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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

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.