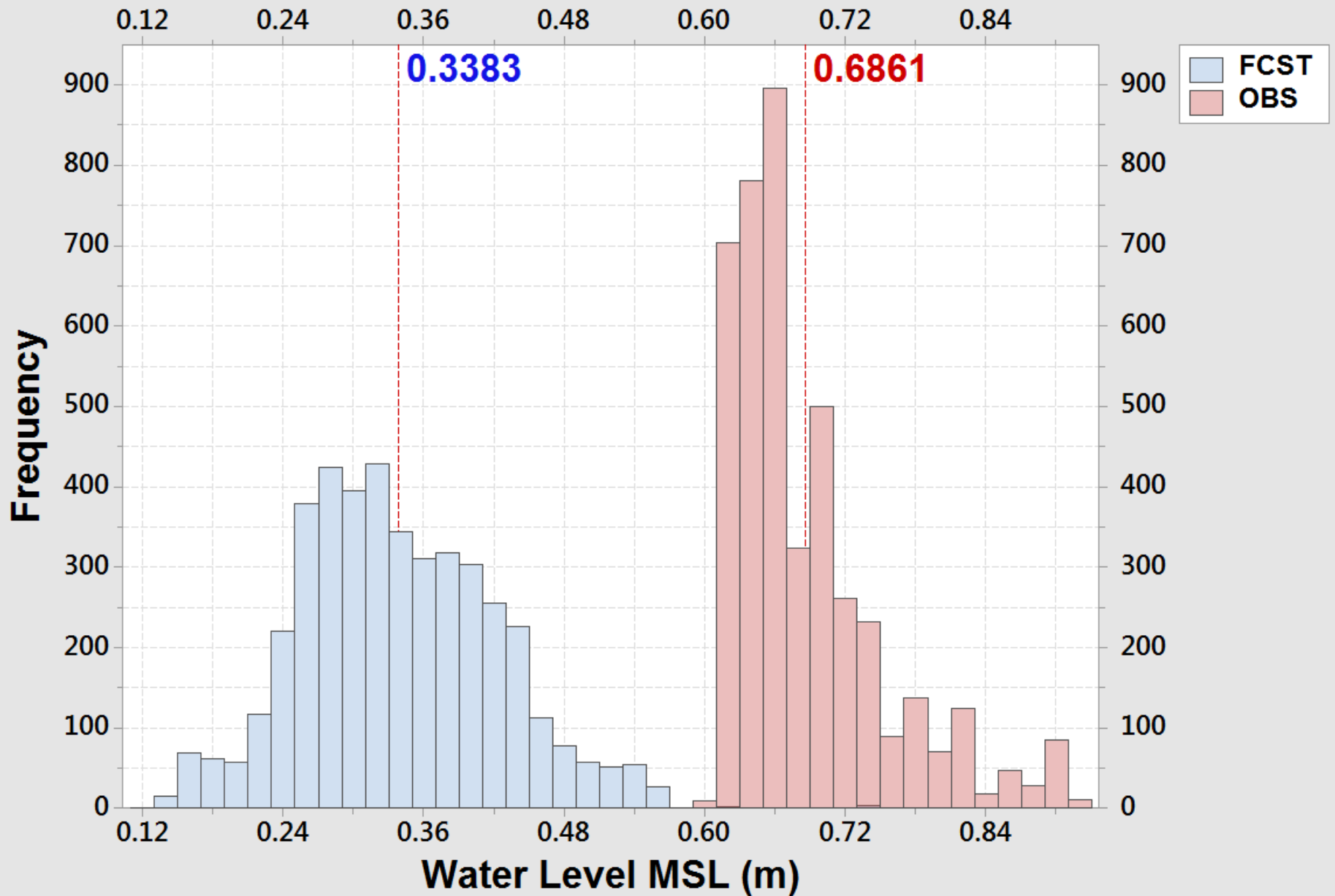
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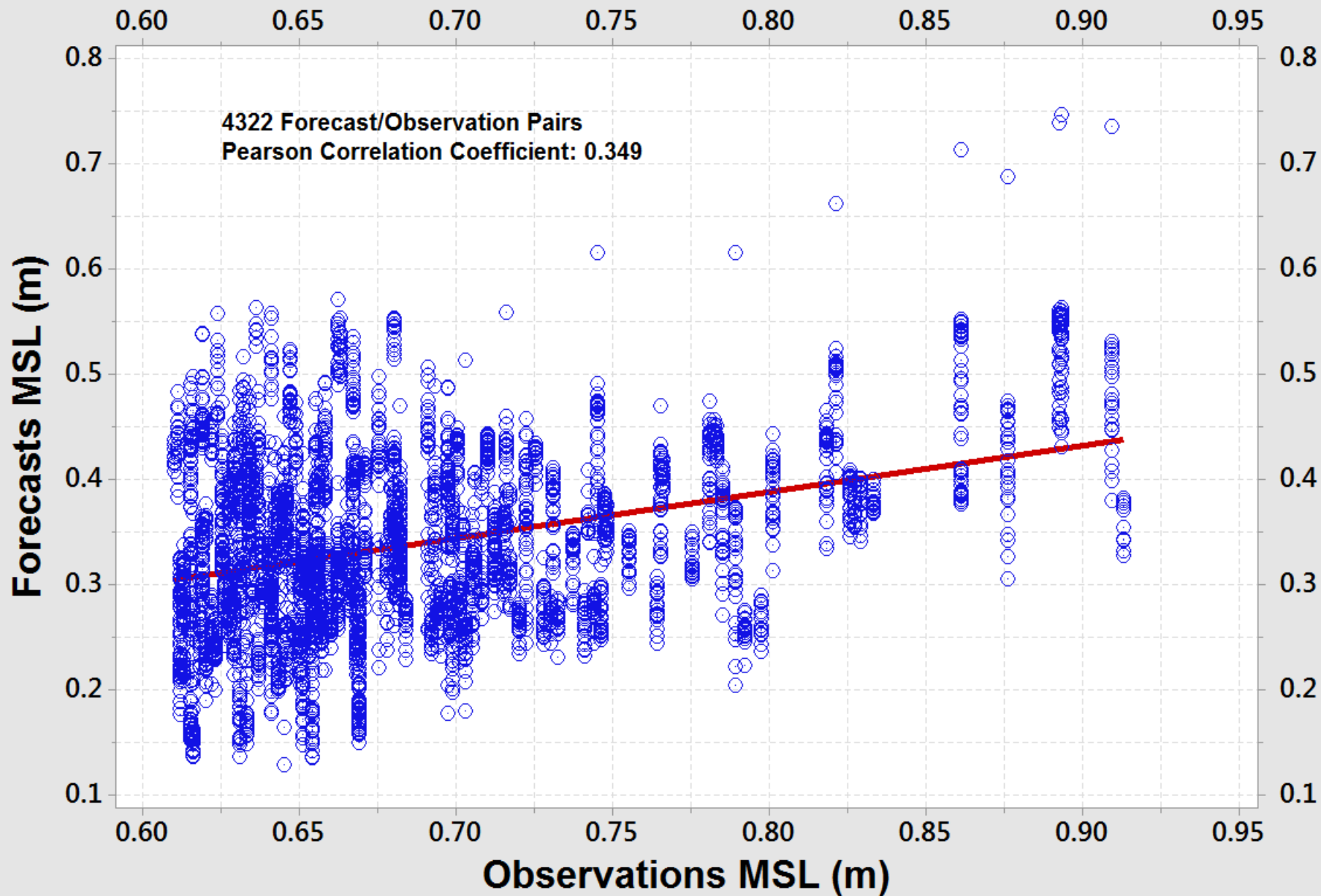
RMSE vs Lead Time of ESTOFS Version 1 Forecasts for Bob Hall Pier



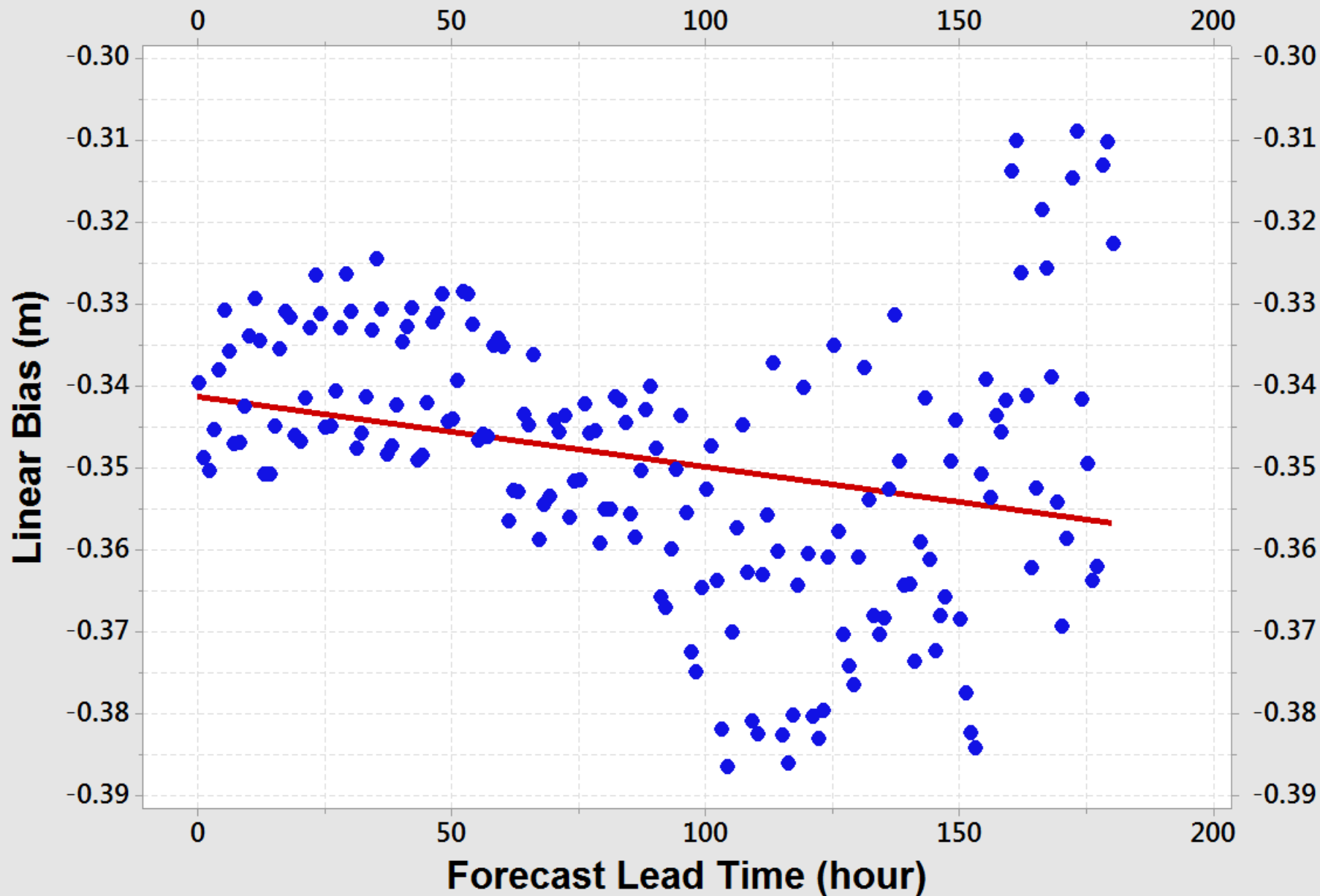
Water Level Observations and ESTOFS Version 2 Forecasts for Bob Hall Pier



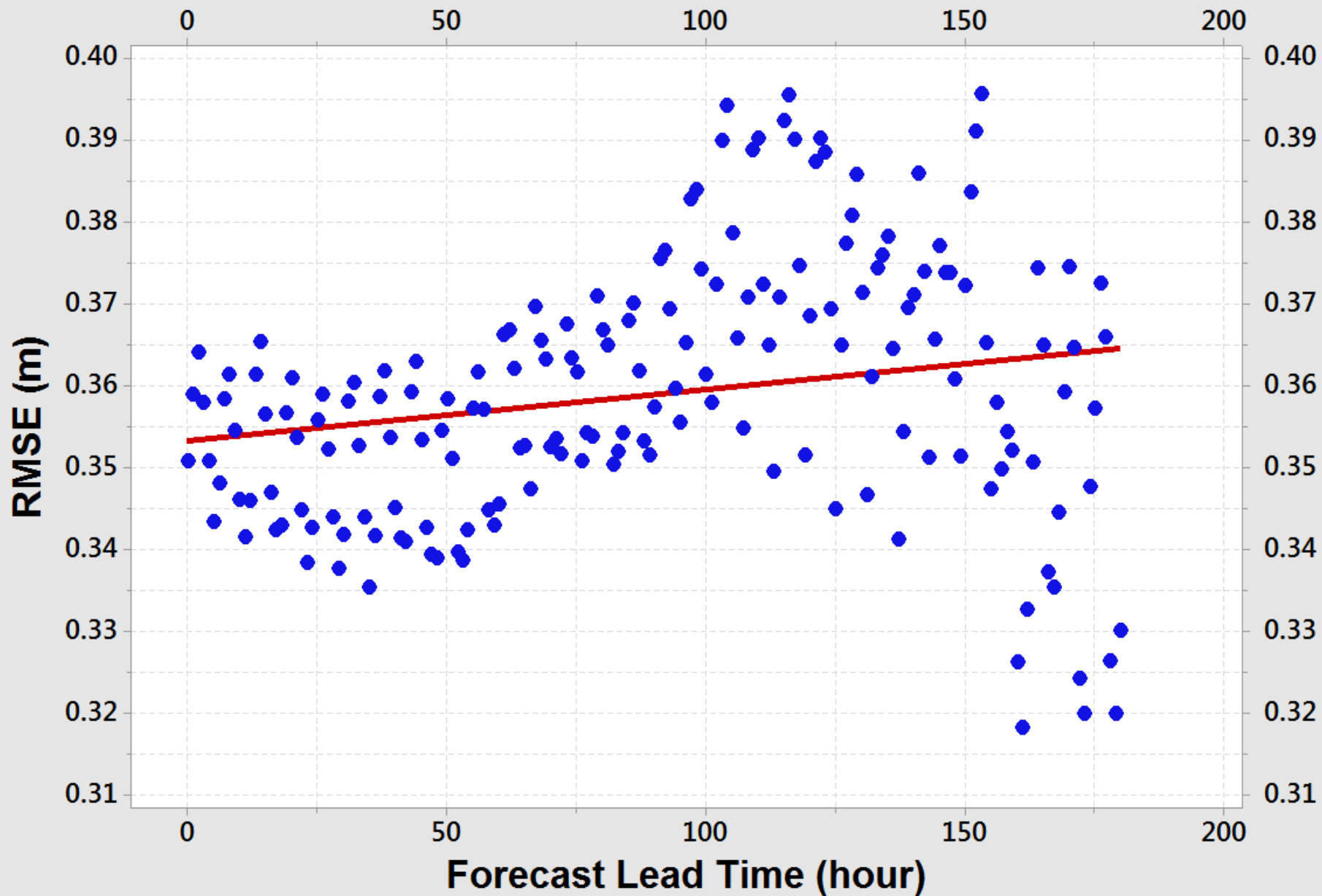
Water Level Observations and ESTOFS Version 2 Forecasts for Bob Hall Pier



Linear Bias vs Lead Time of ESTOFS Version 2 Forecasts for Bob Hall Pier



RMSE vs Lead Time of ESTOFS Version 2 Forecasts for Bob Hall Pier



ESTOFS Verification Summary for Bob Hall Pier

ESTOFS Version 1

- **Bias: -0.330162 m**
- **RMSE: 0.360782 m***

ESTOFS Version 2

- **Bias: -0.347794 m**
- **RMSE: 0.358529 m***

* RMSE 0.2 m for hindcast runs in 2009

Questions

