



# HWT-Hydro: Evaluation of Experimental Forecast and Nowcast Tools

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## Introduction

The inaugural Hazardous Weather Testbed Hydro (HWT-Hydro) experiment occurred from 7 July to 1 August 2014 in Norman, Oklahoma. The HWT-Hydro experiment was coordinated with the Flash Flood and Intense Rainfall Experiment at the Weather Prediction Center. 17 NWS forecasters participated issuing experimental probabilistic flash flood watches and warnings with impact characterizations. The forecasters were given access to a suite of 30+ experimental Multi-Radar Multi-Sensor (MRMS) tools in AWIPS-II to aid in watch and warning issuance. Warning verification was conducted with a multi-source real time flash flood observation database.



Fig. 1. (above) HWT-Hydro operations as JJ Gourley explains the experiment to distinguished visitors.

## Datasets

- MRMS QPE 1-, 3-, and 6-hour accumulations served as the precipitation estimates.
- QPE to flash flood guidance (FFG) ratios were computed using the MRMS QPE suite.
- Comparisons to NOAA Atlas 14 depth-duration-frequency maps were made to compute the average recurrence interval (ARI) for the MRMS QPE accumulations.
- The CREST distributed hydrologic model was forced using the MRMS QPE to provide estimates of simulated streamflow average recurrence interval.

## Conclusions

QPE to FFG ratios and QPE average recurrence interval products have comparable skill with maximum CSIs of 0.05 during the HWT-Hydro operations period. Both products will be transitioned to operations in the MRMS-FLASH suite of products.

Updates to the CREST distributed hydrologic model to improve the skill of the simulated streamflow average recurrence intervals are ongoing.

## References

Clark, R. A., J. J. Gourley, Z. L. Flamig, Y. Hong, and E. Clark, 2014: CONUS-Wide Evaluation of National Weather Service Flash Flood Guidance Products. *Wea. Forecasting*, 29, 377–392.

## The Flash Flood Tools

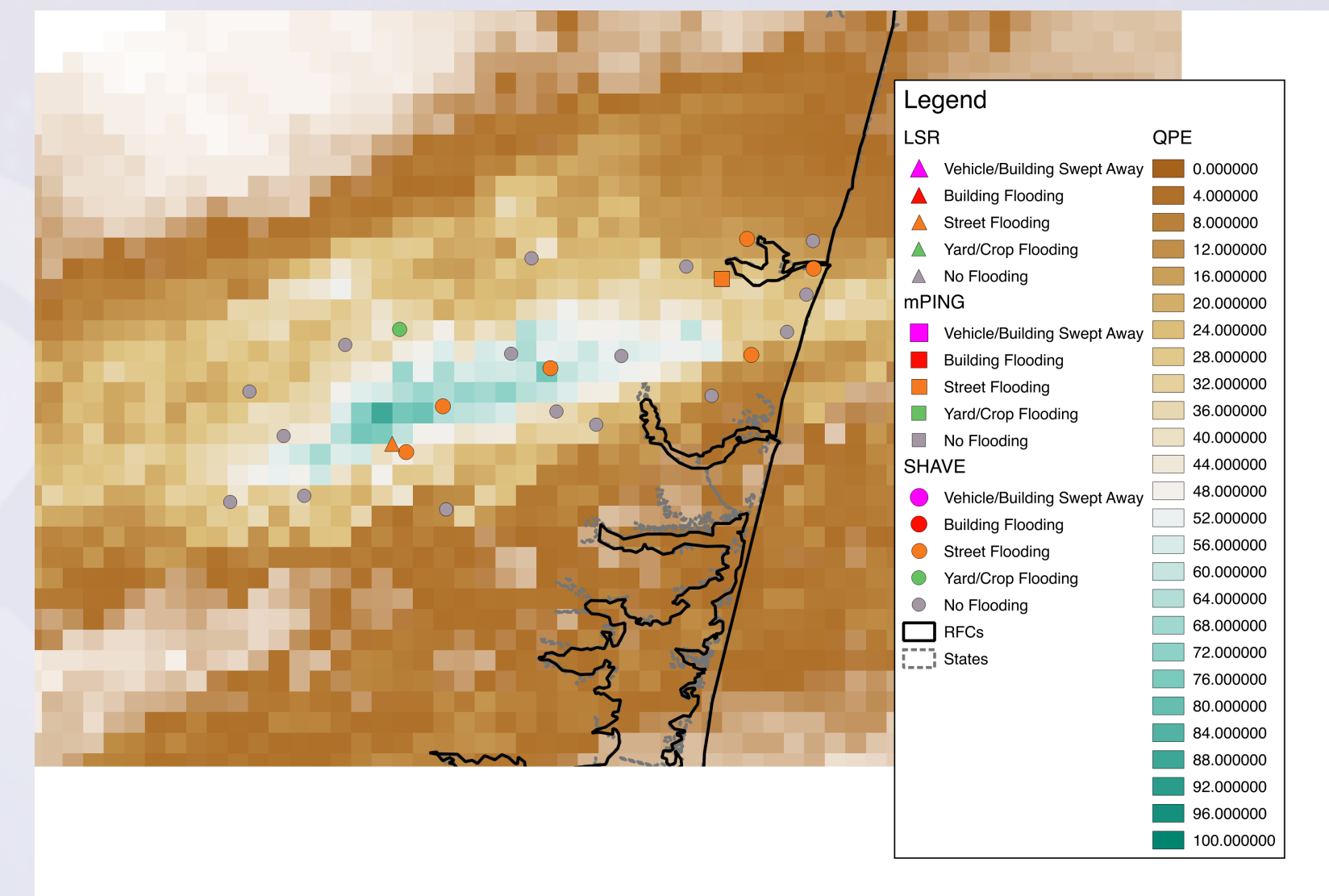


Fig. 2. (above) The MRMS Q3 radar only precipitation 6-hour accumulation for 14 July 2014, 21 UTC.

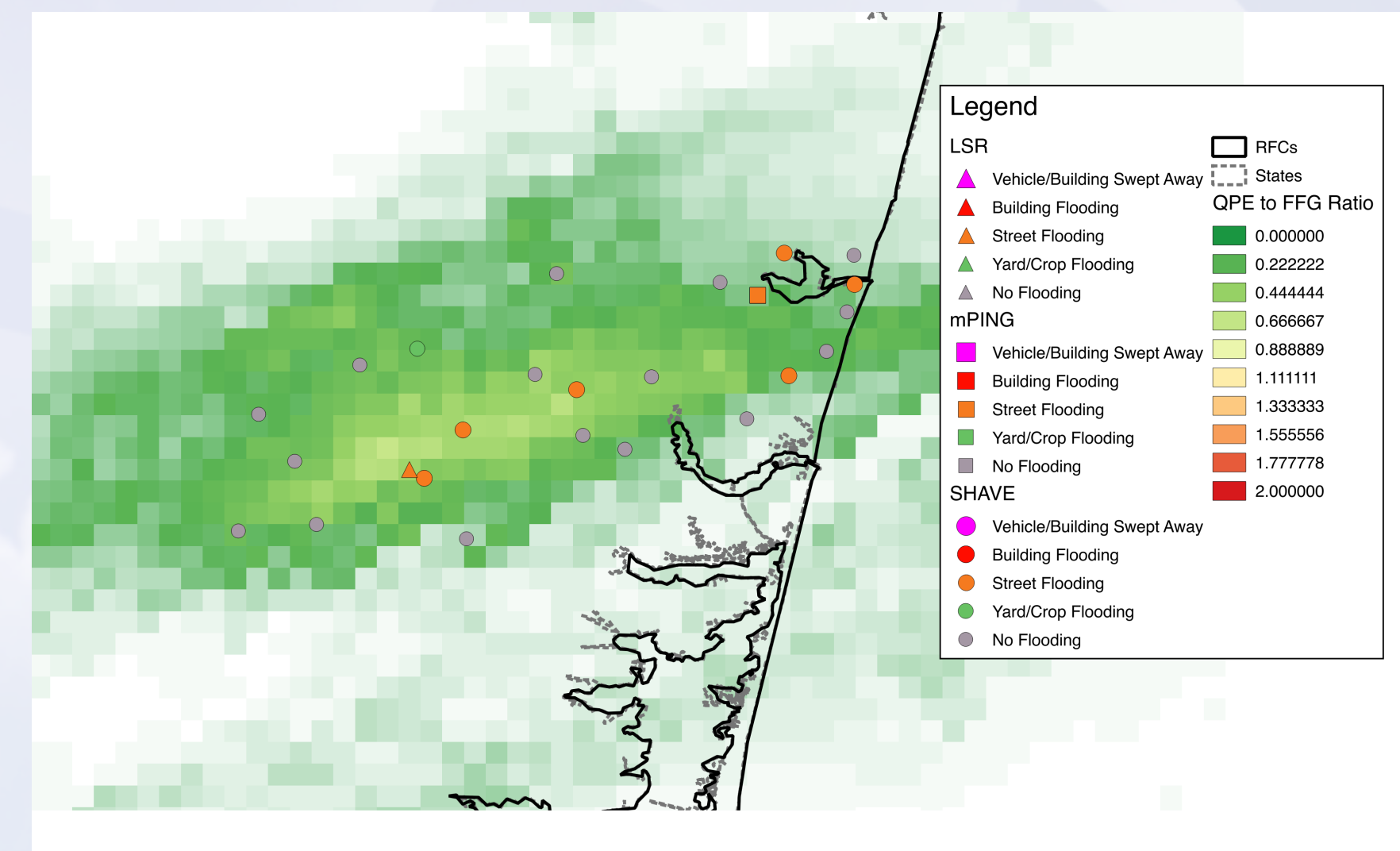


Fig. 3. (above) MRMS Q3 radar only precipitation ratio with 6-hour flash flood guidance for 14 July 2014, 21 UTC.

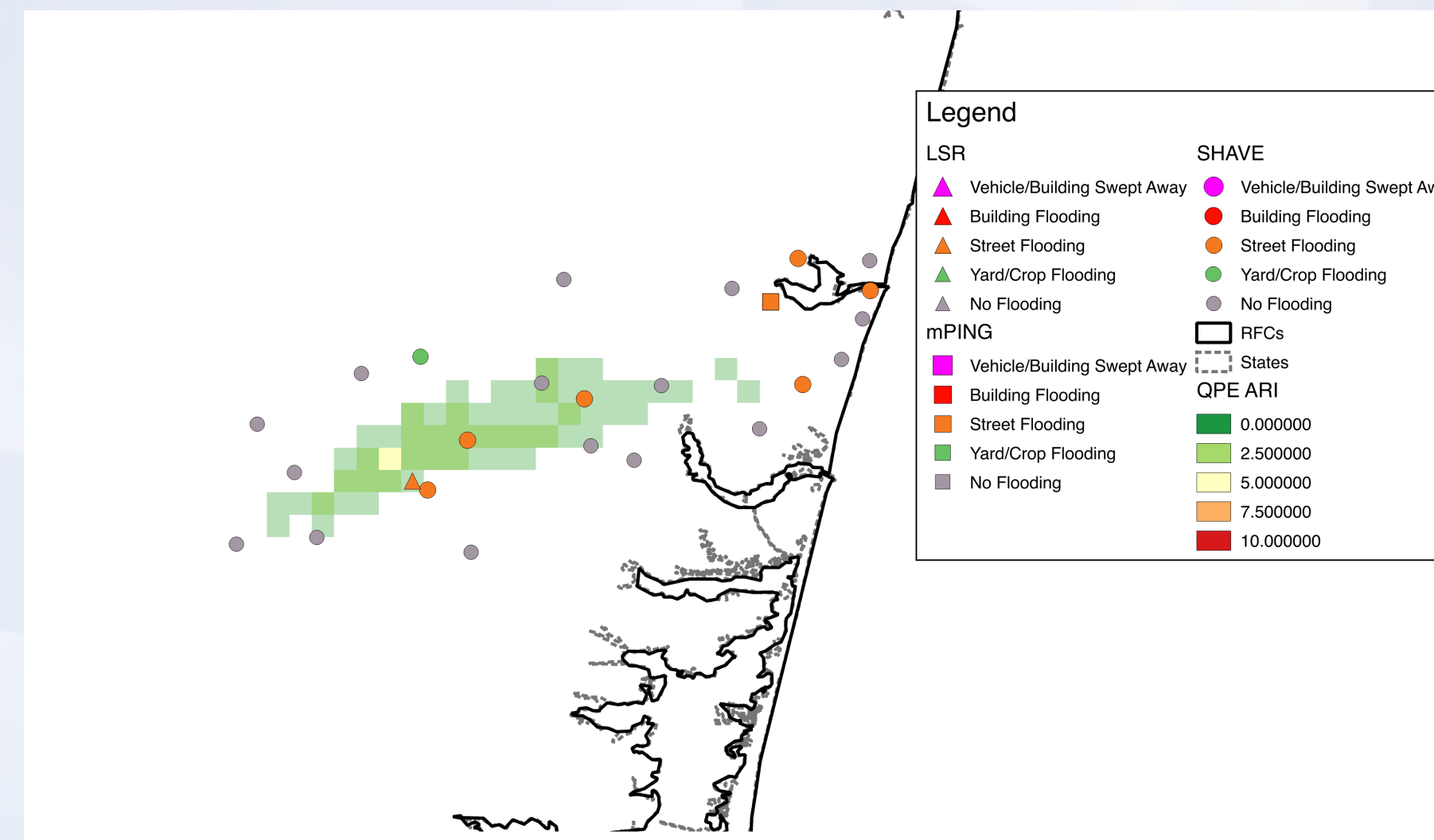


Fig. 4. (above) MRMS Q3 6-hour accumulation compared to NOAA Atlas 14 Depth-duration-frequency maps to compute average recurrence intervals for 14 July 2014, 21 UTC.

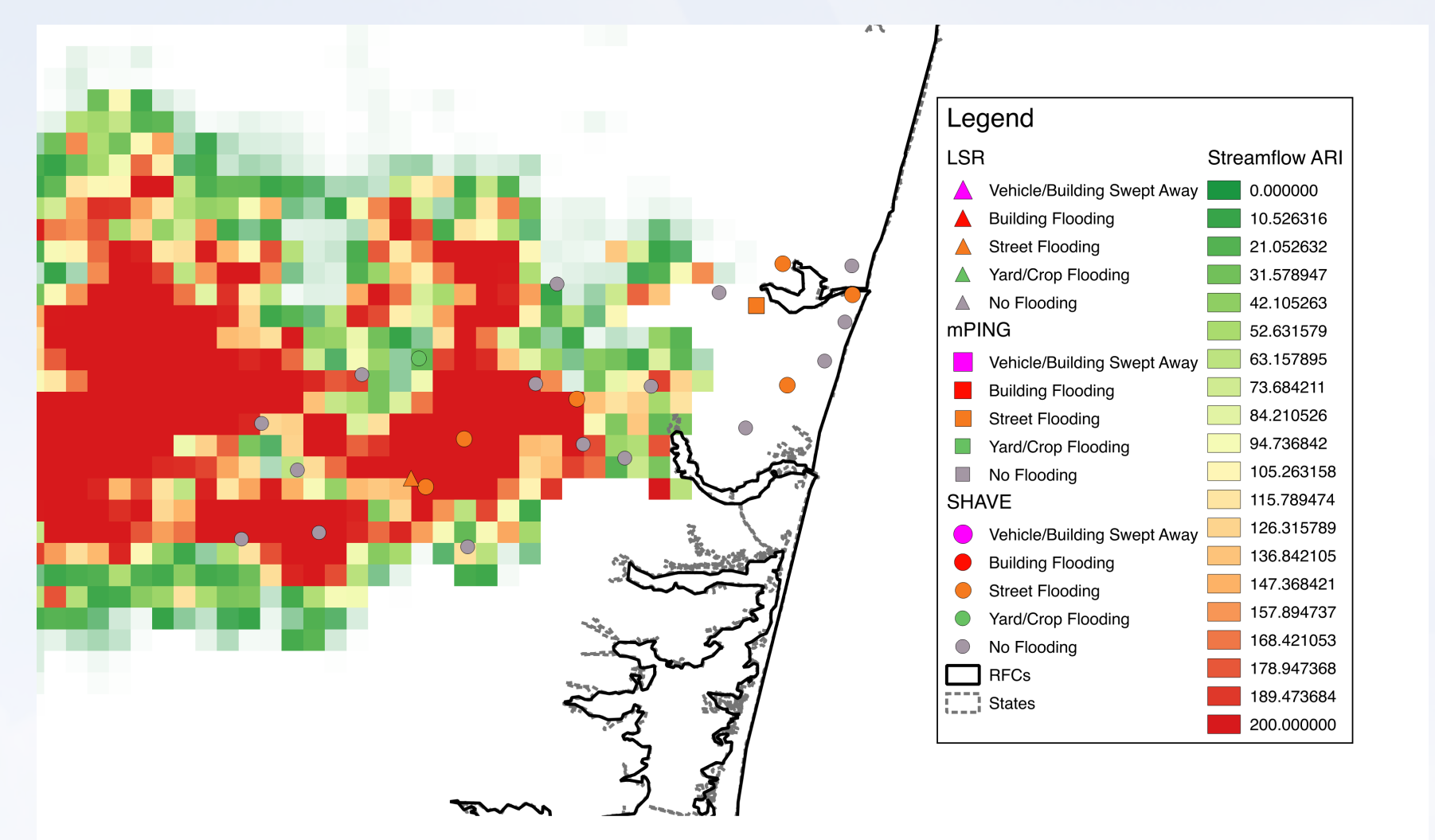


Fig. 5. (above) MRMS Q3 precipitation forced CREST hydrologic model simulated average recurrence intervals for 14 July 2014, 21 UTC.

## How skillful were the tools during HWT-Hydro?

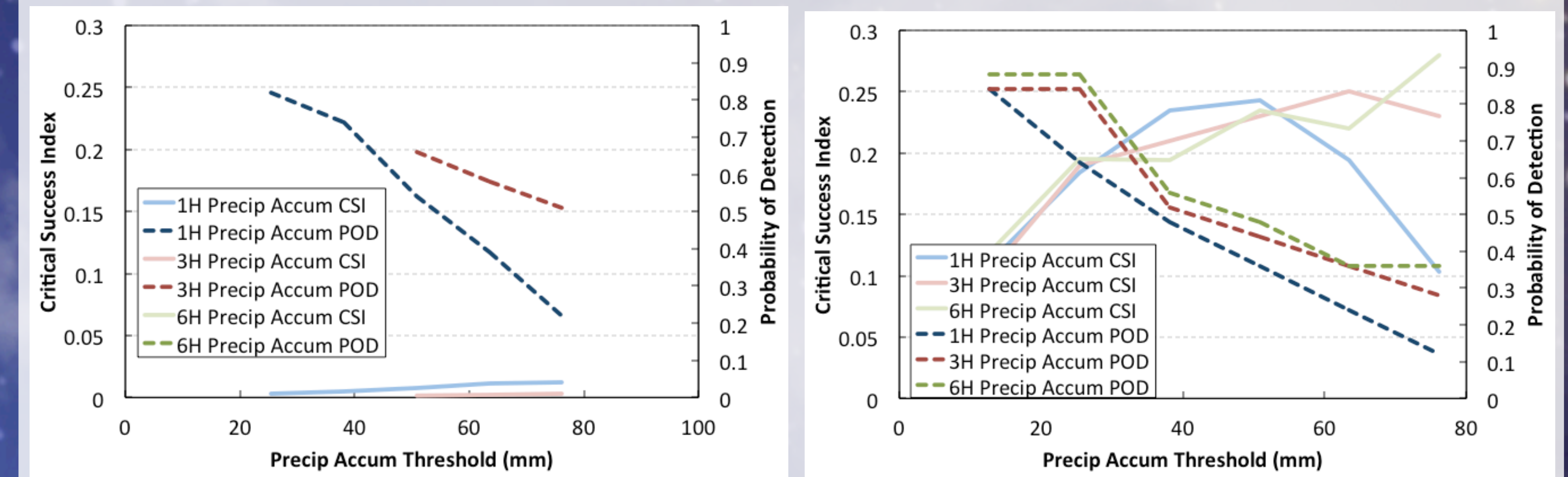


Fig. 6. (above) Critical success index and probability of detection for 1-, 3-, and 6-hour MRMS QPE accumulations when using local storm reports (left) and USGS stream gauges (right) as the verification observation source.

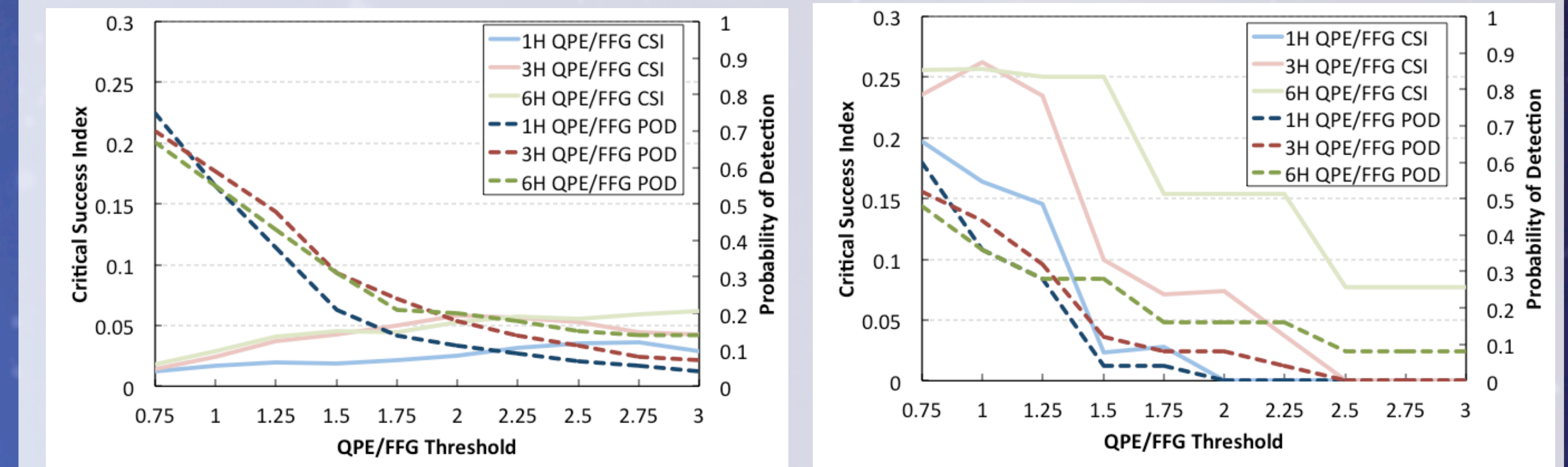


Fig. 7. (above) Critical success index and probability of detection for 1-, 3-, and 6-hour MRMS QPE to flash flood guidance ratios when using local storm reports (left) and USGS stream gauges (right) as the verification observation source.

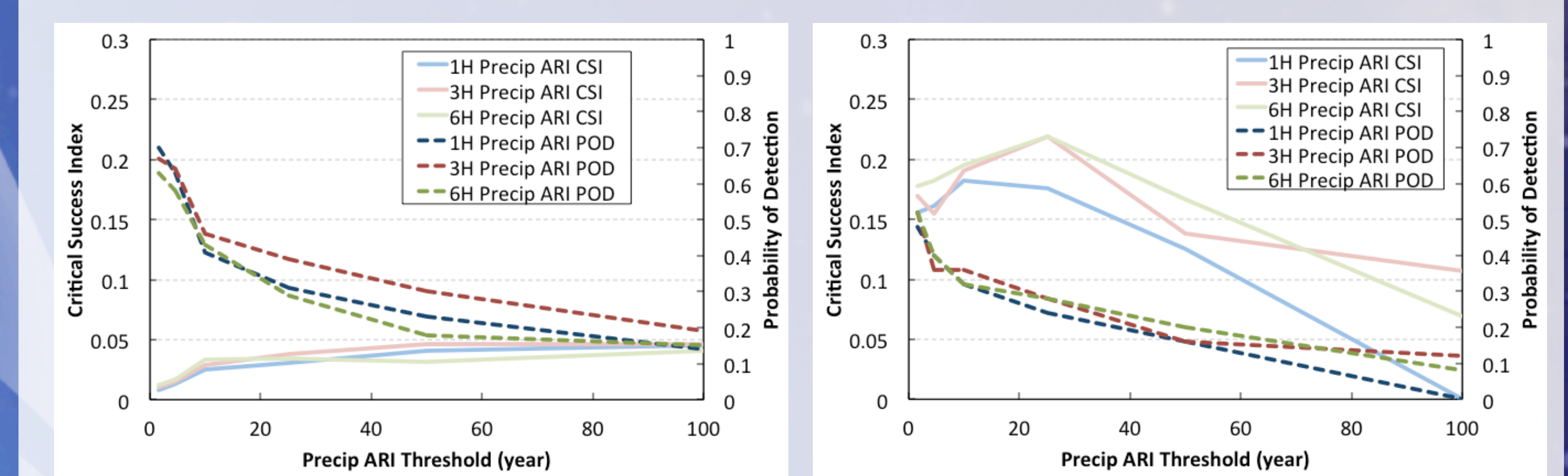


Fig. 8. (above) Critical success index and probability of detection for 1-, 3-, and 6-hour MRMS QPE average recurrence intervals when using local storm reports (left) and USGS stream gauges (right) as the verification observation source.

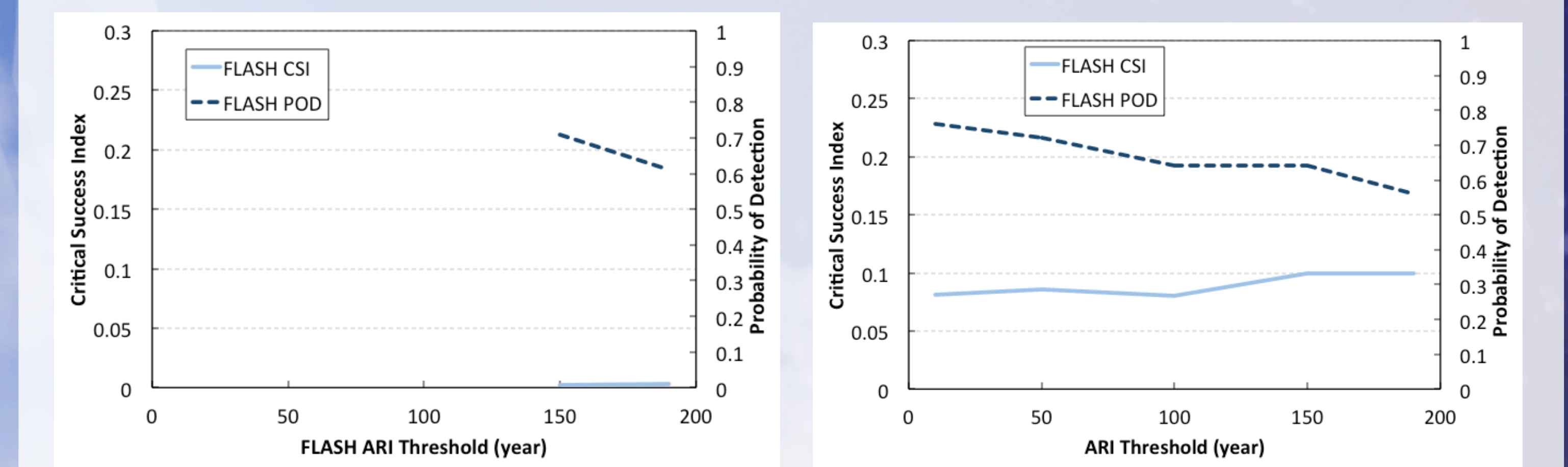


Fig. 9. (above) Critical success index and probability of detection for MRMS QPE forced CREST distributed hydrologic model simulated streamflow average recurrence intervals when using local storm reports (left) and USGS stream gauges (right) as the verification observation source.

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