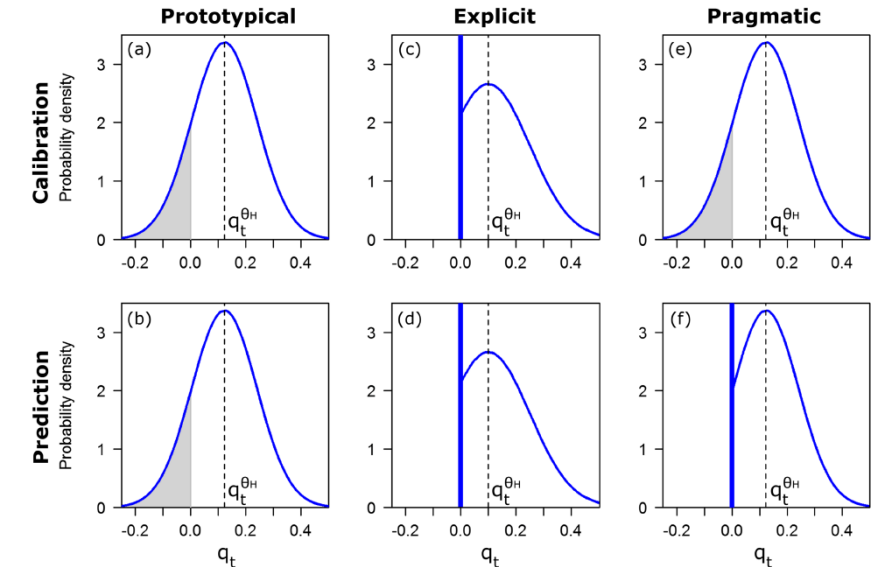
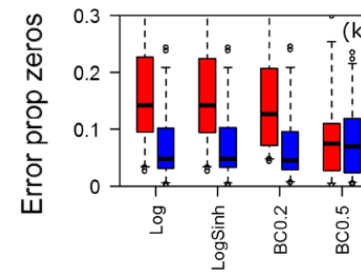
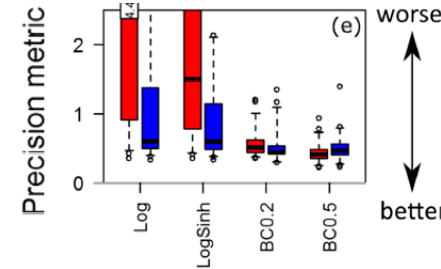


Probabilistic prediction in ephemeral catchments

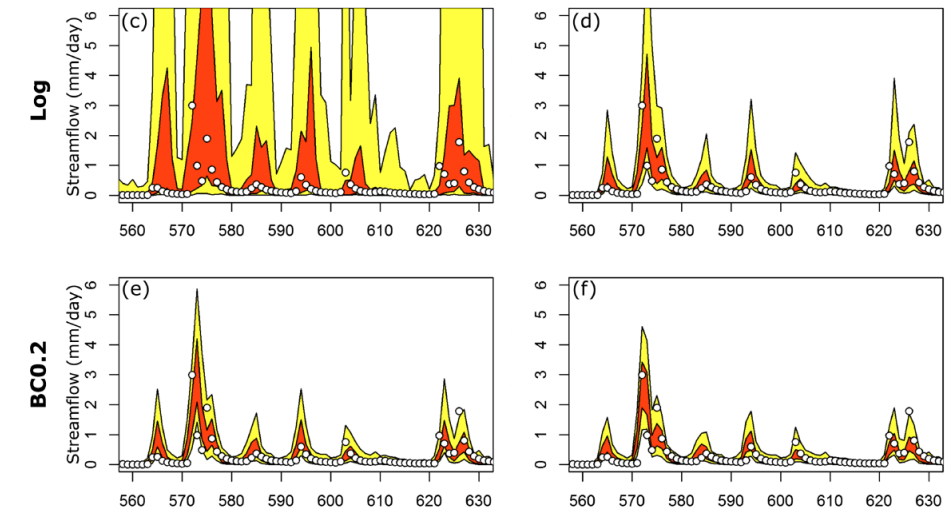
Dmitri Kavetski¹, David McInerney¹, Mark Thyer¹, Julien Lerat², George Kuczera³

¹University of Adelaide, ²Bureau of Meteorology, ³University of Newcastle, Australia

- Ephemeral catchments experience intermittent flows (e.g. frequent days with zero flows)
- Key challenges for uncertainty quantification
 - How do we characterize uncertainty in zero flows?
 - Especially using (transformed) Gaussian error models
 - *Is specialised treatment warranted? When?*
- Residual error models and case study setup
 - Pragmatic approach: censored Gaussian in calibration
 - Explicit approach: censored in calibration + prediction
 - 74 catchments in Australia; GR4J rainfall-runoff model
 - Metrics: Reliability, precision, bias, proportion of zero flows
- Key findings
 - Explicit approach offers clear advantages in mid-ephemeral catchments (5-50% zero flows)
 - No advantage in low ephemeral catchments (<5% zero flows)
 - Poor performance in high ephemeral catchments (>50% zero flows)
 - Box-Cox scheme with $\lambda = 0.2$ is least sensitive to treatment of zero flows
 - Recent work is achieving improvements in high-ephemeral catchments



Catchment 418014 ($\omega_{q=0}=16\%$)



McInerney et al (2019) Benefits of explicit treatment of zero flows in probabilistic hydrological modeling of ephemeral catchments, *Water Resources Research*, 55, doi:10.1029/2018WR024148