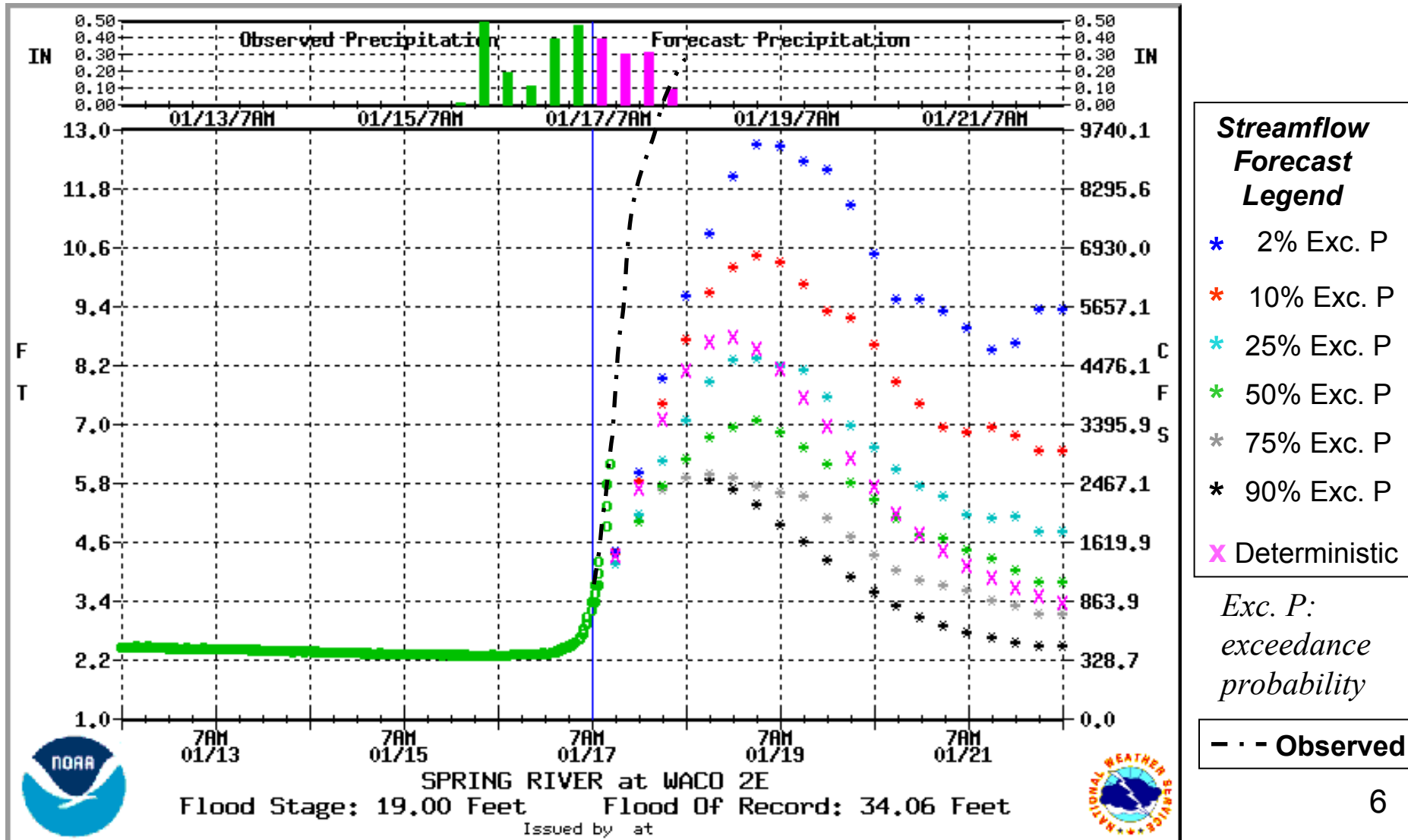
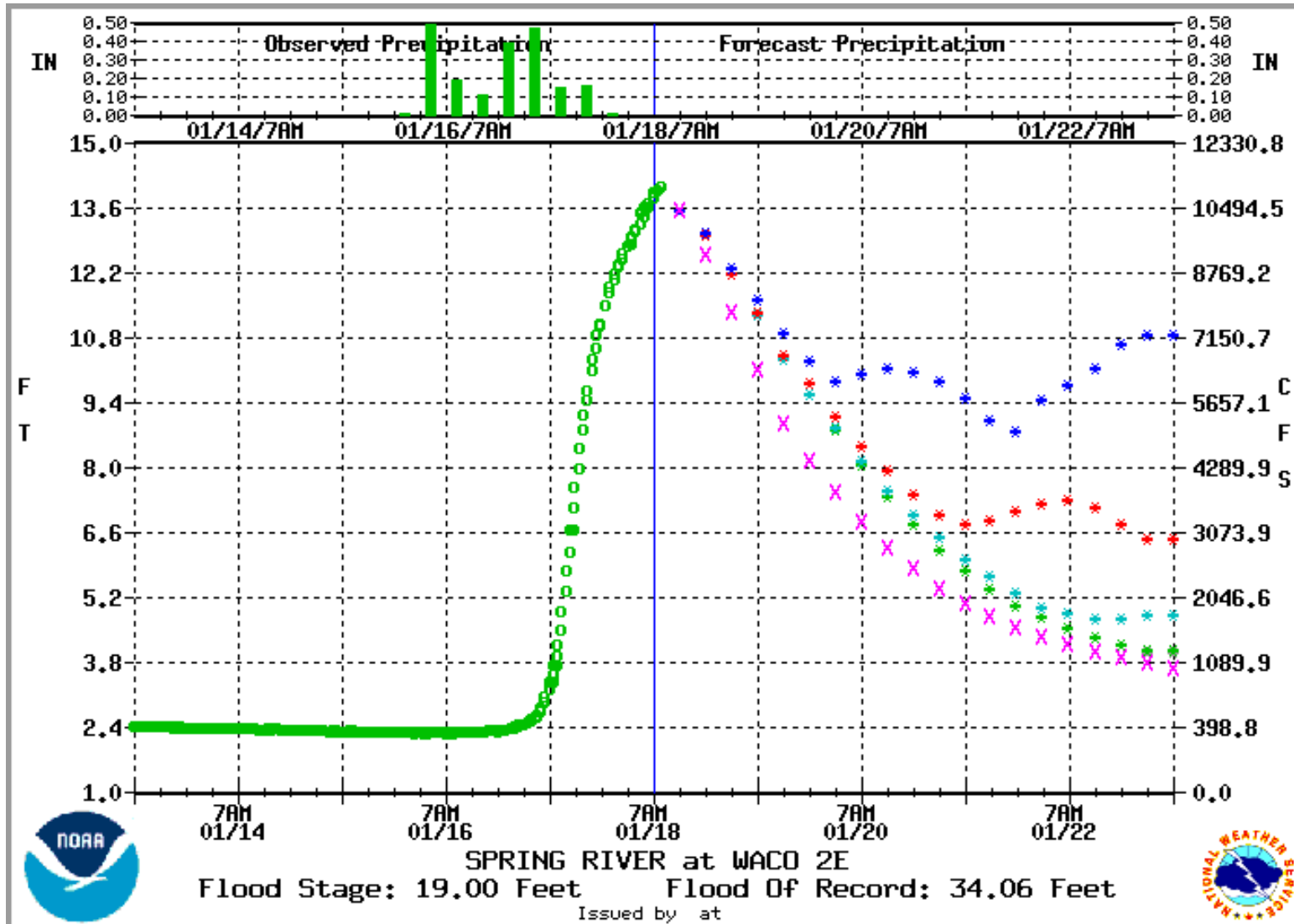


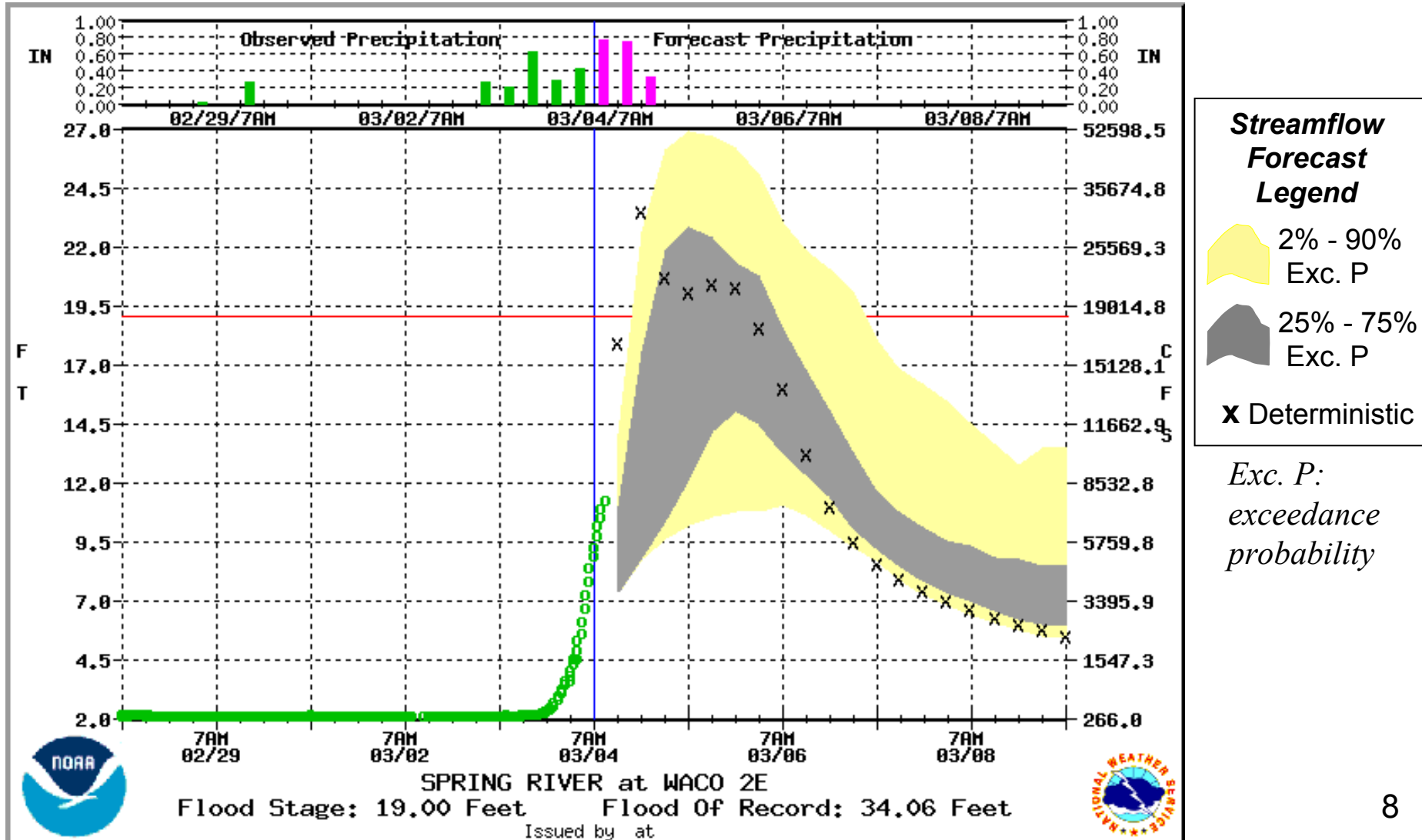
# Example 1 – Under forecasted likely due to hydrologic uncertainty (a)



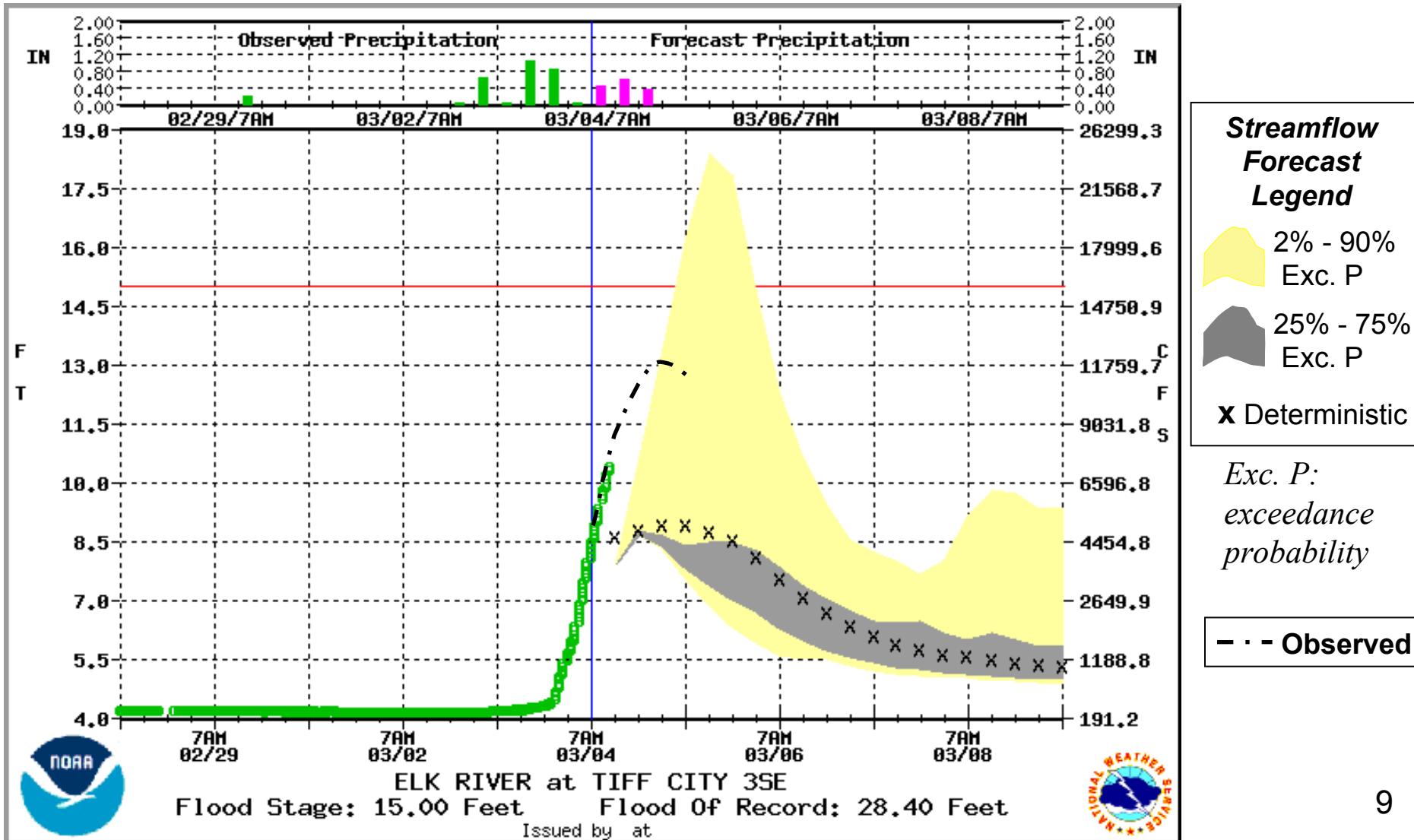
# Example 1 – Under forecasted likely due to hydrologic uncertainty (b)



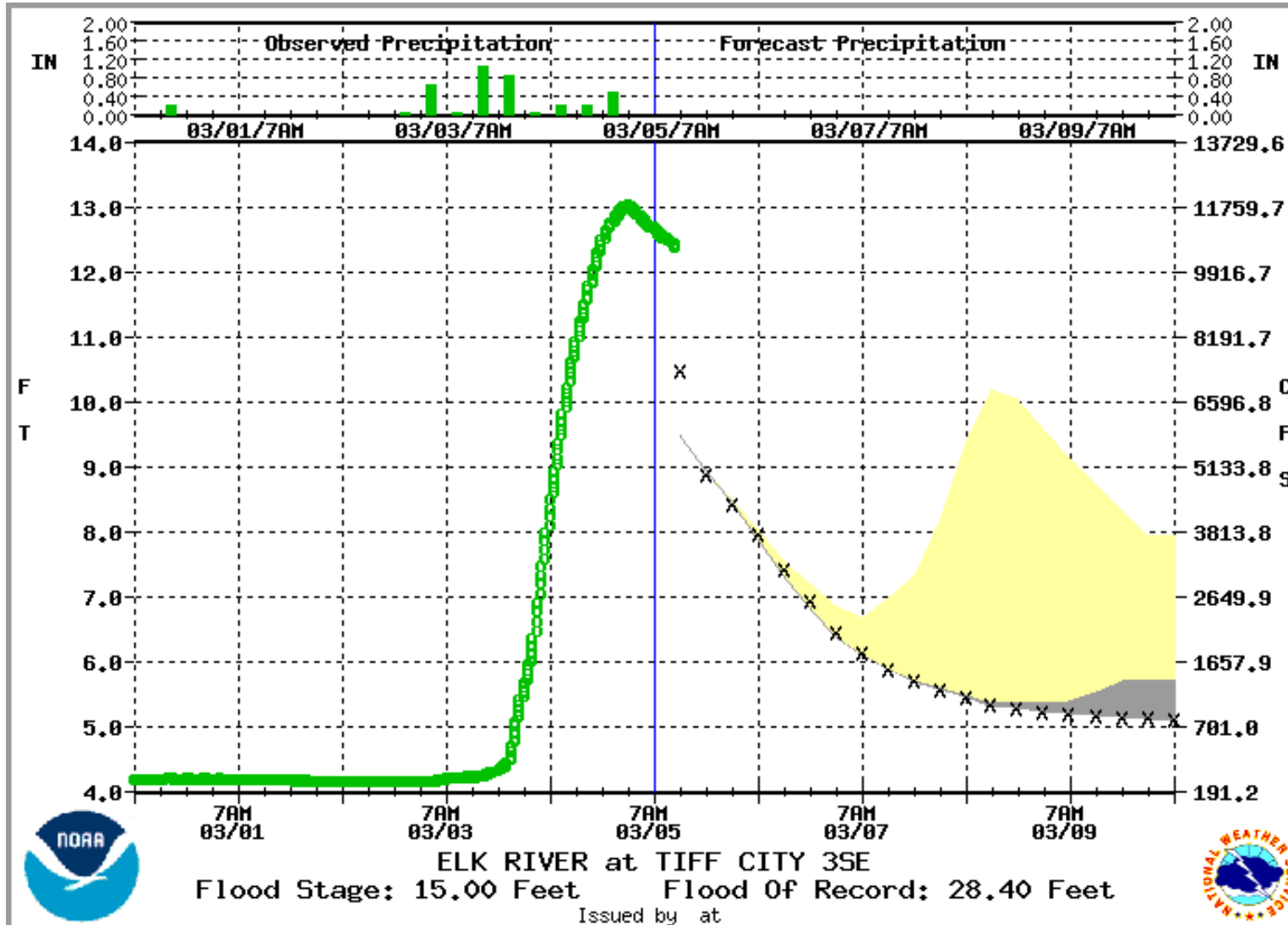
# New look to forecast hydrograph



# Example 2 – Another under forecast (a)



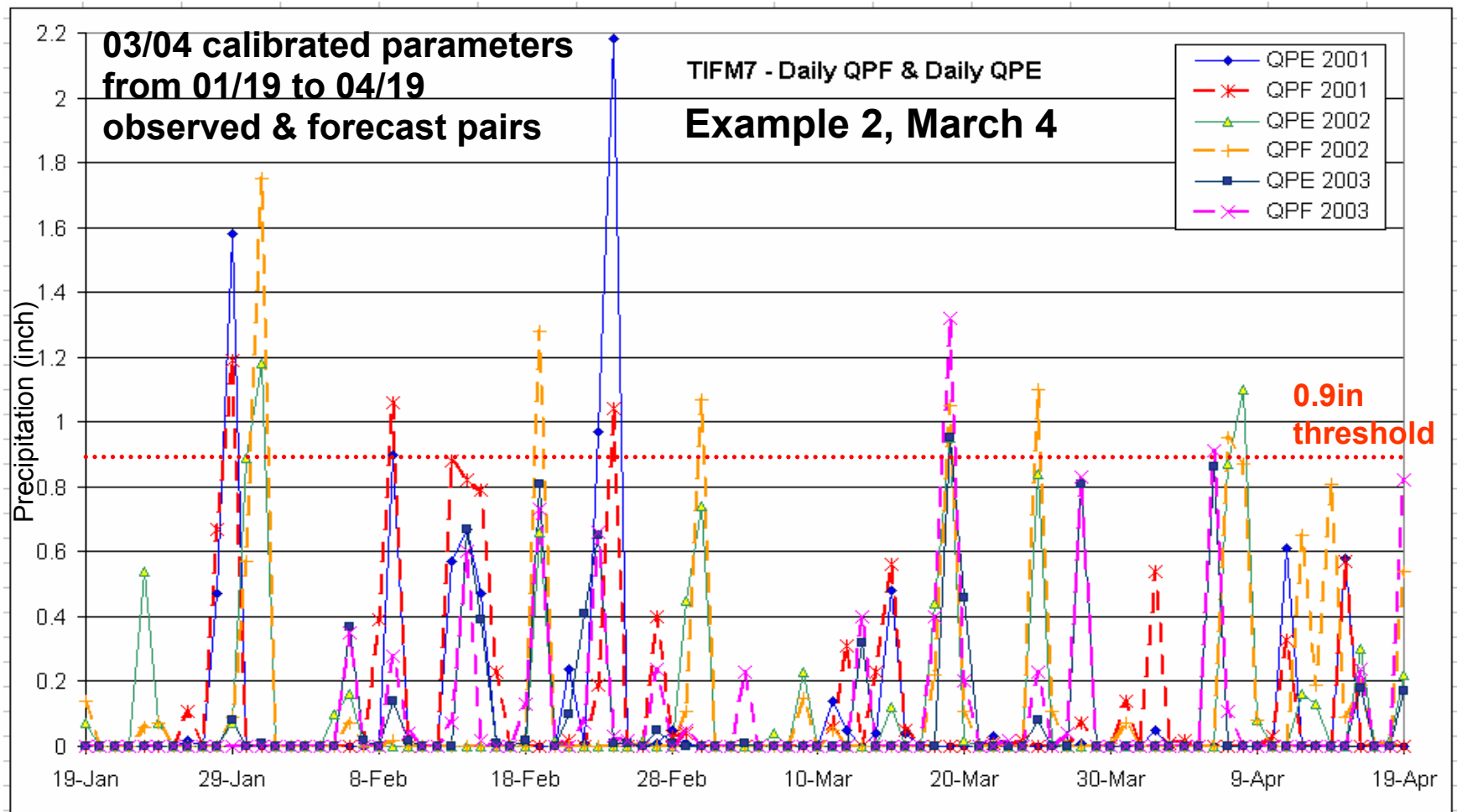
# Example 2 – Another under forecast (b)



# Calibration of Joint Distribution Parameters

For each time step, calibration on a 91-day window centered on the given day

Daily QPE/QPF high events present in the 3 years archive  
=> calibration parameters appropriate for high event estimation

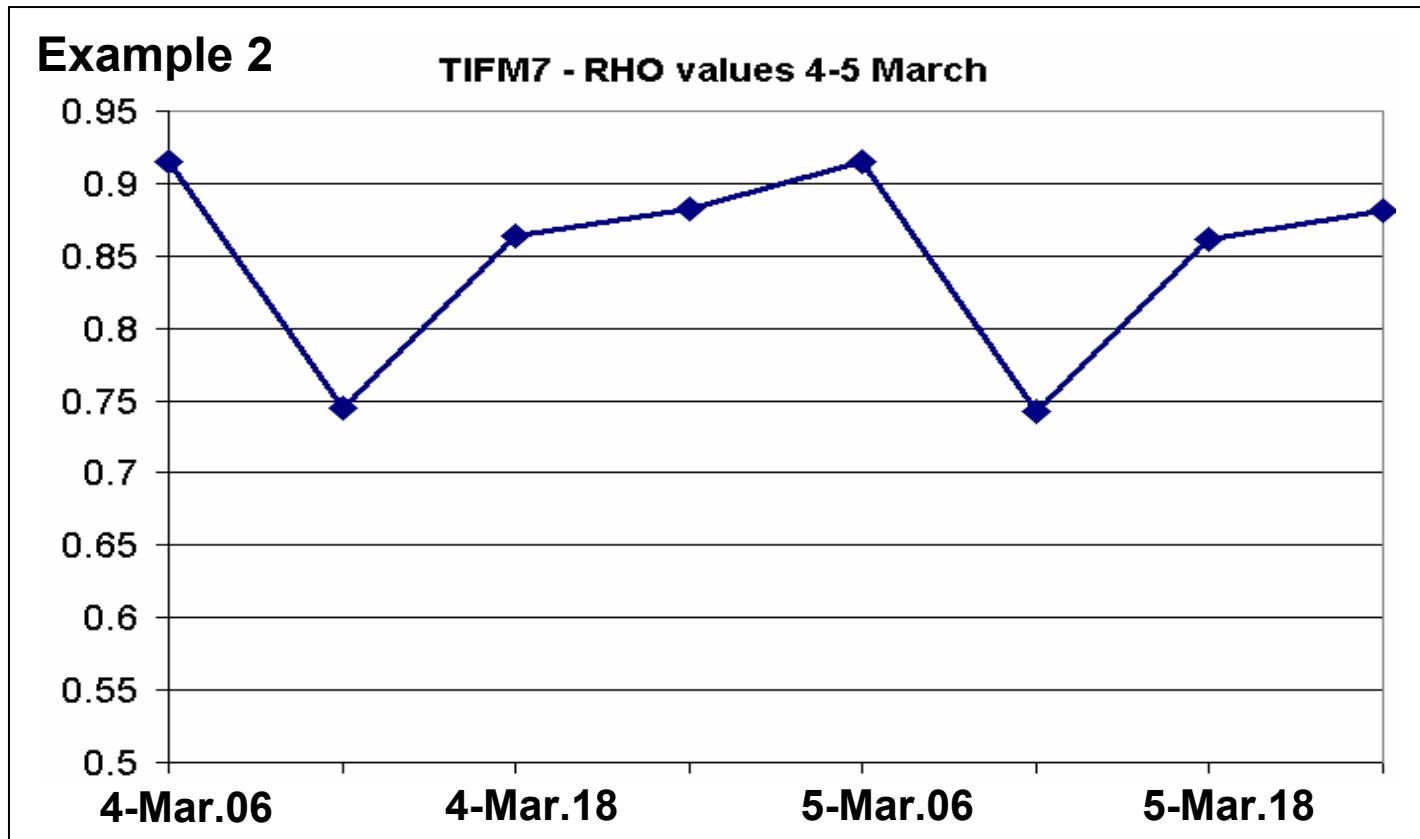


# Joint Distribution: Parameter RHO

RHO: correlation parameter between forecast and observed values  
=> measure of the forecast skill

RHO  $\rightarrow$  0: unskilled forecast => PQPF distribution close to smoothed climatology

RHO = 1: perfect forecast => PQPF distribution is the single value of bias-adjusted QPF



At  
12CEN:  
lower  
RHO  
=> more  
spread of  
PQPF

# PQPF with QPF & QPE: Example 2, March 4

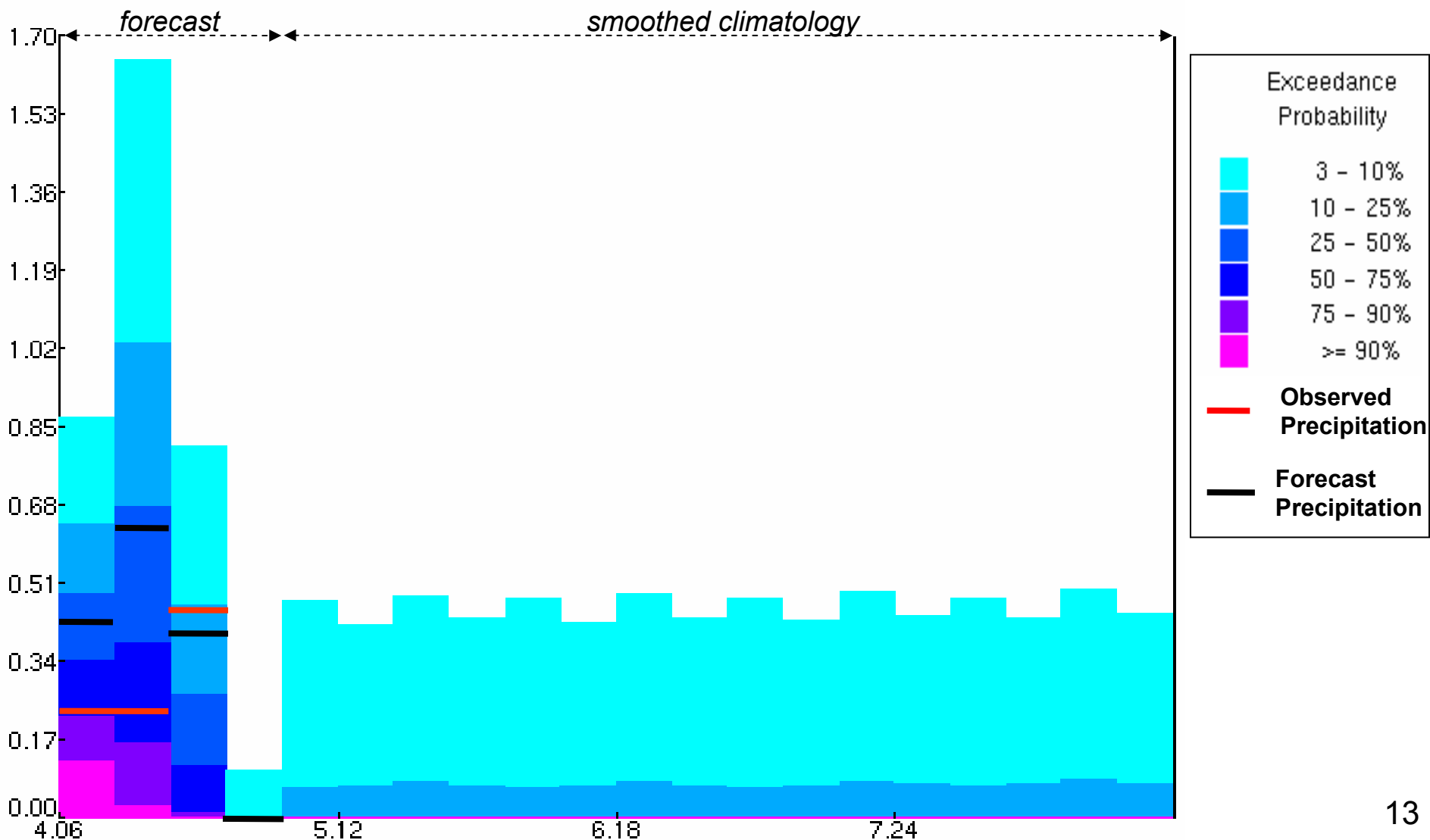
6 Hour Calib.Chances of Exceeding River Levels on the

TIFM7

Latitude: 0.0 Longitude: 0.0

Forecast for the period 3/4/2004 6h - 3/8/2004 24h INTL

This is a conditional simulation based on the current conditions as of 3/4/2004





# PQPF with QPF & QPE: Example 2, March 5

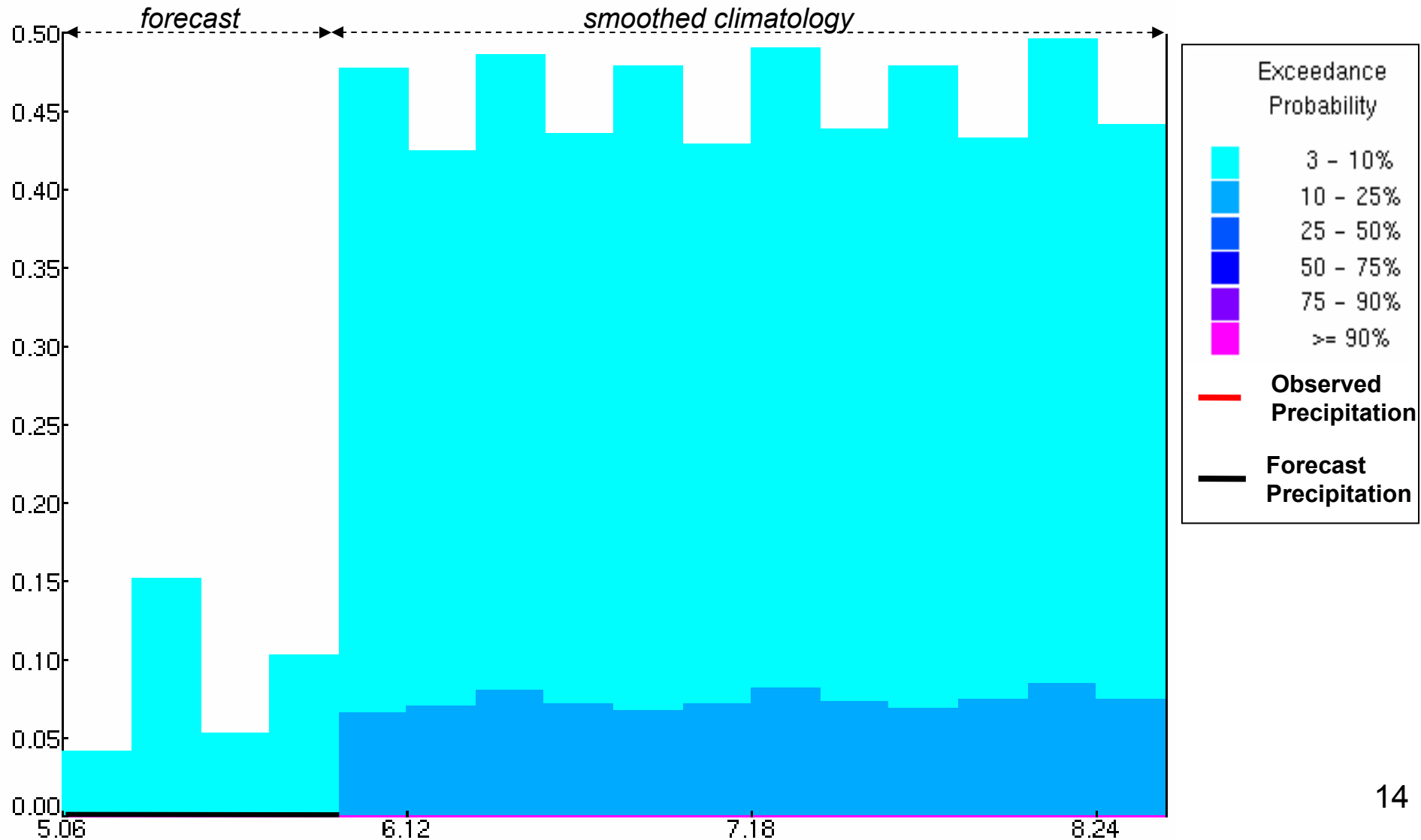
6 Hour Calib.Chances of Exceeding River Levels on the

TIFM7

Latitude: 0.0 Longitude: 0.0

Forecast for the period 3/5/2004 6h - 3/8/2004 24h INTL

This is a conditional simulation based on the current conditions as of 3/5/2004

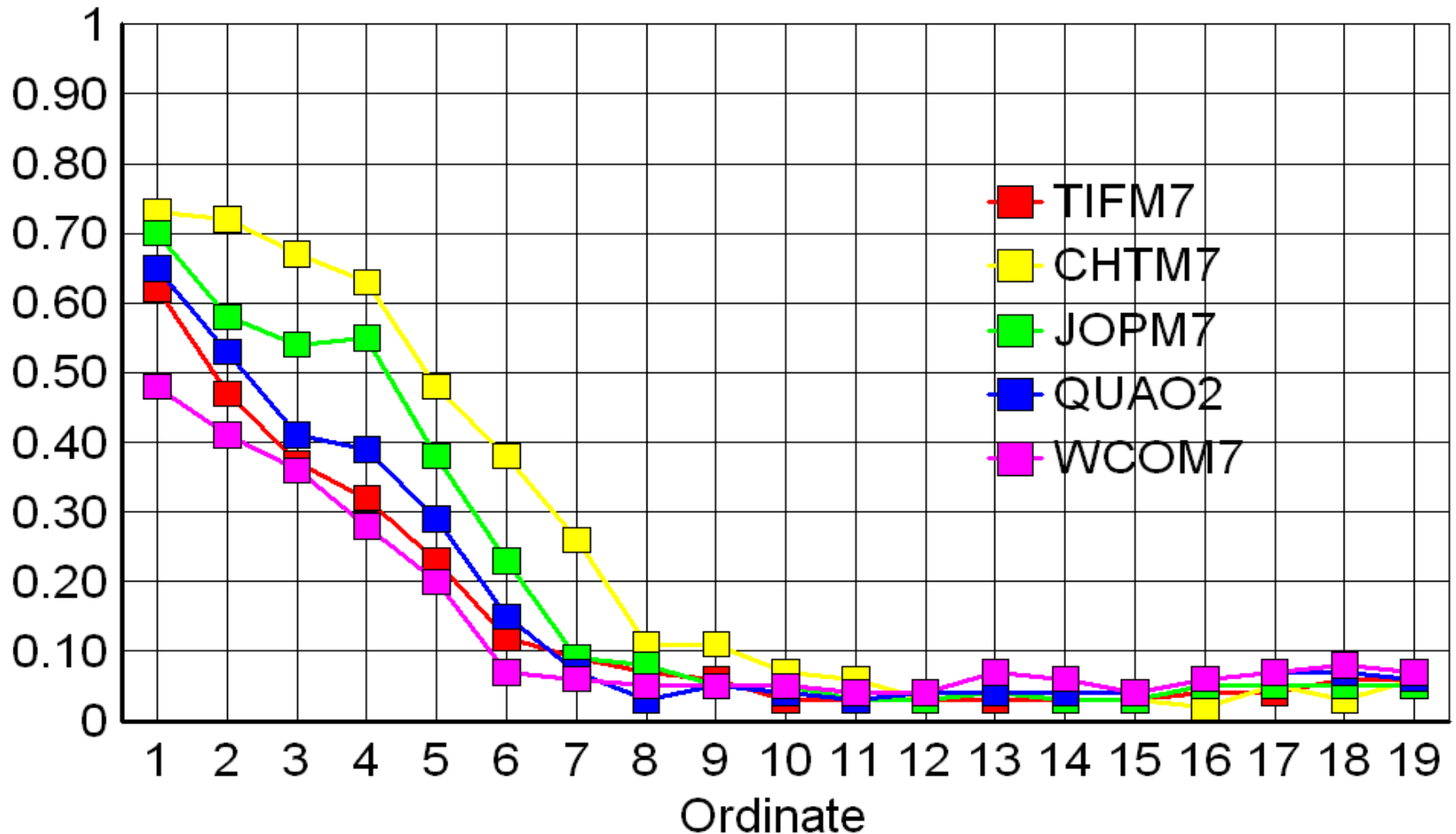


# Verification of Short Term Forecasts

- Ran verification statistics for period of October 15th, 2003 until April 7, 2004 (175 days, or 48% of a year)
- Several large rainfall events included as well as sustained dry periods.
- Determined reliability statistics for each ordinate of xsets forecast to see if it varied by time period.
- Had ESPADJQ technique turned on during entire period.
- Results varied from point to point, but showed we need additional work on algorithm as distinct biases were evident.
- Unsure of why distinct differences between forecast points.

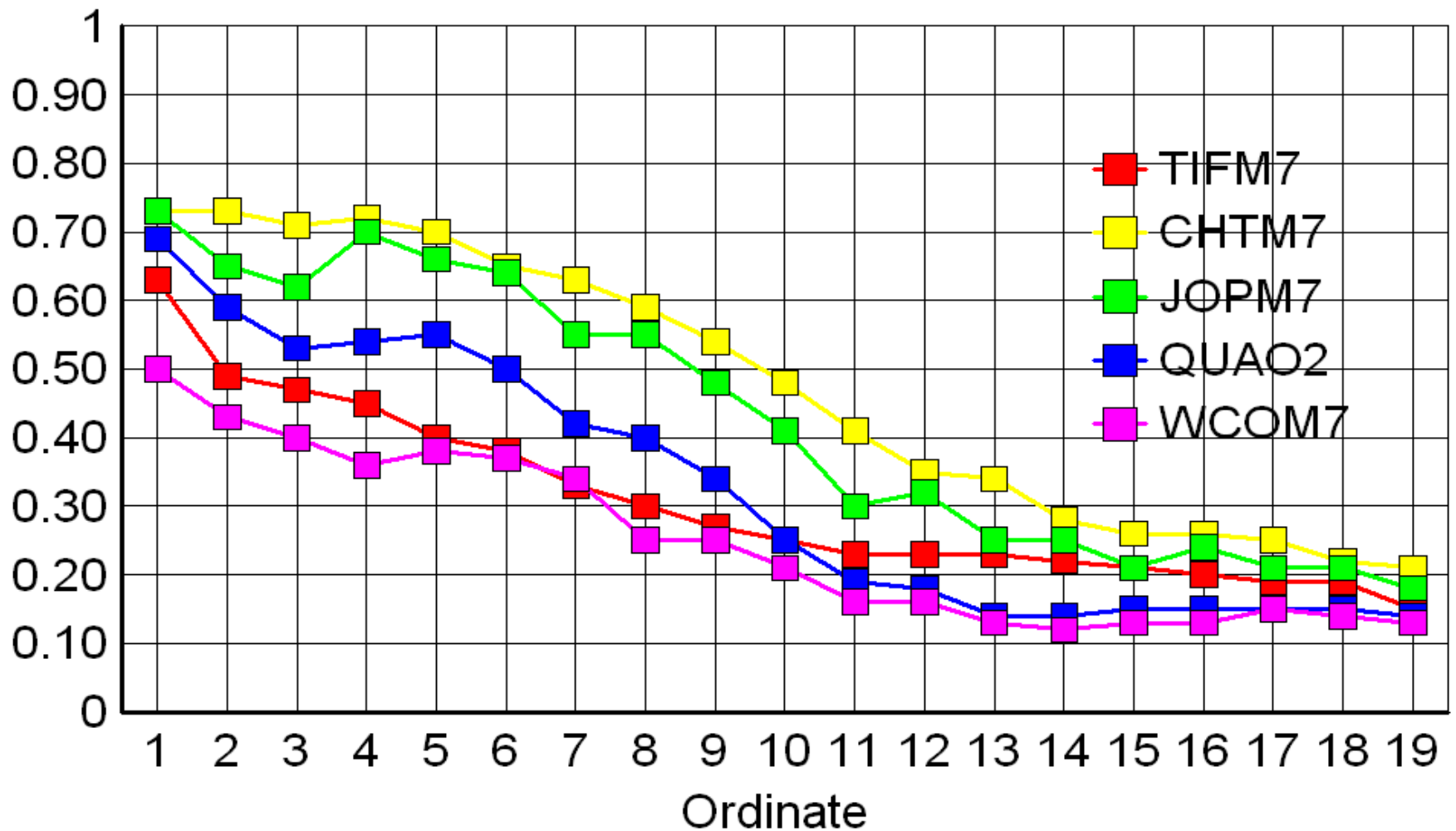
# All points 10/15/03-4/7/04

## 2 percent exceedance by Ordinate



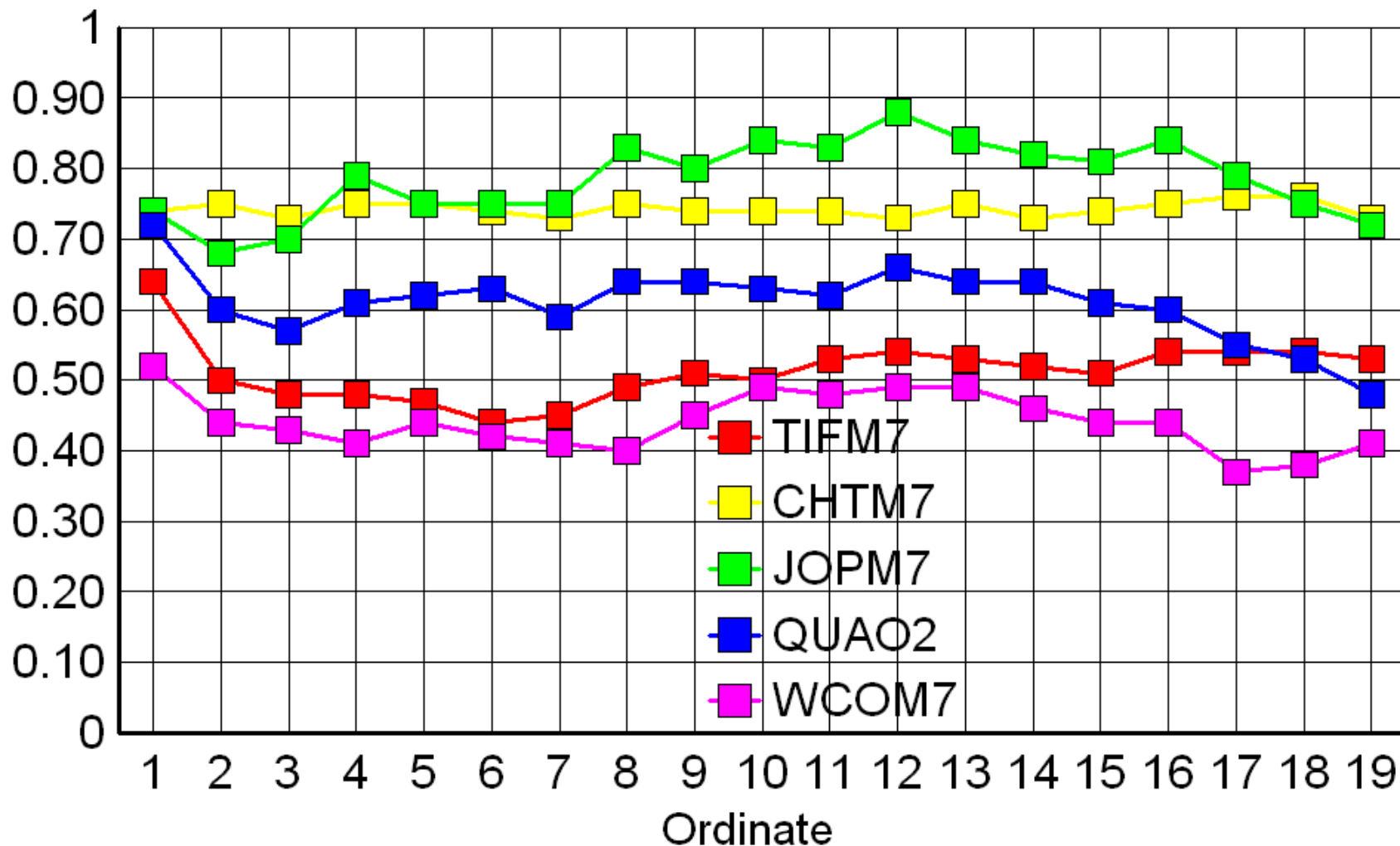
# All points 10/15/03-4/7/04

## 10 percent exceedance by Ordinate



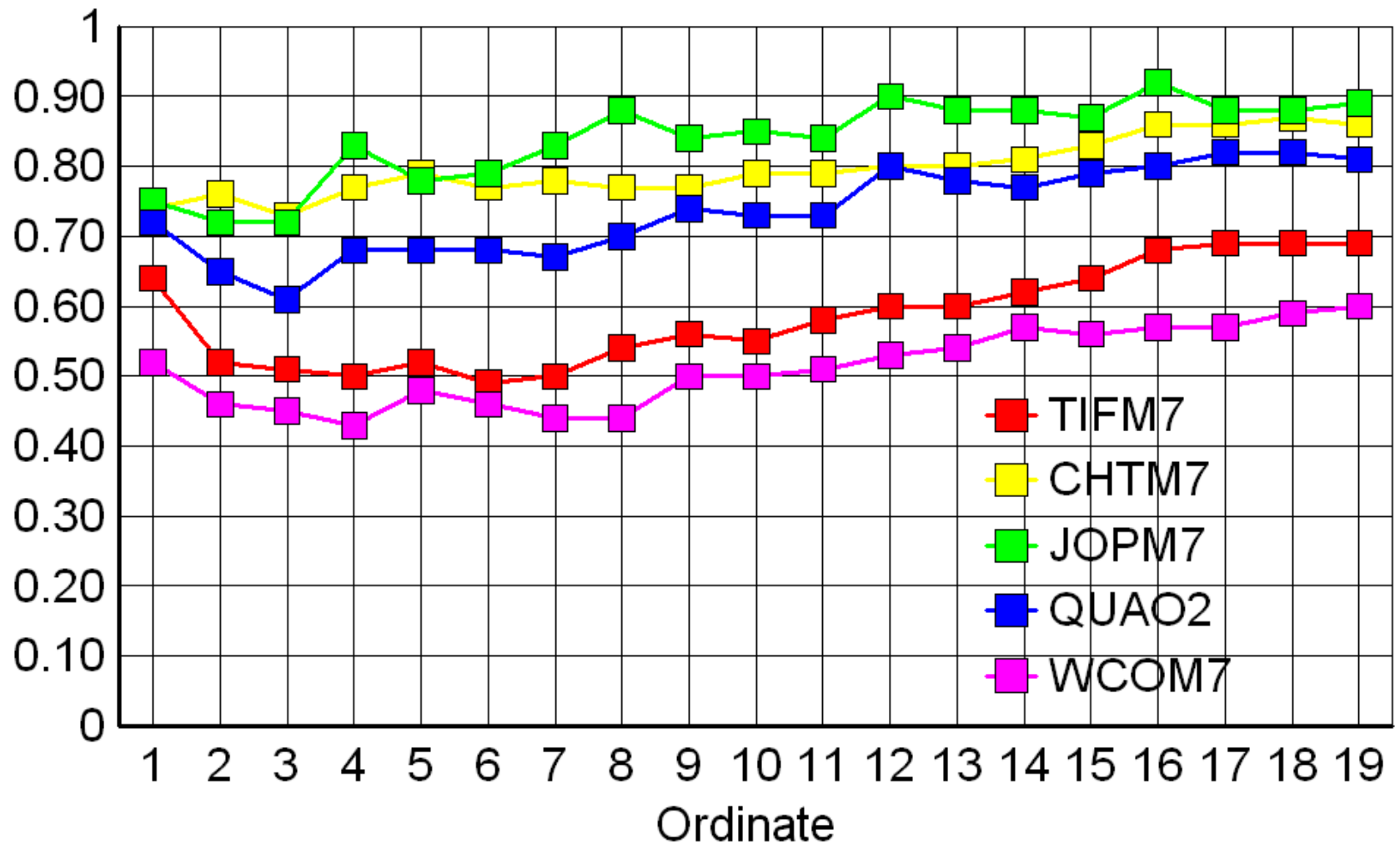
# All points 10/15/03-4/7/04

## 25 percent exceedance by Ordinate



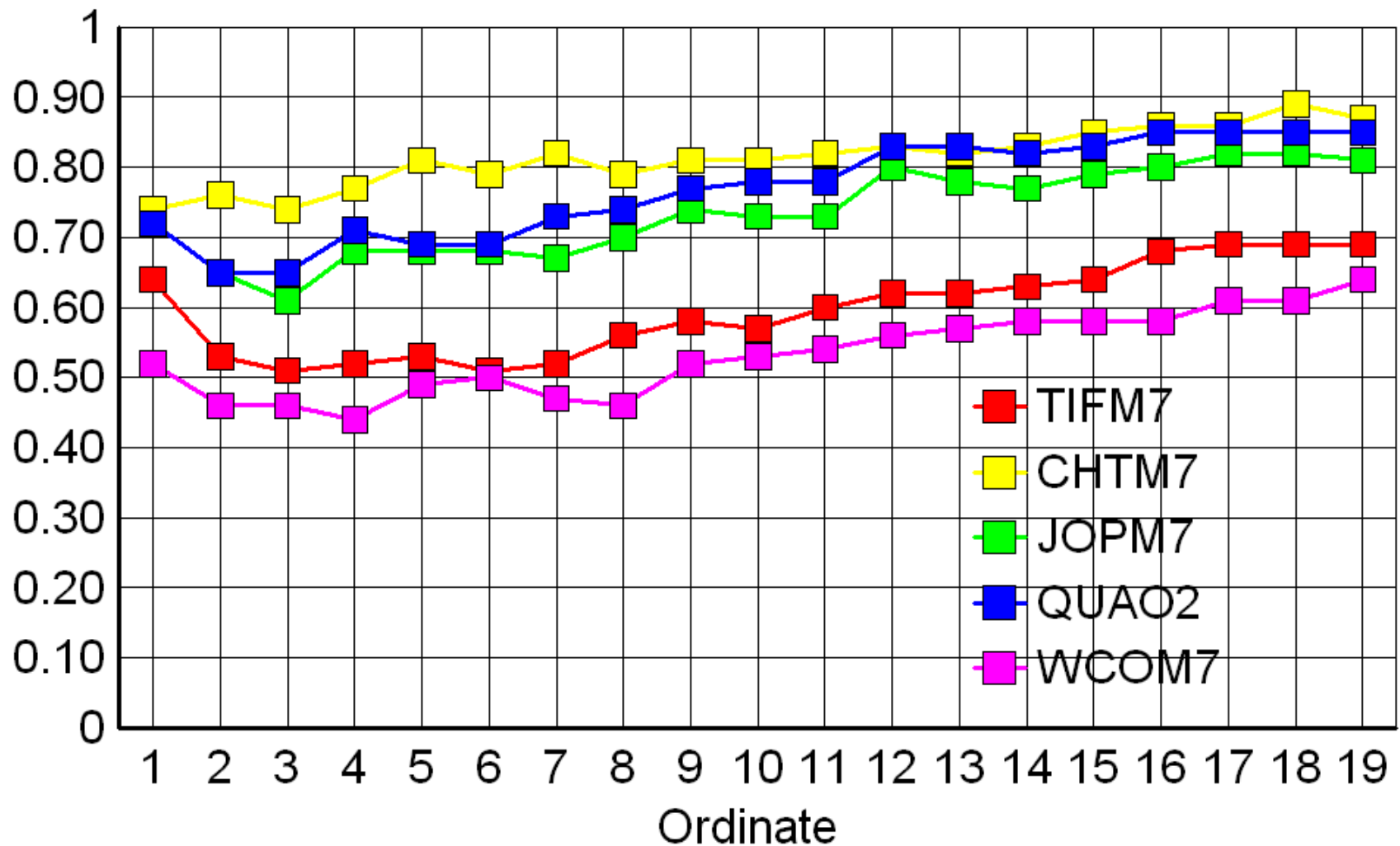
# All points 10/15/03-4/7/04

## 50 percent exceedance by Ordinate



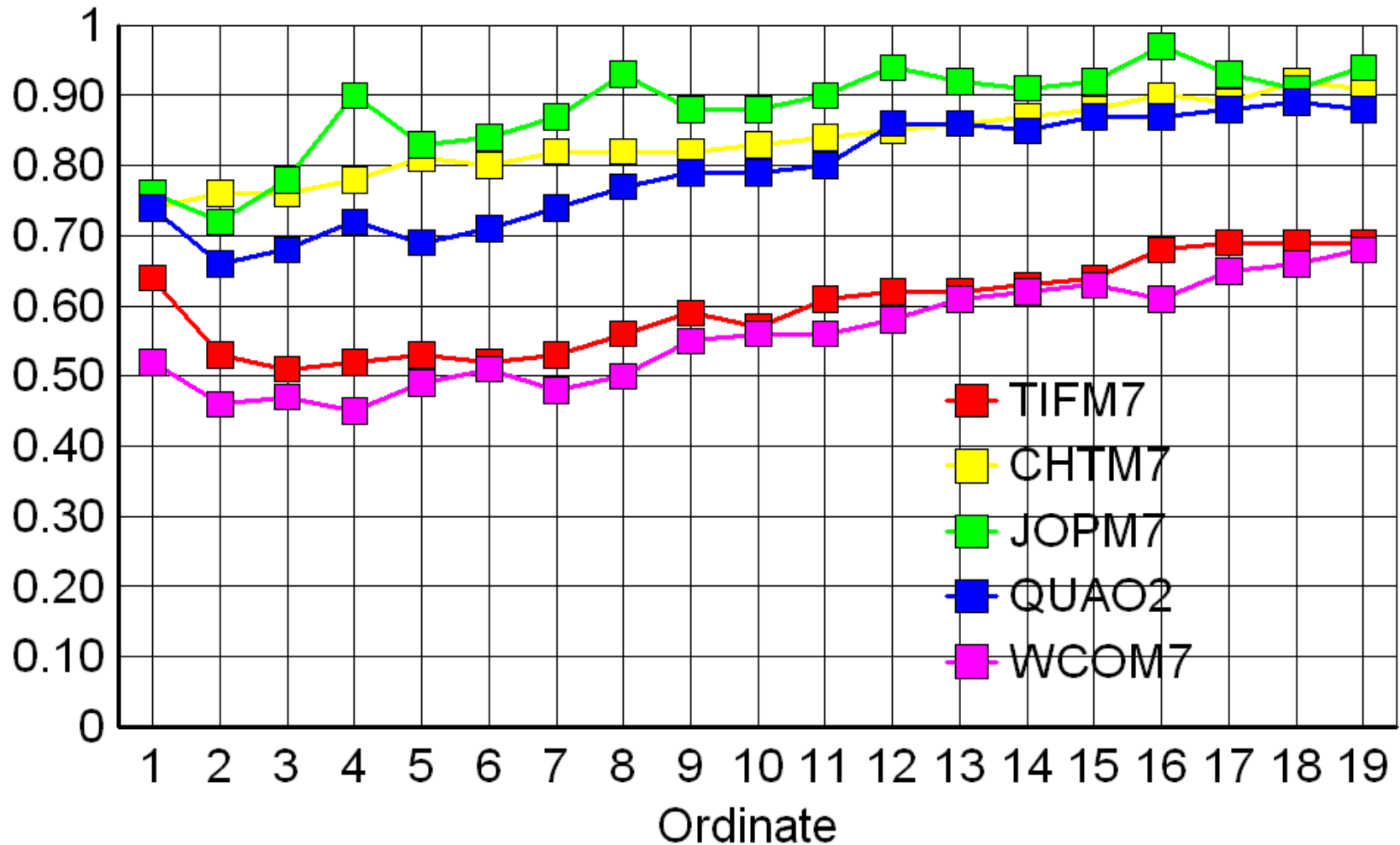
# All points 10/15/03-4/7/04

## 75 percent exceedance by Ordinate



# All points 10/15/03-4/7/04

## 90 percent exceedance by Ordinate





# Conclusions

- Hydrologic based uncertainty is not currently accounted for, and needs to be added.
- Algorithm needs to be refined as strong biases shown for all points verified.
- Patterns are evident in verification trends, but what do they mean??

# Future work, other studies

- Continue to run short term probabilistic forecasts, adding any enhancements from OHD.
- Continue to document results.
- Participate in AHPS funded project to determine QPF reliability with HPC.
- Output from AHPS project may be 5, 25, 75 and 90% probability QPFs for all 5 basins in OHD test.
- Will produce 5 different forecasts with these QPFs and run verification.
- Can compare reliability charts of two methods.
- Easier to explain procedure to our customers.