

## **Supplemental Material**

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## Robustness of process-based versus data-driven modelling in changing climatic conditions

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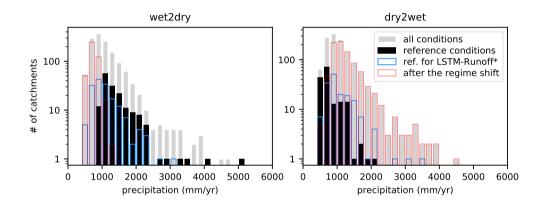
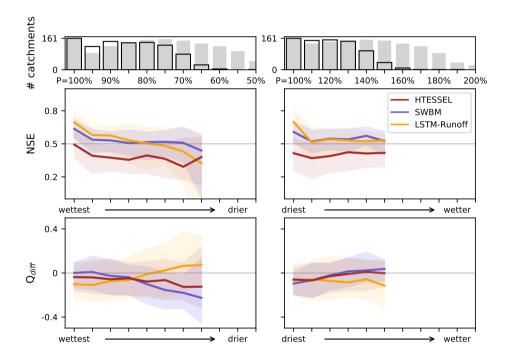


Figure S1. Distribution of annual precipitation used for model training and evaluation for wet2day (left) and dry2wet (right). Grey bars are same with those in Fig. 2 in the main text, but in absolute terms. Black bars show the reference wettest/driest years from each of the 161 catchments, while blue bars indicate randomly selected reference years for training LSTM-Runoff\*. Red bars show evaluation years after the climate regime shift.



**Figure S2.** Major results of Fig. 2 in the main text are revisited using two-years sub-periods for model calibration and evaluation. Open bars in the top panel show the number of catchments that contribute two-years time series for each precipitation bin.

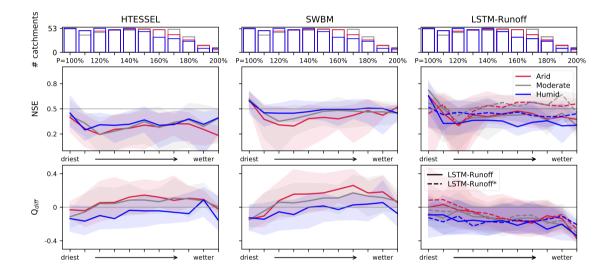


Figure S3. Same as Fig. 3 in the main text, but for dry2wet.

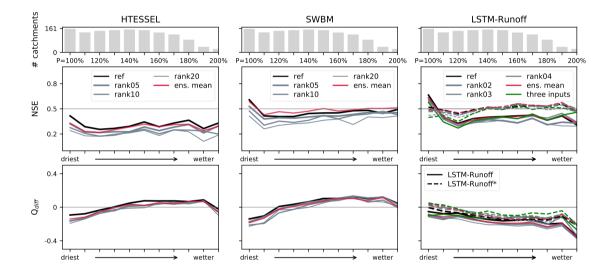


Figure S4. Same as Fig. 5 in the main text, but for dry2wet.