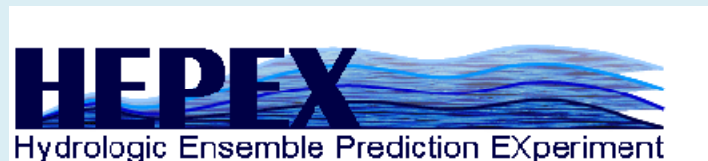


Some Perspectives on the Relationship Between Dependent and Independent Verification Suggested by an Analysis of Ensemble Simulation Results

John Schaake

**HEPEX International Workshop on Post-Processing
and Verification of Hydrological Ensemble
Predictions**

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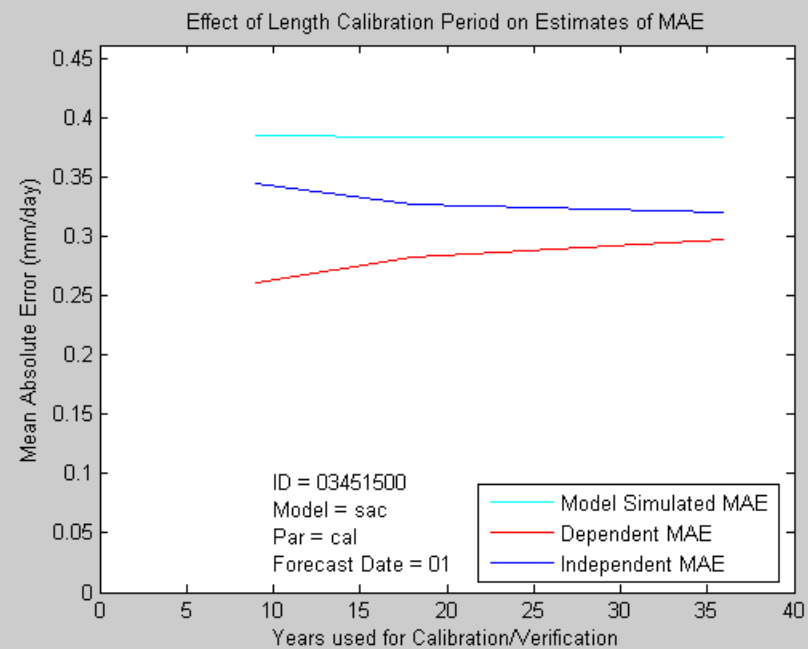
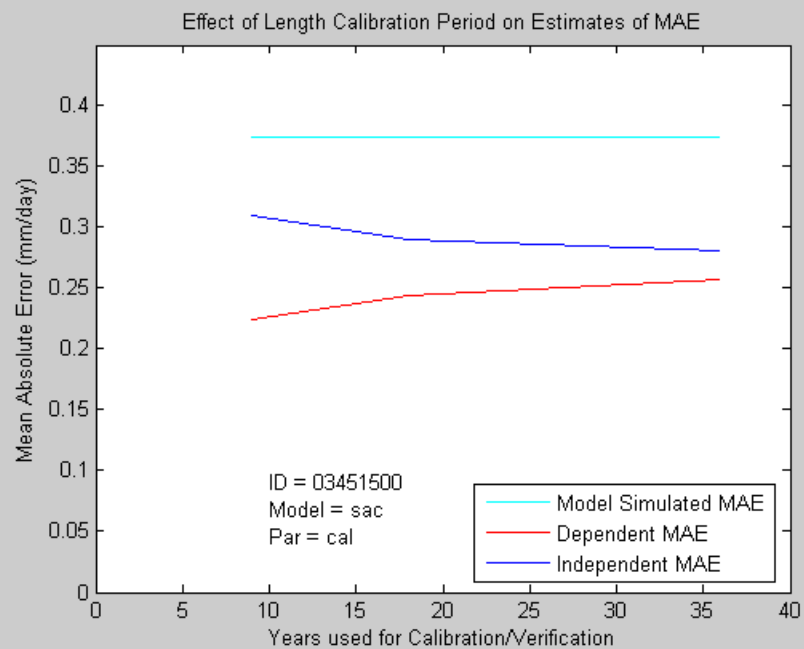


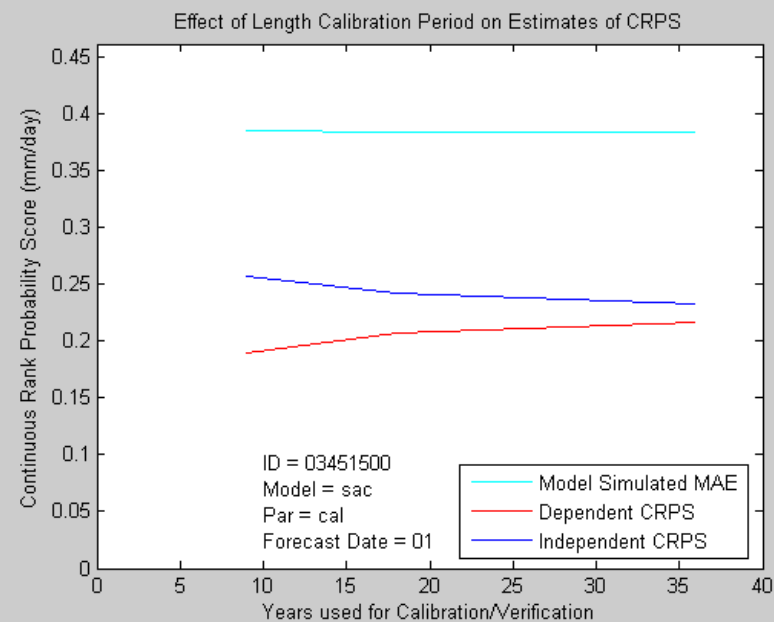
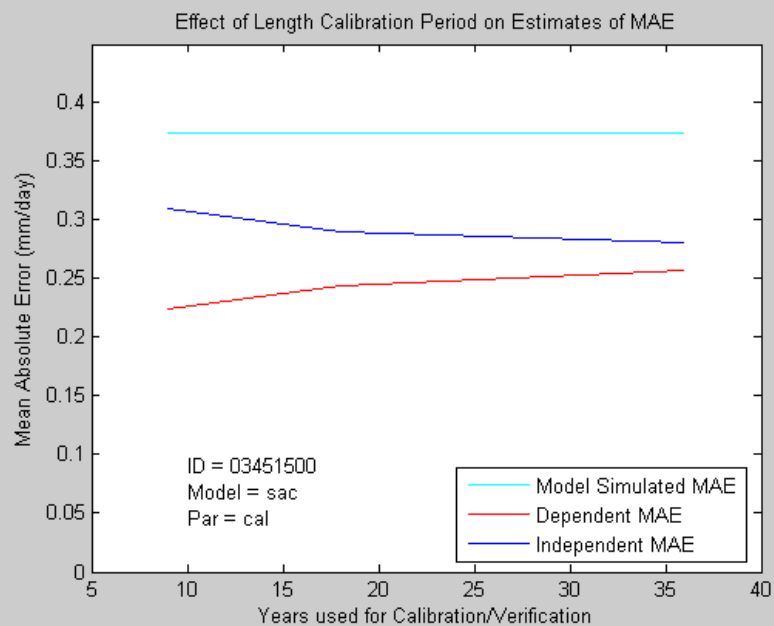
Hypotheses

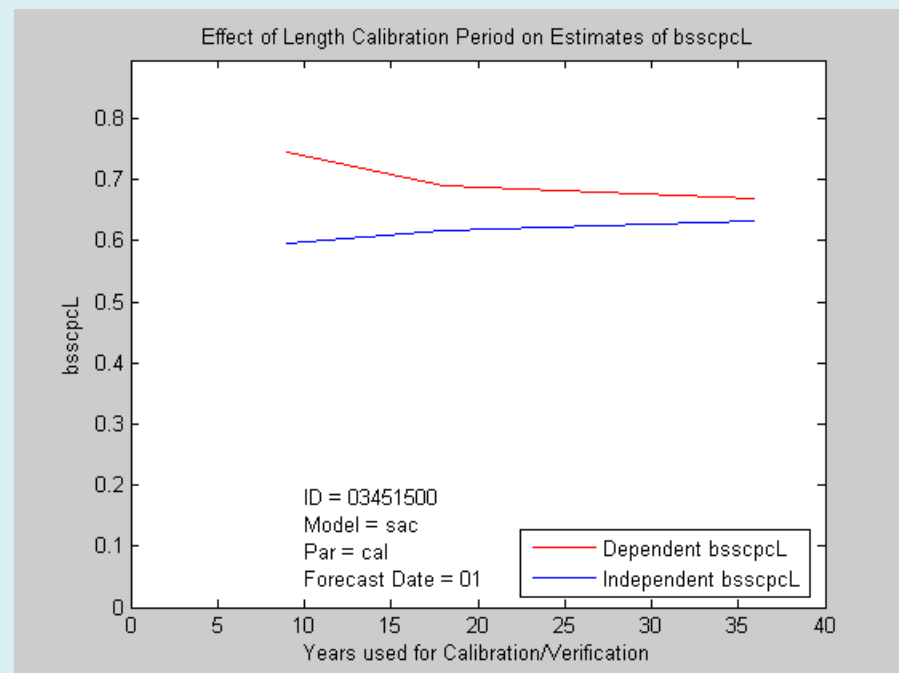
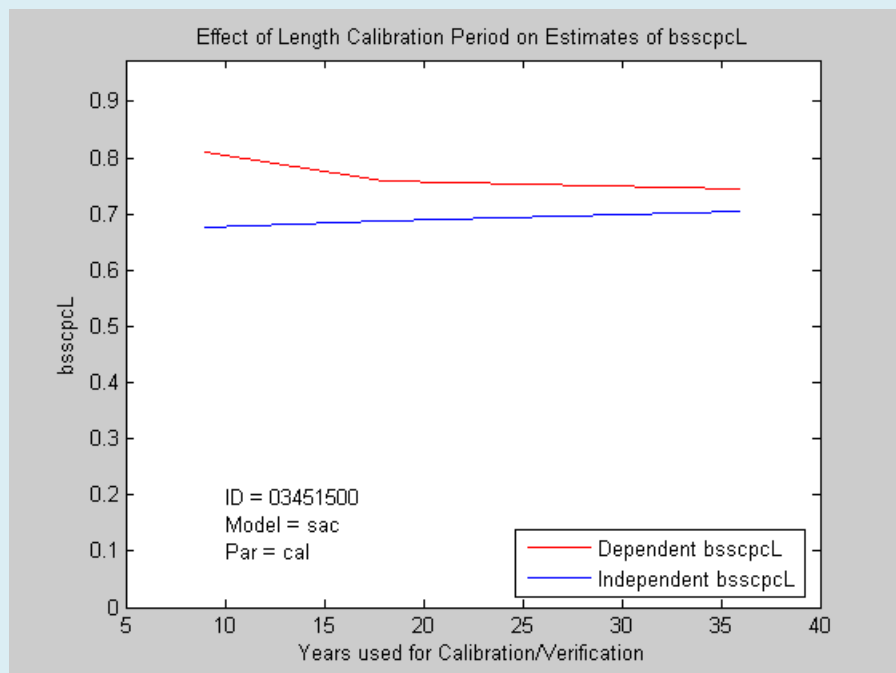
- Dependent verification statistics tend to be too optimistic – calibration tends to fit model to noise
- Independent verification statistics tend to be too pessimistic – statistics include effects of sampling noise
- Effects of noise diminish (in each case) as number of years of data used increases

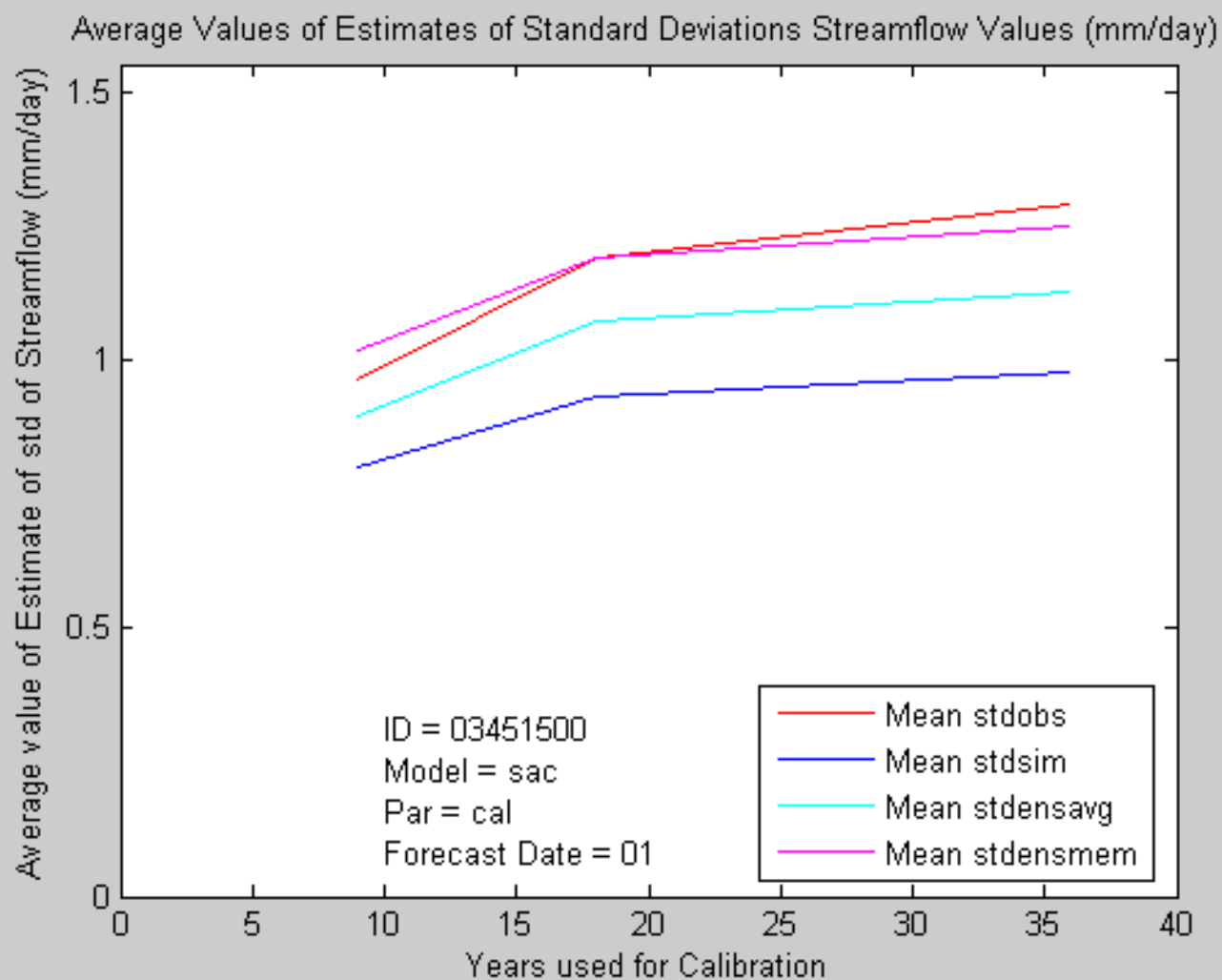
Scenario 1 - Total Number of Potential Verification Periods for Each Basin/Model/Analysis_Option

Calibration Option	# of Dependent Periods	# of Independent Periods
1	1-36yr	0
2	1-18yr	1-18yr,2-9yr
3	1-18yr	1-18yr,2-9yr
4	1-18yr	1-18yr,2-9yr
5	1-18yr	1-18yr,2-9yr
6	4-9yr	2-18yr,3-9yr
7	4-9yr	2-18yr,3-9yr
8	4-9yr	2-18yr,3-9yr
9	4-9yr	2-18yr,3-9yr
Total	21	32









Conclusions

- Both dependent and independent verification statistics are influenced by sampling noise but in different ways but converge as the sample size increases.
- Dependent verification statistics computed with all of the available data may be closer to the “true” statistics than either independent or dependent statistics computed with less than all of the data.
- Did not evaluate “leave-one-out” cross-validation approach