Background and Motivation

- In Ethiopia, more than 80% of big freshwater lakes are located in the Rift Valley Lake Basin.
- Prediction for ungauged basins (PUB) has demonstrated its effectiveness in hydro-climatic data-rich regions. However, these approaches are not well evaluated in the climatic data-limited condition.

Methods

Parameter estimation and uncertainty quantification

- We incorporate a procedure, which enables us to select the best regional models derived from the best parameters estimated from calibration, validation, and stable sets from the split sample test.
- We calculate uncertainties resulting from parameter sampling, choice of best parameter sets, and spatial cross-validation.
- We identified parameters for the ungauged catchments using weighted regression, and evaluate the corresponding uncertainty using the leave-one-out spatial cross-validation.

Results and discussion

1. Performance of the regionalization procedure

- The split sample test, shows the best parameter sets of the validation period provides better estimates of regionalized parameters than the best-calibrated, and stable parameter sets.
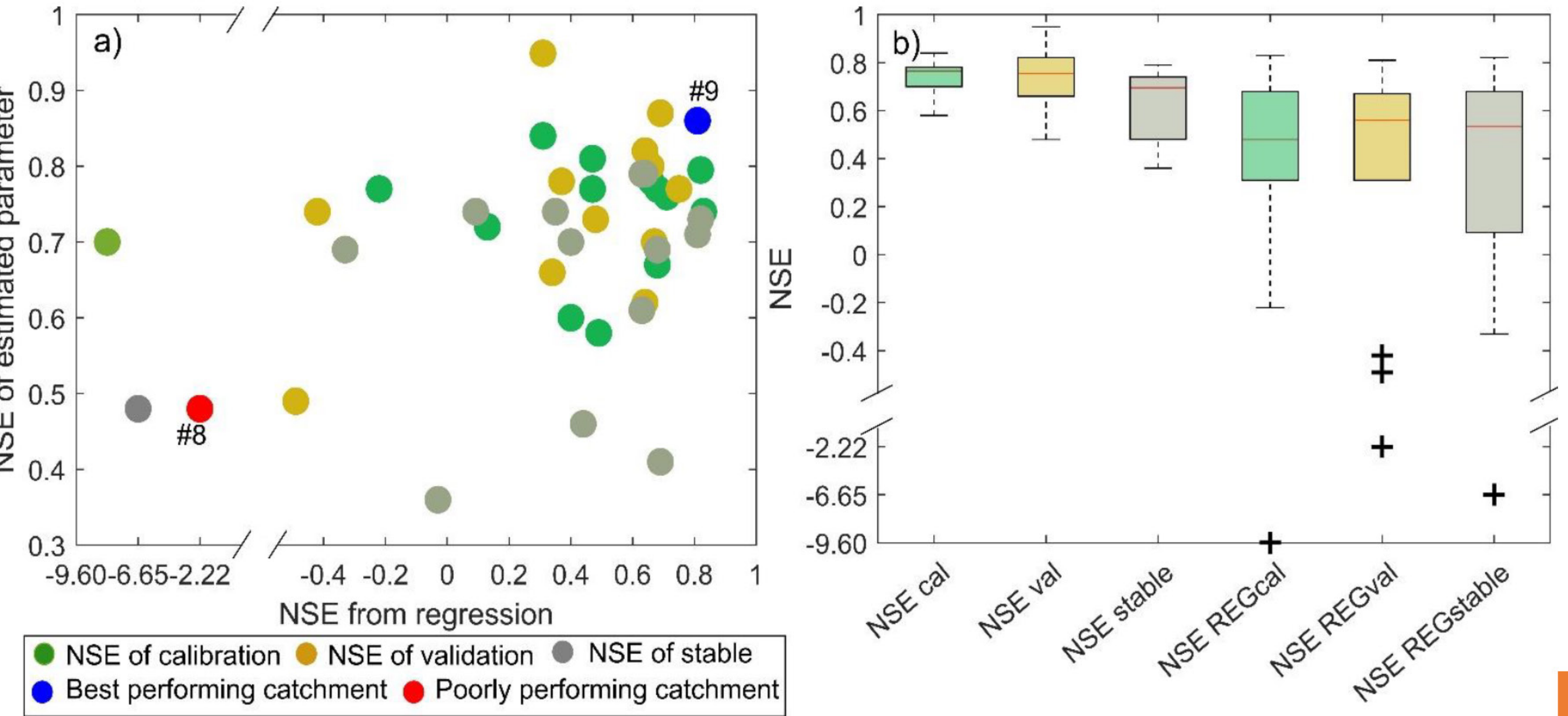
2. Estimation of regional resilience of streamflow to precipitation variability

- This approach shows variability in the resilience of gauged and ungauged regions, which emerges from parameter uncertainty and climate variability.
- We show the uncertainties of elasticities in the gauged catchments obtained from simulation to be less than that of the uncertainties of elasticities in the ungauged catchments obtained from regionalization.
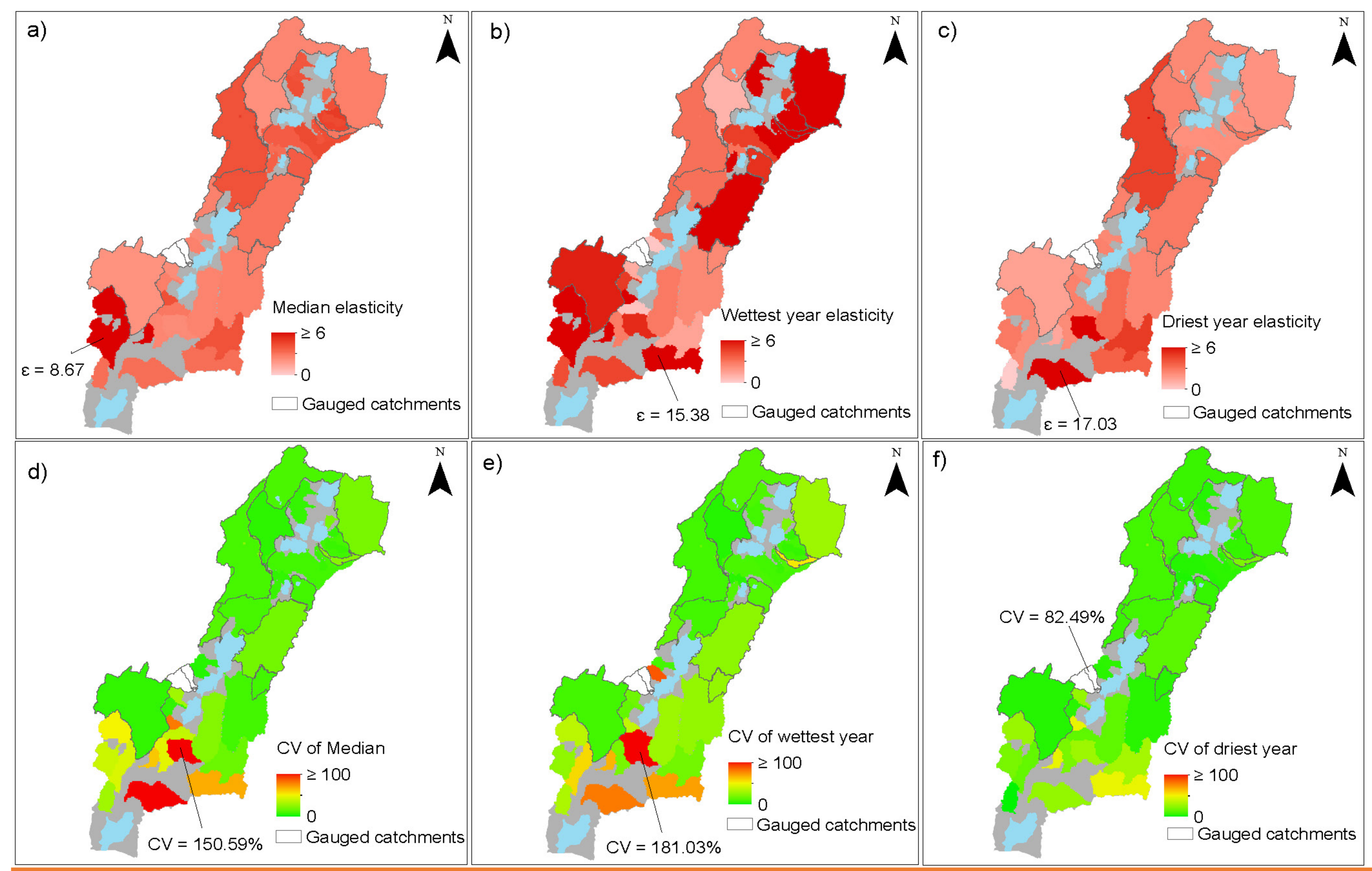
Conclusions

- With these results, our study provides a new procedure to use global precipitation and evapotranspiration products to predict and evaluate streamflow simulation for hydro-climatically data scares regions considering uncertainty.
- With its input data are available globally, it can be applied model-independent in any other data-scarce region where predictions of regional water availability are required.