

A high-speed photograph of water splashing, creating a dynamic, blue-toned background. The water droplets and spray are captured in mid-air, with some droplets appearing as bright highlights against the darker blue water.

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# Model performance of high flow events using a heterogeneous land surface configuration



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A dynamic background image featuring a blue-tinted water splash. The water is captured in mid-motion, with various droplets and bubbles suspended in the air, creating a sense of movement and energy. The overall color palette is a range of blues, from deep navy to lighter, airy tones.

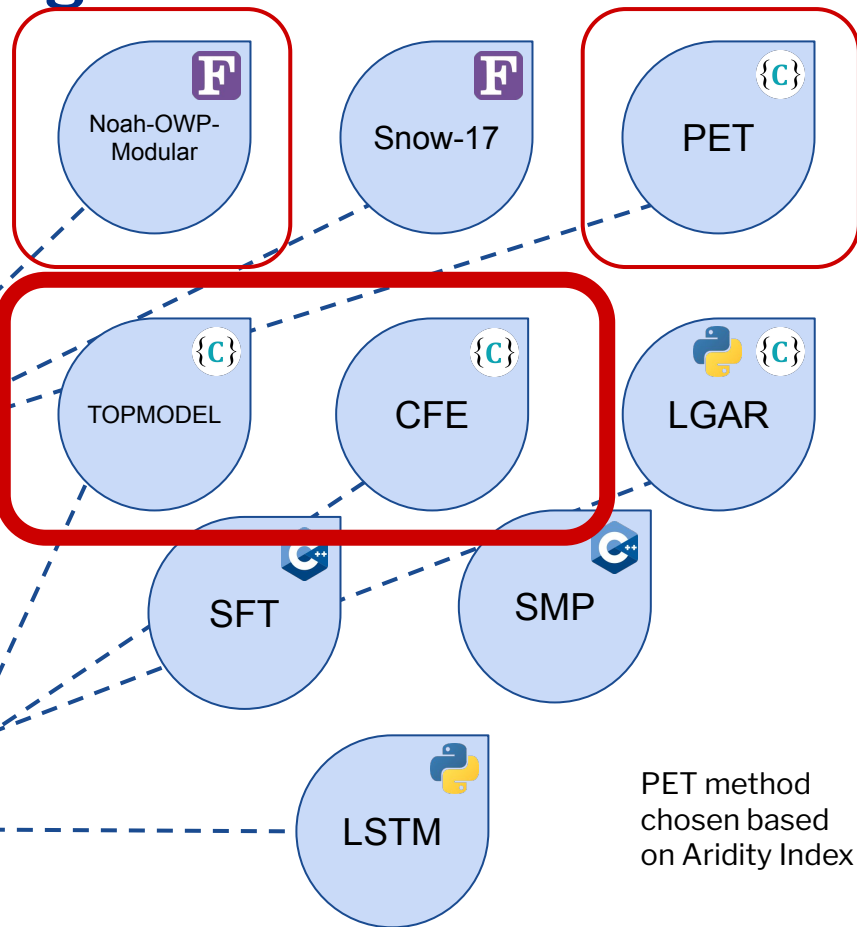
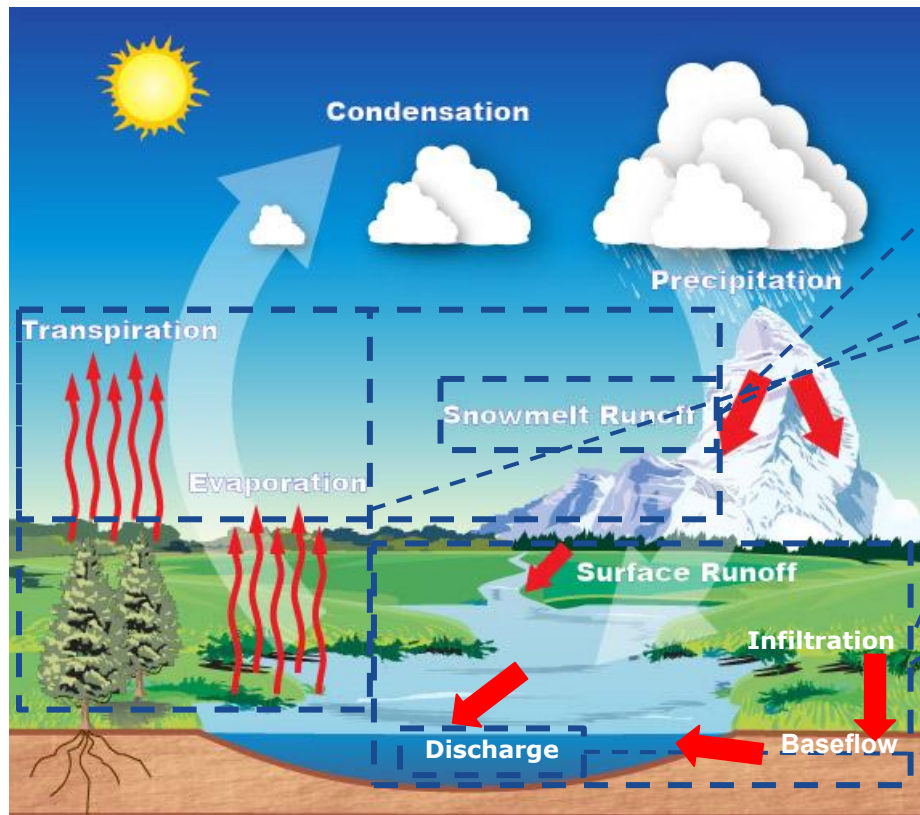
# Question:

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Can storm event streamflow be better predicted across CONUS with a set of heterogeneous, location appropriate models than the same model used across the entirety of CONUS?



# Background: NextGen modeling framework



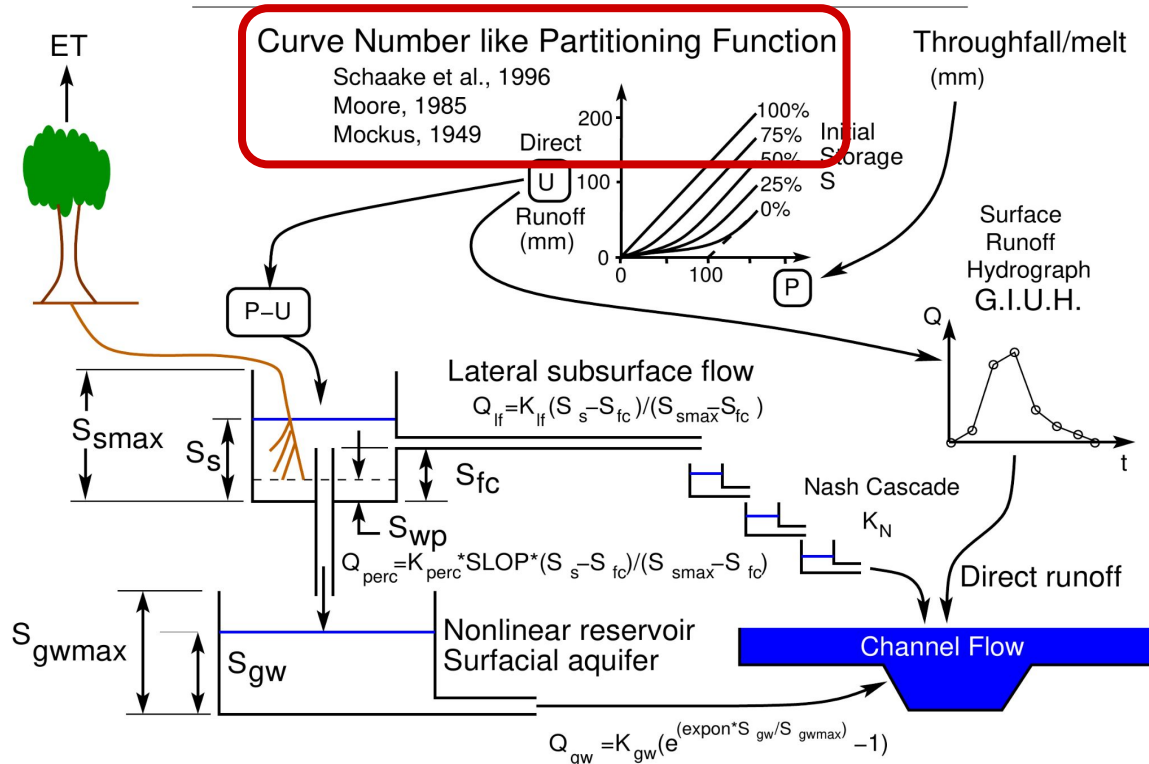
PET method  
chosen based  
on Aridity Index

# Background: Models

1. Topmodel
2. CFE
3. CFEX
4. National Water Model (NWM)

The NWM has been in operations since 2016

## Conceptual Functional Equivalent (CFE) Model



# Study Setup

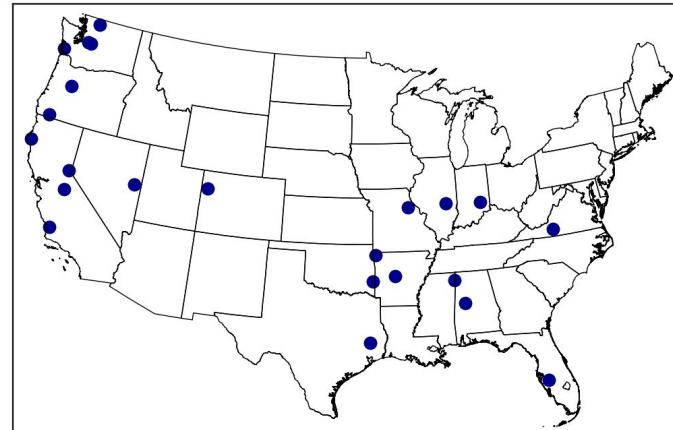
## **Part 1:** 491 uncalibrated CAMELS sites

- Four models: Topmodel, CFE, CFEX, NWM 2.1

## **Part 2:** 23 calibrated CAMELS sites

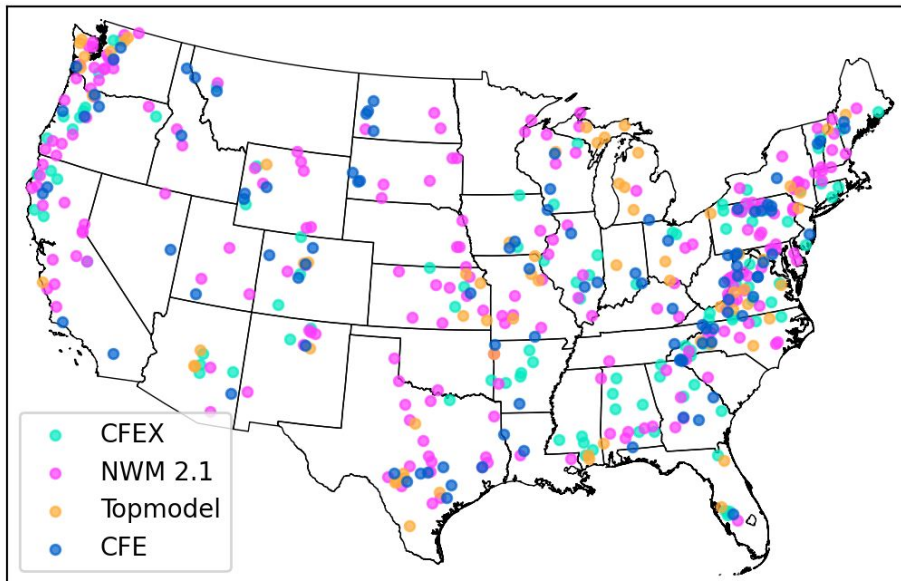
- Four models: Topmodel, CFE, CFEX, NWM 2.1
- PET chosen based on the aridity index of the site

### Calibrated Study Locations

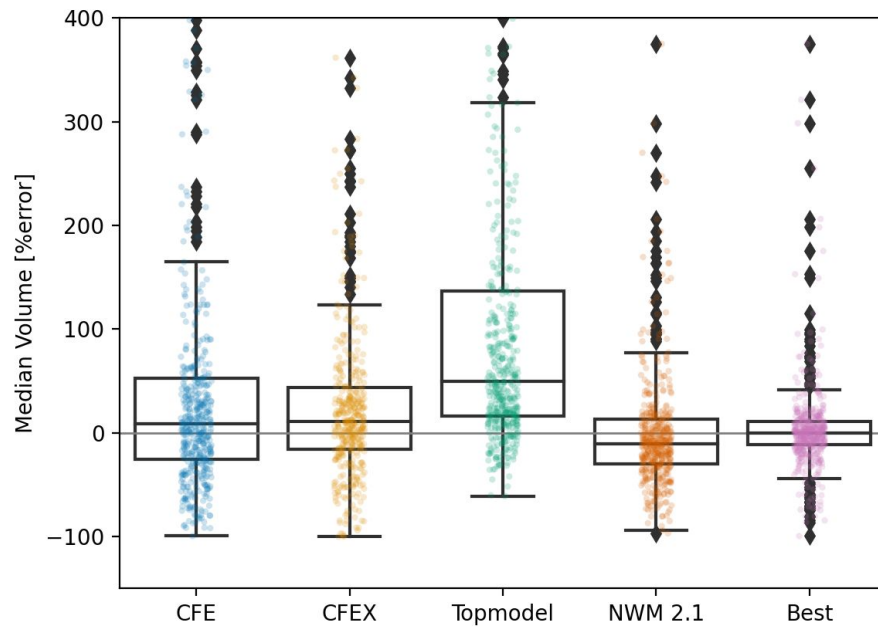


# Results: Uncalibrated

Model with Best Median Event Volume Error

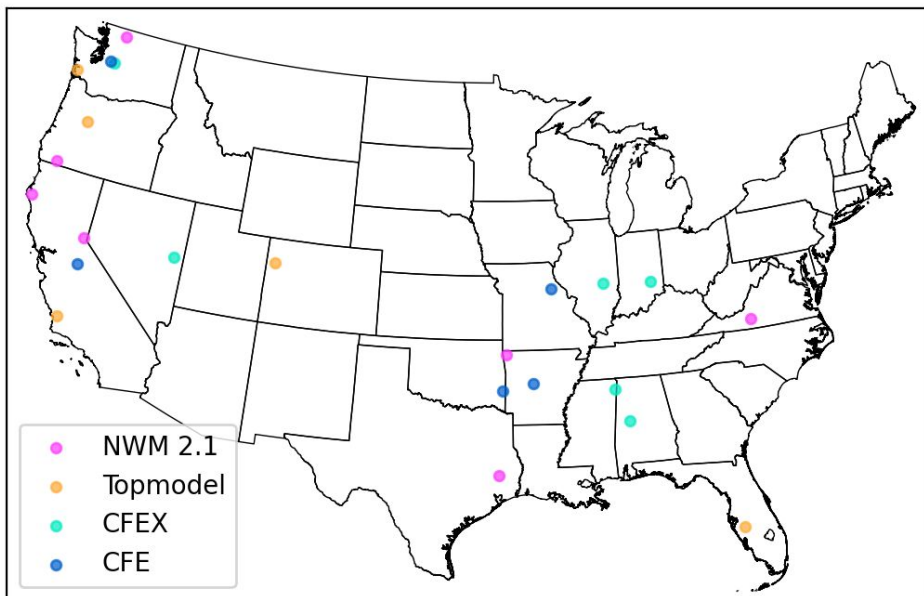


Best = Median Event Volume error closest to zero

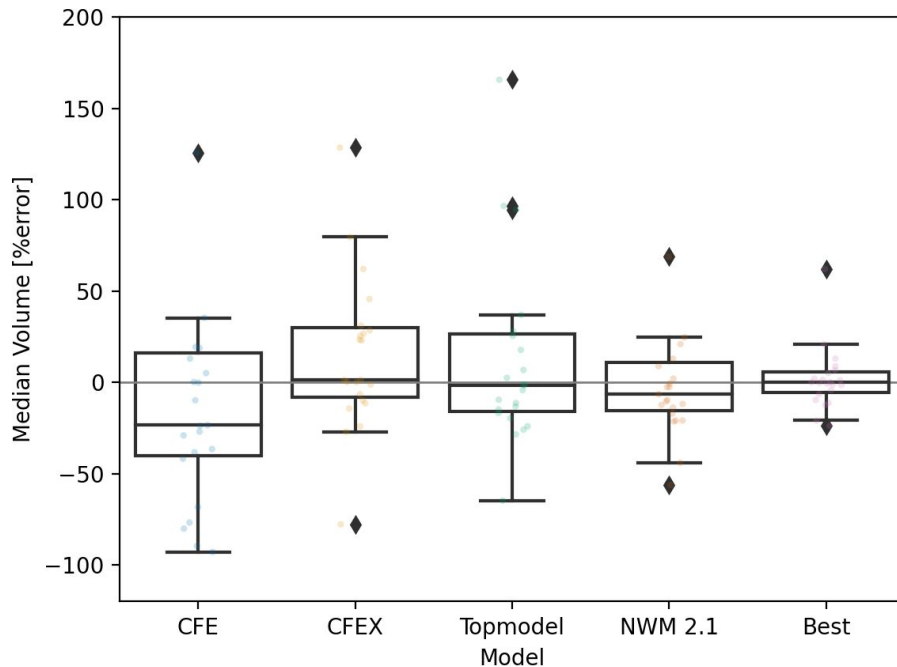


# Results: Calibrated

Model with Best Median Event Volume Error

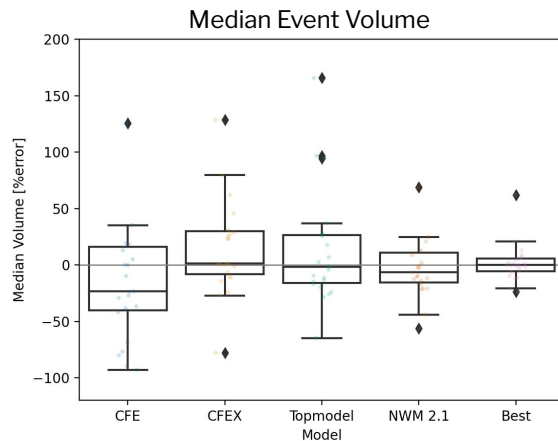


Best = Median Peak Flow error closest to zero

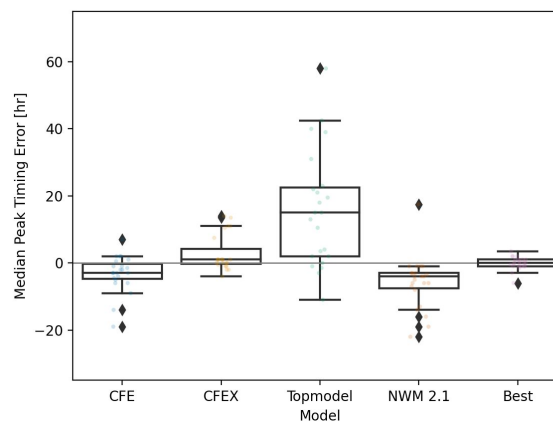
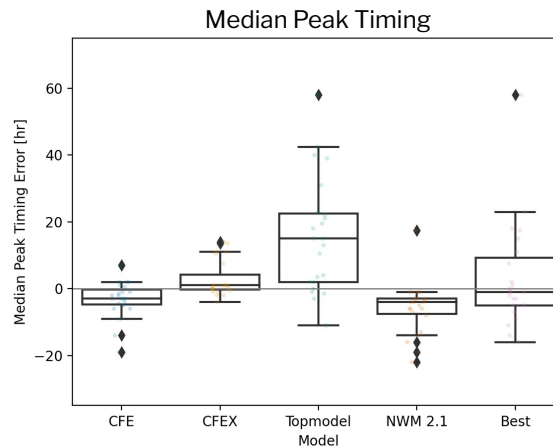
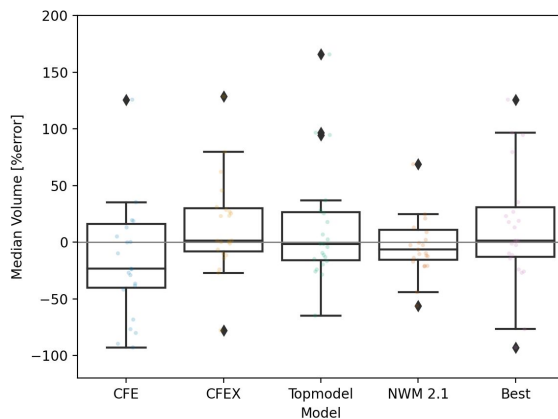


# Results: Trade Offs

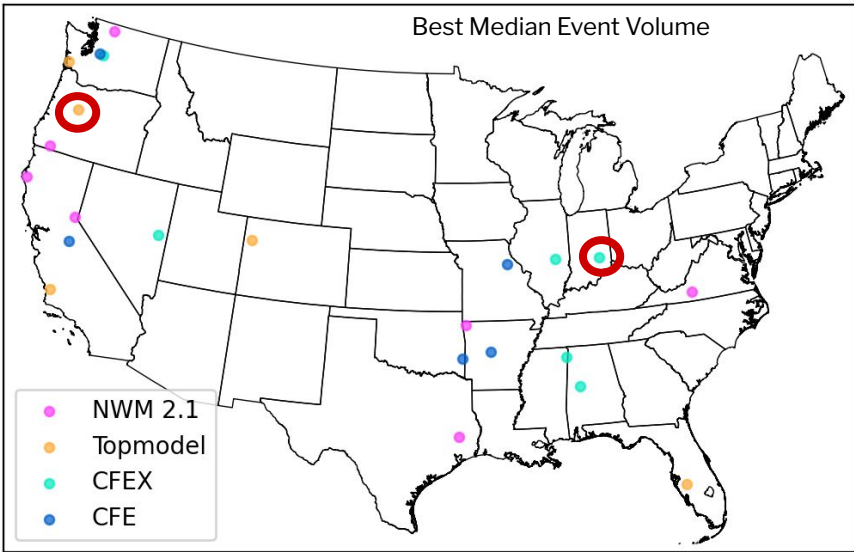
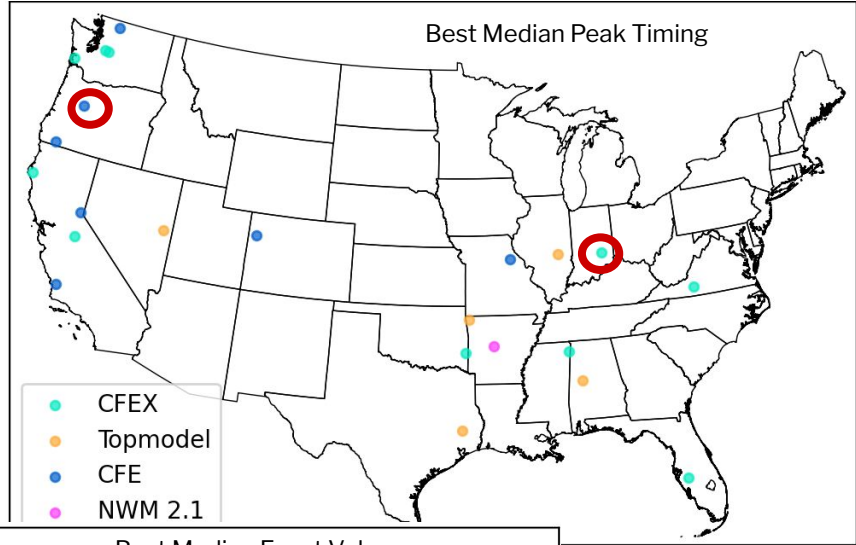
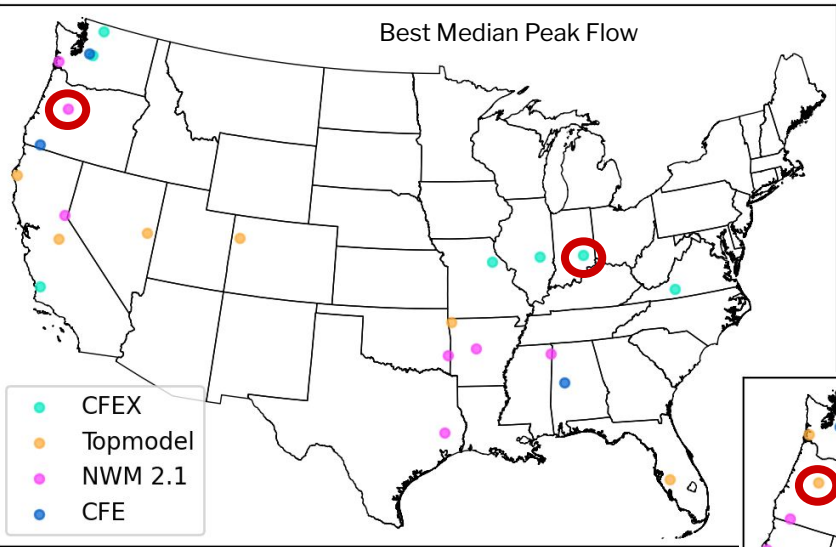
Best = Median Event Volume  
error closest to zero



Best = Median Peak  
Timing error closest to zero







# Final Thoughts

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- We can use a multi-model approach to improve continental scale event modeling
- In some cases the best model for event prediction is clear
- We are still working to enhance our capabilities, providing improved event detection to support the nation

This is where



come in!



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*Thank You!*



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<https://water.noaa.gov>