Interactive comment on "Technical note: Pitfalls in using log-transformed flows within the KGE criterion" *by* Léonard Santos et al.

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We would like to thank Dr J. Ding for reading our manuscript and for his comment.

We had not heard before about this transformation which is, actually, very interesting.

Regarding only Table 1, the inverted square root transformation shows exactly the same pros and con as the inverse transformation. It allows to decrease high-flow weight and increase low-flow weight in the KGE' calculation. A KGE' calculated on this transformation is also dimensionless and shows no issue when the flow average is around 1 (see Fig. 1 of this comment) and, as for inverse transformation, the inverted square root one needs specific attention for zero flows.

However, if we only consider numerical characteristics, the inverted square root trans-

formation presents two advantages compared to invert transformation. The first one is that, even if it is sensitive to the constant added to avoid zero flows, this sensitivity is lower than the inverse transformation's sensitivity (as shown in Fig. 2). The second one is that the inverse transformation can be very extreme and totally erase the weight of high flows. The inverted square root can be seen as "smoother" than inverse.

In a nutshell, we consider the inverted square root transformation as a good compromise to replace logarithm transformation. We are grateful to Dr J. Ding for his suggestion and we propose to add this transformation in Table 1 and to add comments in Sect. 6.2. Obviously, we will acknowledge his contribution in the text.

Léonard Santos, on behalf of co-authors

PS: We only managed to find the Ishihara and Takagi reference but we are interested in reading the two other cited references. We would be grateful if you accept to send us a copy of these two works.
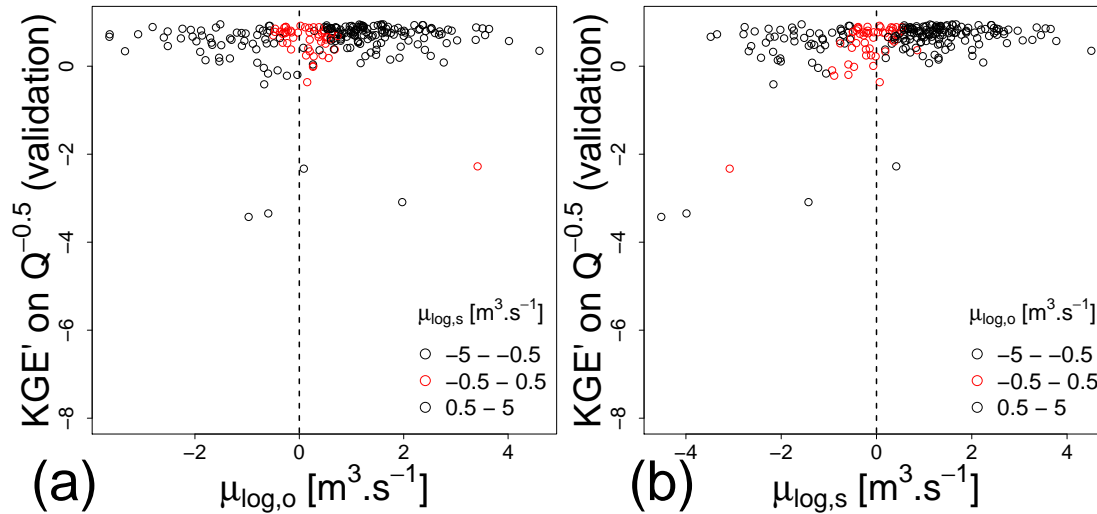

Fig. 1. Values of KGE' on inverse square rooted transformed flows versus the mean of the log-transformed observed (a) and simulated (b) flows. Each dot represents the performance obtained in validation.
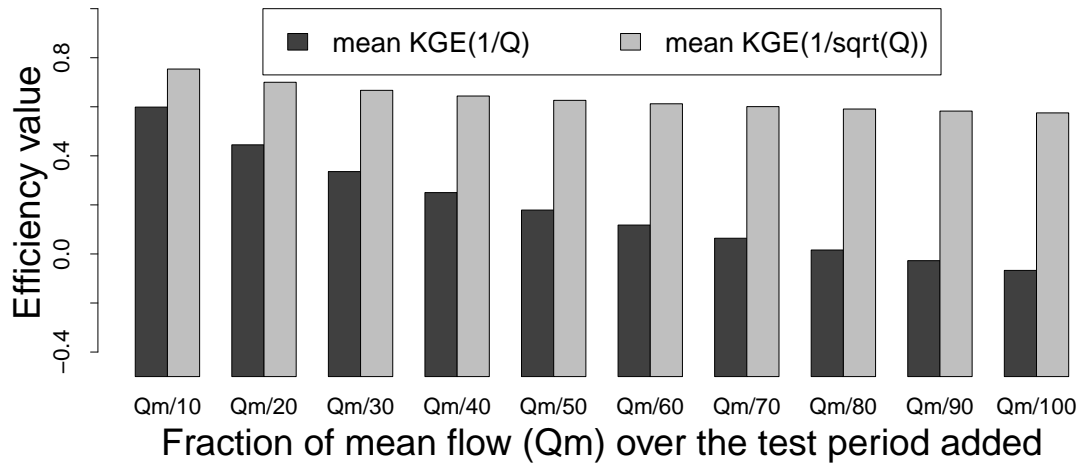
Fig. 2. Sensitivity of KGE' to the fraction of average flows that is added to flows to avoid zero flows in the inverted square root transformation for 240 catchments over the validation period.