

Interactive comment on “Searching for an optimized single-objective function matching multiple objectives with automatic calibration of hydrological models” by F. Tian et al.

Anonymous Referee #3

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The paper proposes and analyses the use of a single-objective function for calibration of a hydrological model that balances different calibration objectives (high flow, low flow, water balance, etc.). The proposed objective function is a generalisation of the Mean Absolute Error and Mean Squared Error measures and involves selection of a best (optimal) exponent.

The paper shows that by choosing an “optimal exponent” the single-objective optimisation balances well four chosen objective functions. However, the practical applicability of such an approach is highly questionable. How can a best or optimal exponent be determined *á priori*? Although the authors leave this issue for future studies, this is an essential component of the proposed methodology, which must be properly addressed

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before final conclusions can be made.

More importantly, the methodology proposed is not technically sound. Why apply a single-objective function that is tuned using an aggregate of four objective functions? One could rather apply the aggregated single-objective function directly for the optimisation. Using an aggregate of individual objective functions would be more transparent in relation to which hydrograph behaviours are balanced in the optimisation.

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