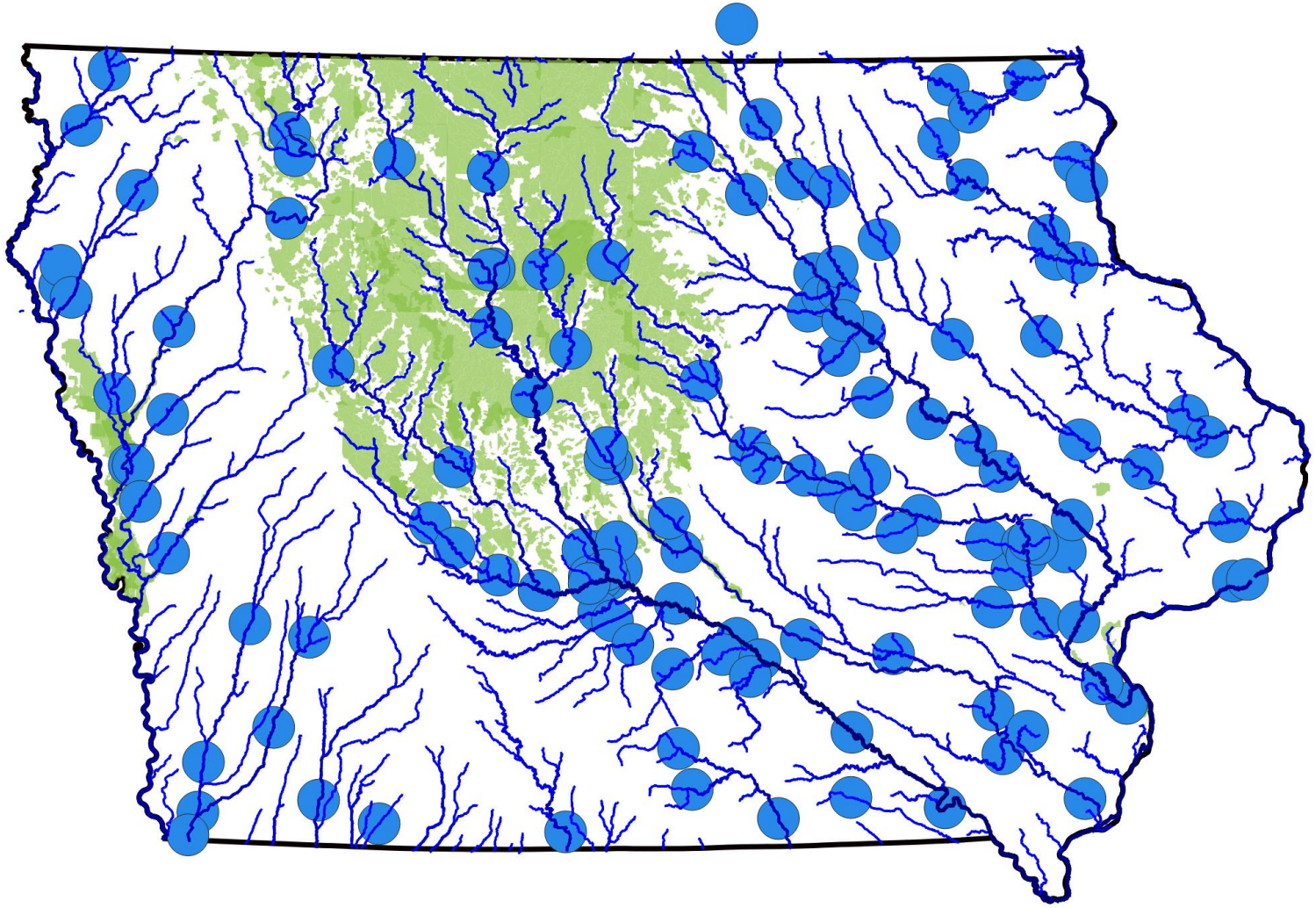
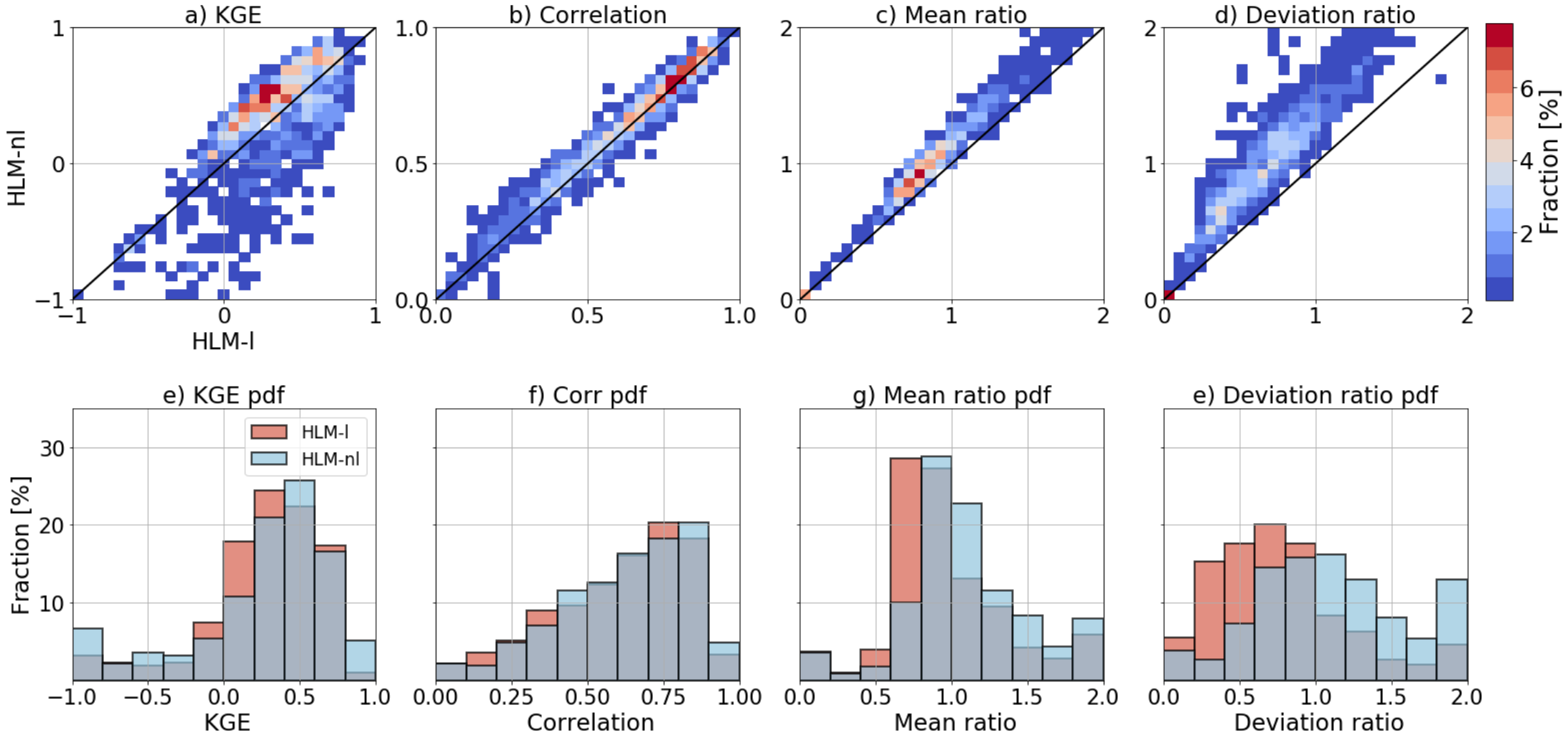
Evaluation of a non-linear function to represent subsurface outflow and tile drainage.

Nicolas Velasquez, Ricardo Mantilla, Felipe Quintero, Morgan Fonley, Witek Krajewsky,

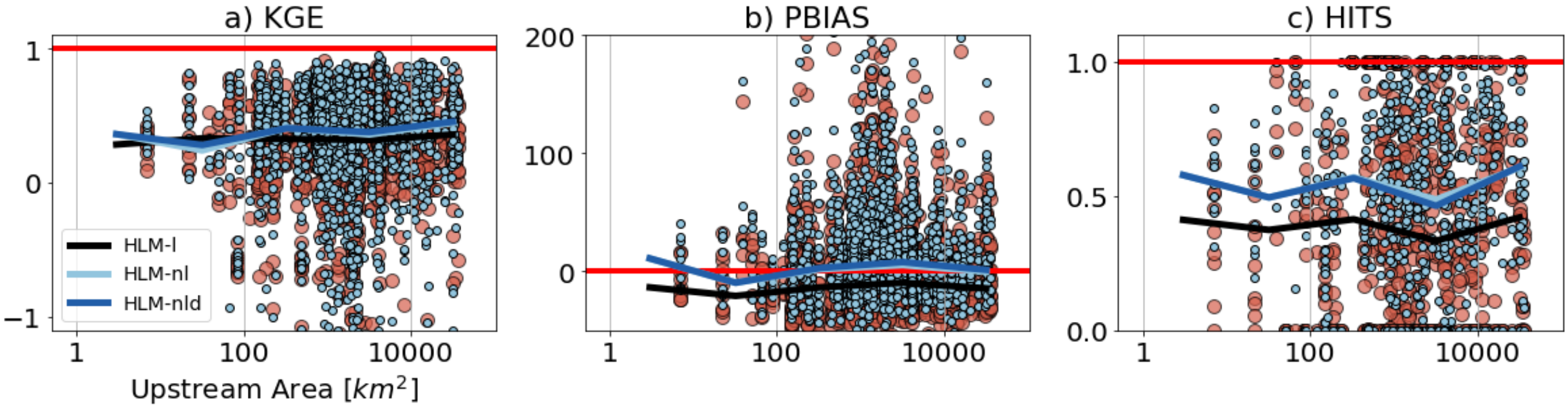
With the new model, we consider three new scenarios between 2002 and 2018: active layer (undrained), tiled (drained), and distributed drained (green).



The HLM-nl setup increases the yearly KGE performance. We attribute this increase performance at the Mean and Deviation biases.



The improved performance happens at all the scales. However, the KGE improvement is limited to watersheds with areas above 100 $\mathbf{km^2}$.



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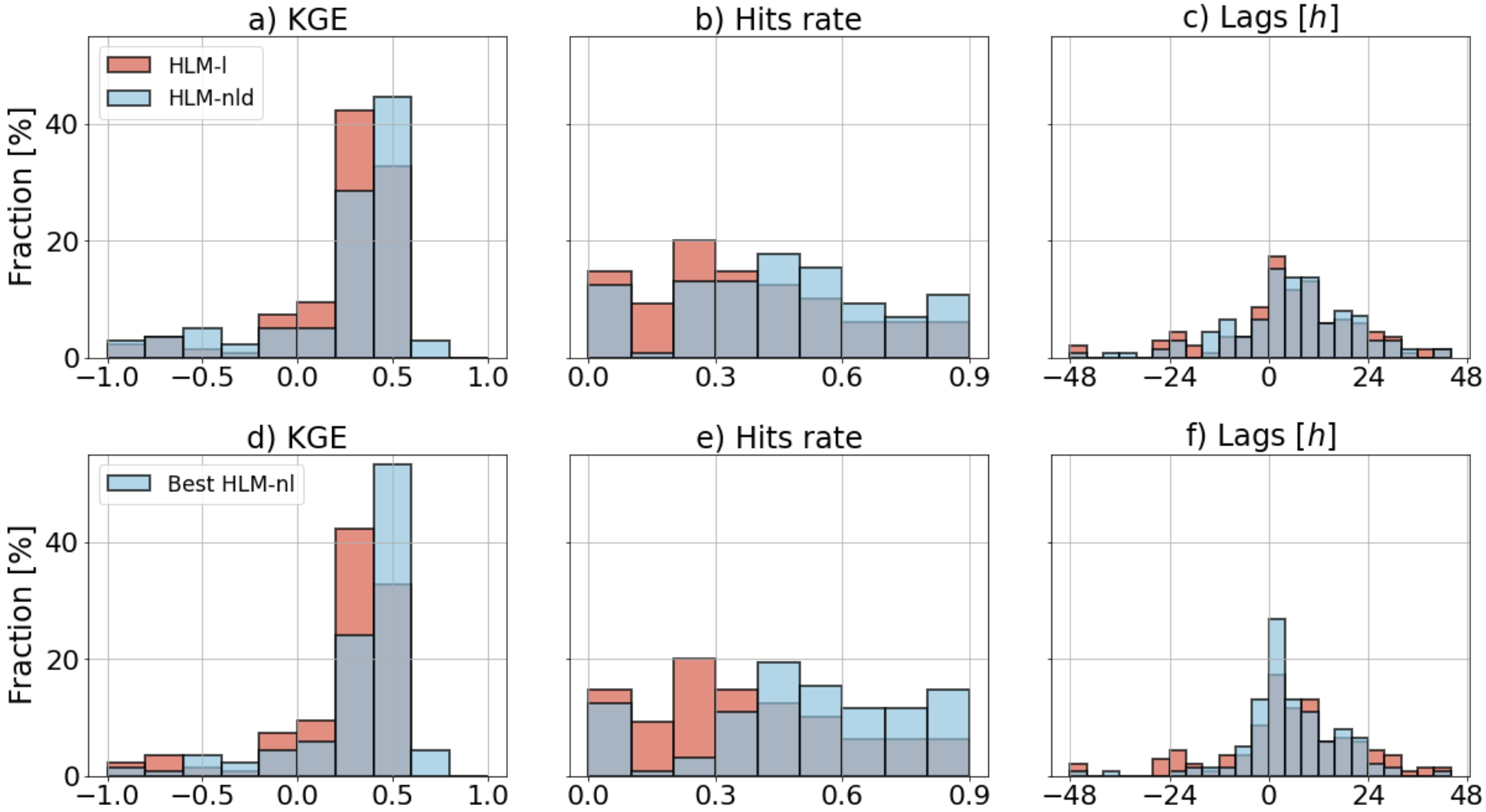

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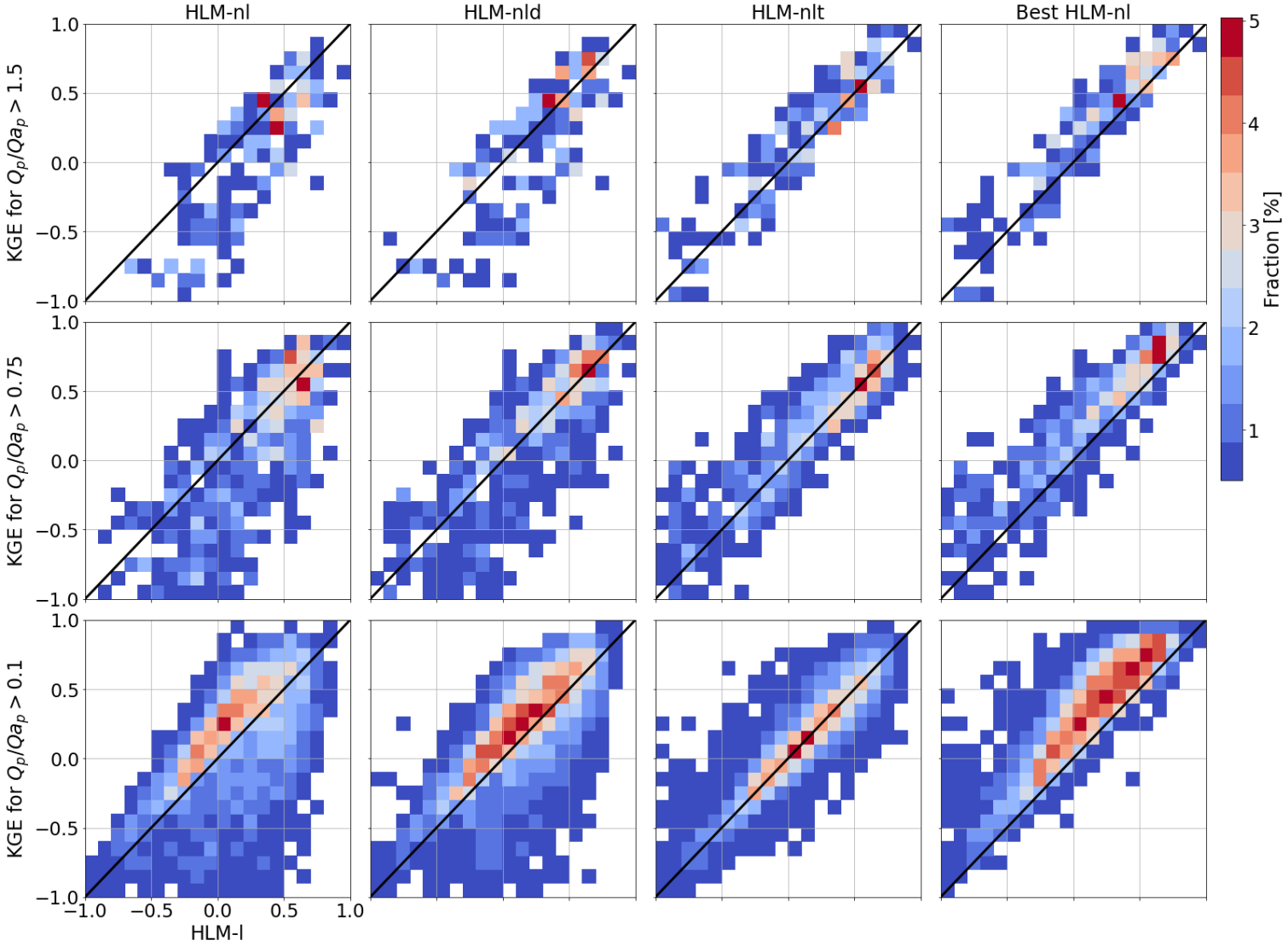
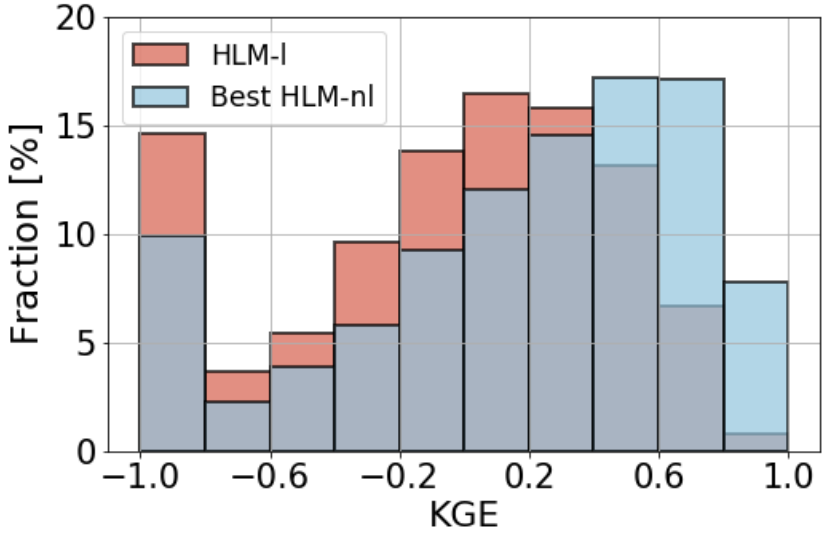
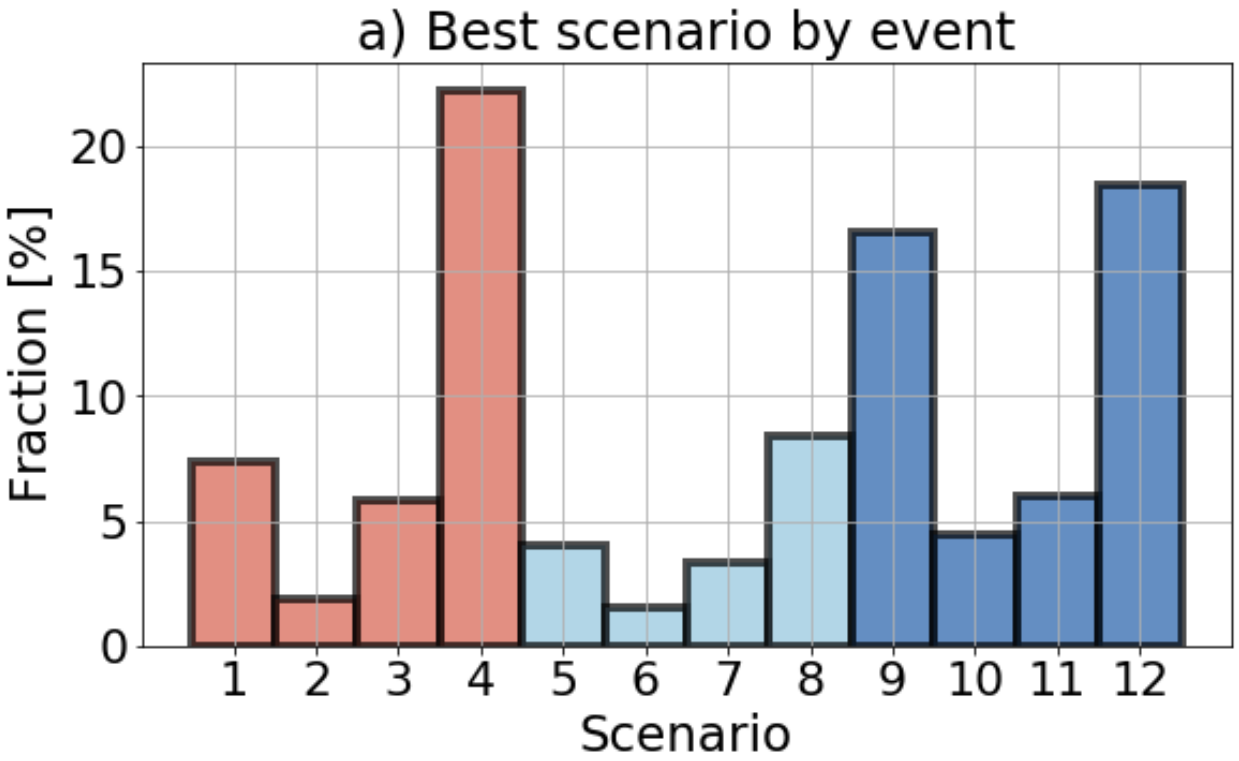
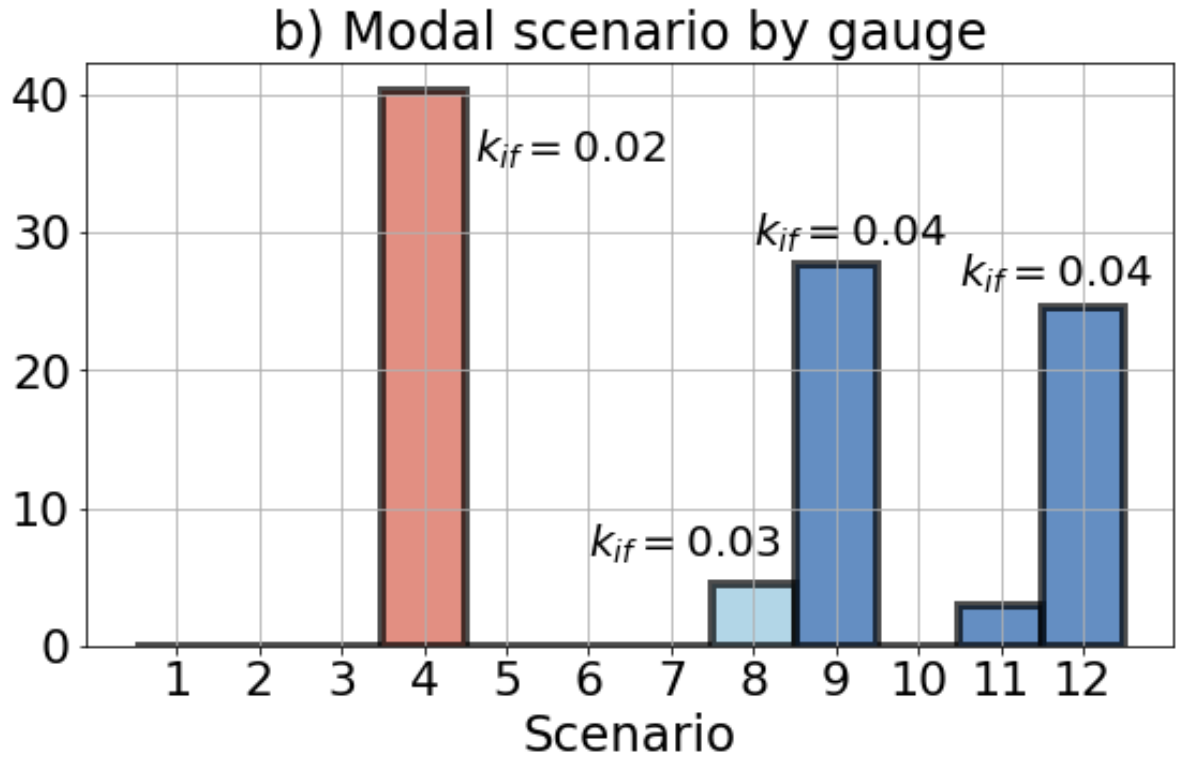




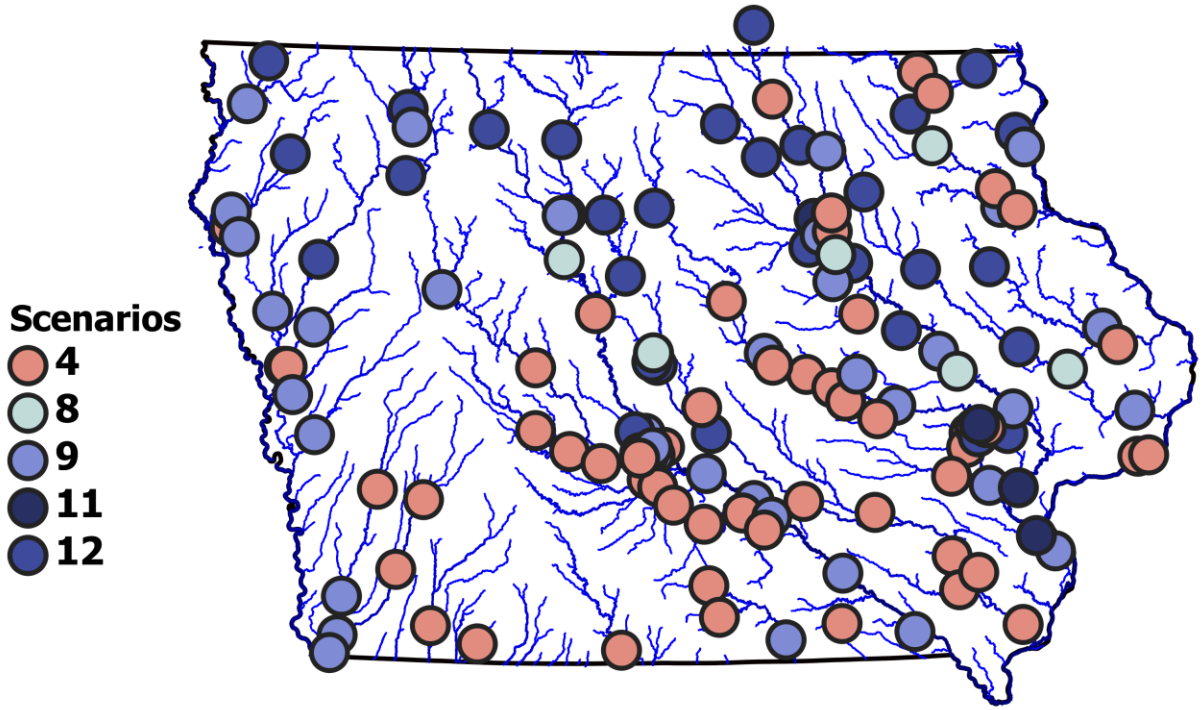
Some of the scenarios are dominant in the region.



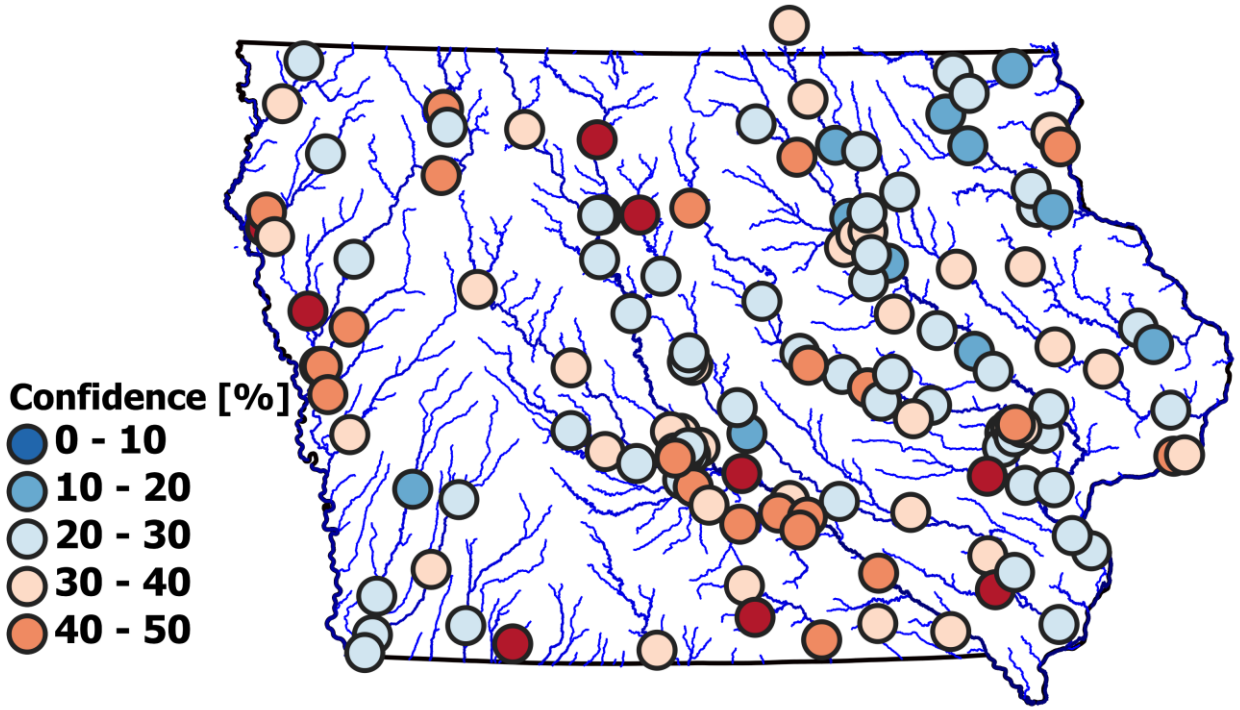


The selected scenarios also have an spatial distribution inside Iowa.

a) Scenarios selected for each gauge

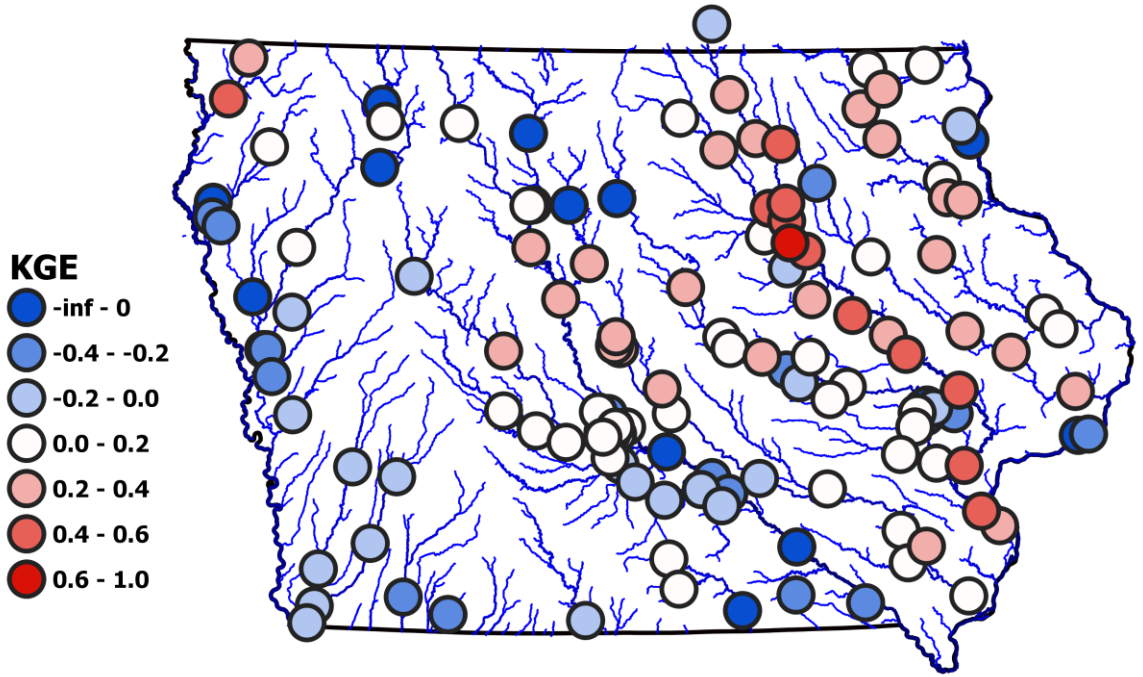


b) Confidence of the selected scenarios.

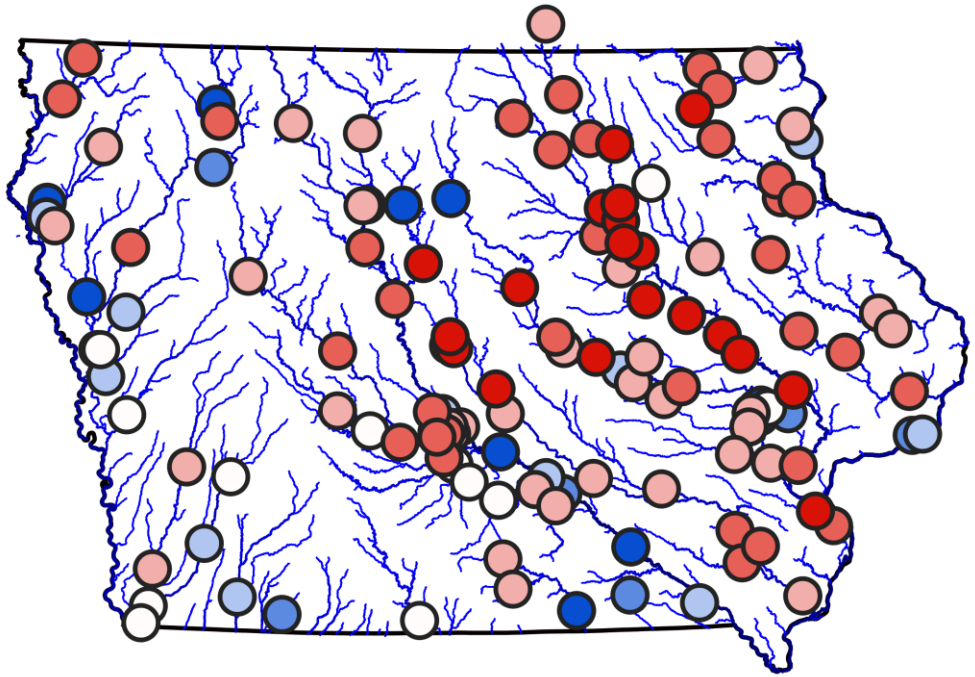


Compared with the HLM-l, the best scenario of the HLM-nl produces a significant improvement at different regions of Iowa.

a) KGE for the HLM-l



b) KGE for the best HLM-nl



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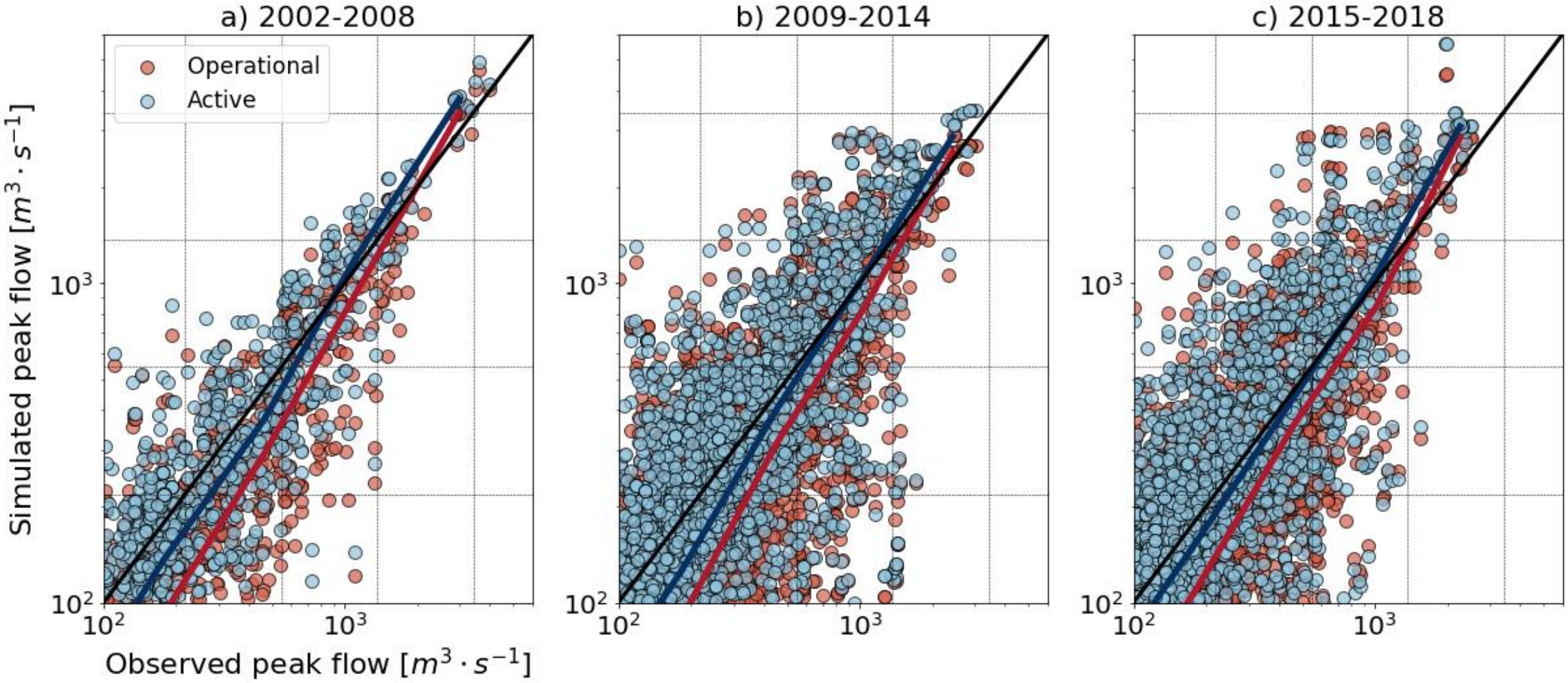
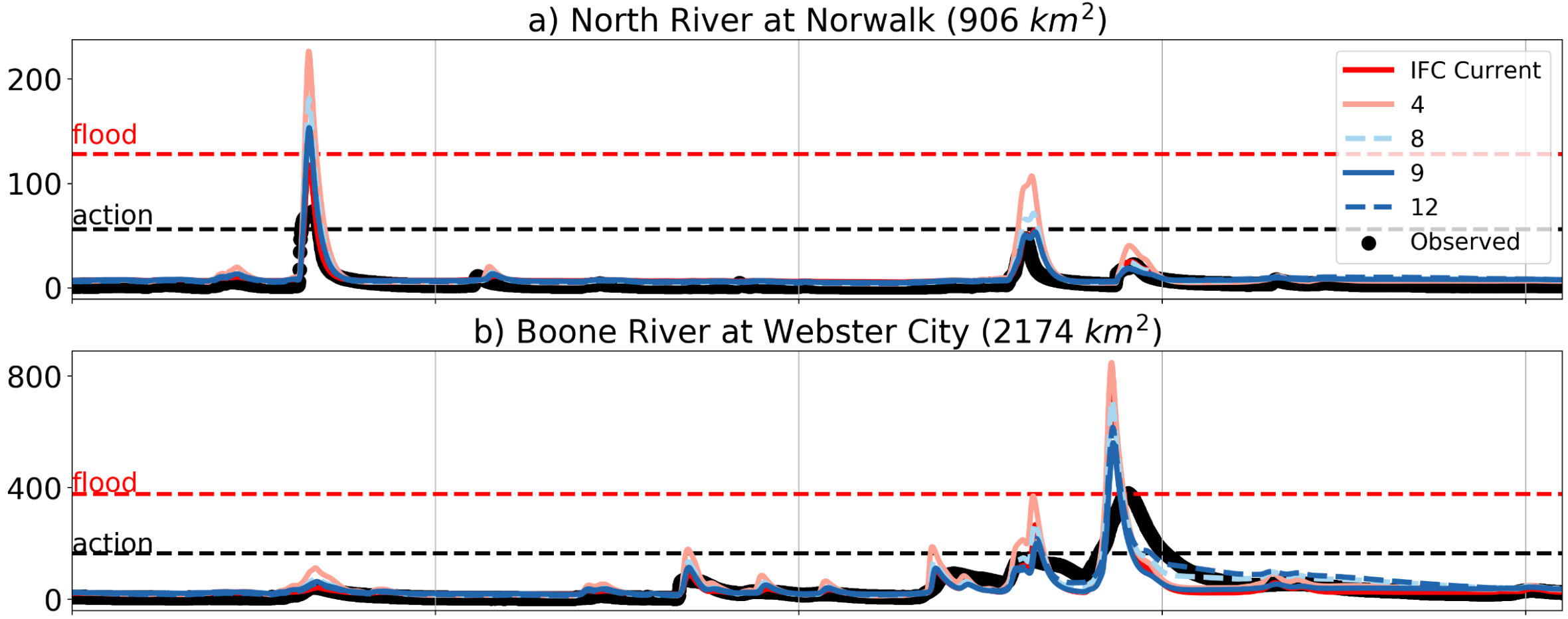
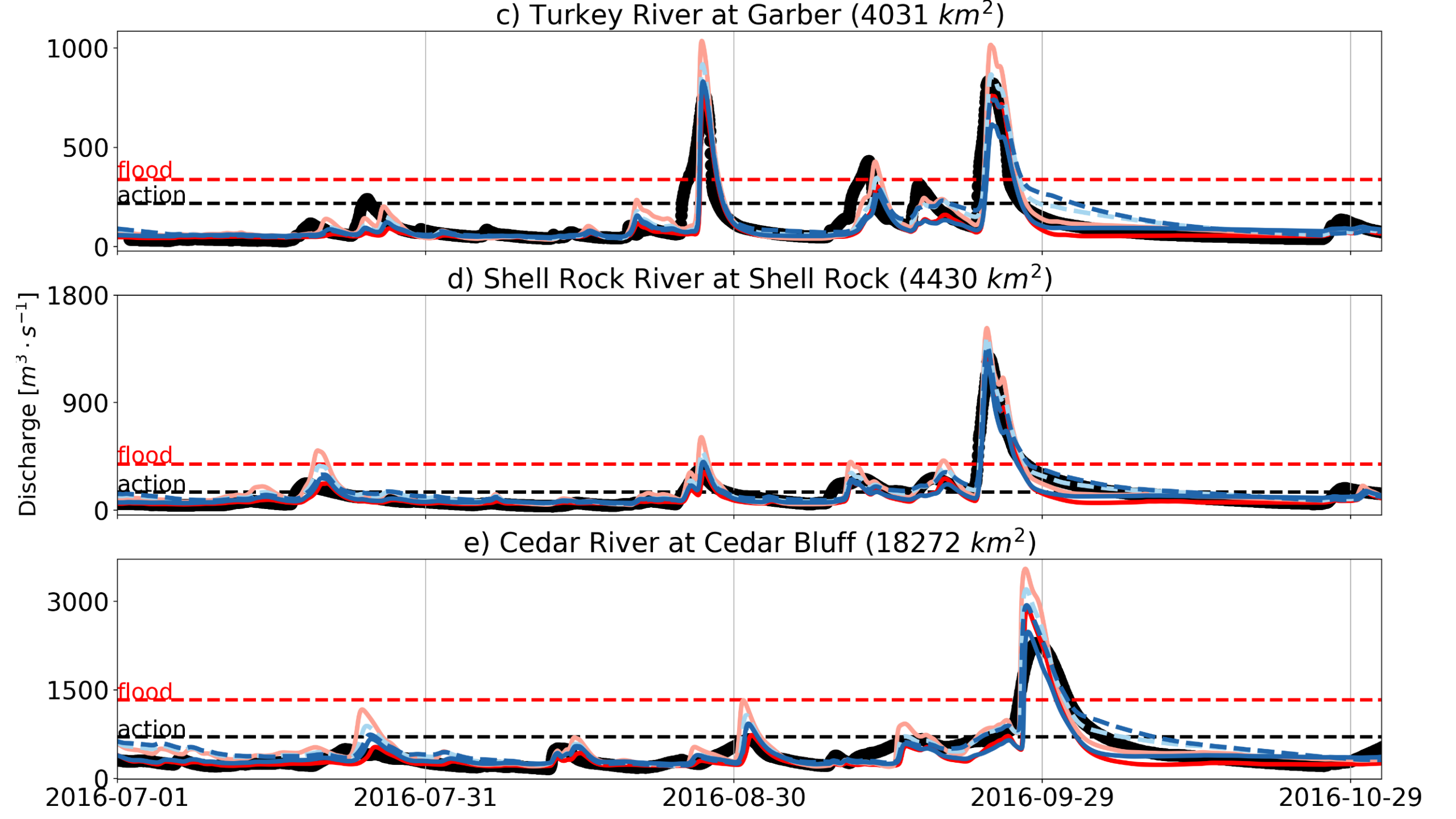



a) North River at Norwalk (906 km^2)
200
100
0
flood
action
IFC Current
4
8
9
12
Observed
b) Boone River at Webster City (2174 km^2)
800
400
0
flood
action


c) Turkey River at Garber (4031 km^2)
1000
500
0
flood
action
d) Shell Rock River at Shell Rock (4430 km^2)
1800
900
0
flood
action
Discharge [$m^3 \cdot s^{-1}$]
e) Cedar River at Cedar Bluff (18272 km^2)
3000
1500
0
flood
action
2016-07-01
2016-07-31
2016-08-30
2016-09-29
2016-10-29