This document provides supplementary material to illustrate the analyses further and add additional details to the discussion of the current research article.

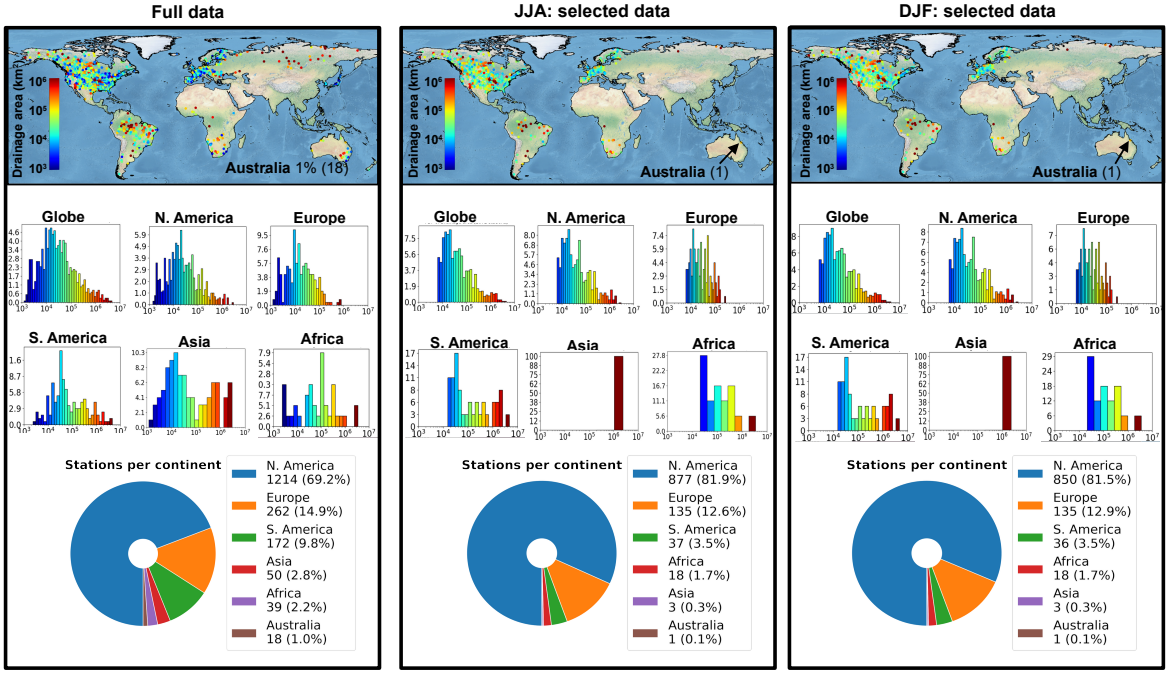

Figure S1. Full global streamflow database and selected database (per season). From the full global database of 1755 streamflow stations, only those with a drainage area higher than 6×10^3 km^2 and less than 25% of missing data (in the corresponding season) are selected. Then, we have 1071 and 1043 stations for JJA and DJF, respectively.

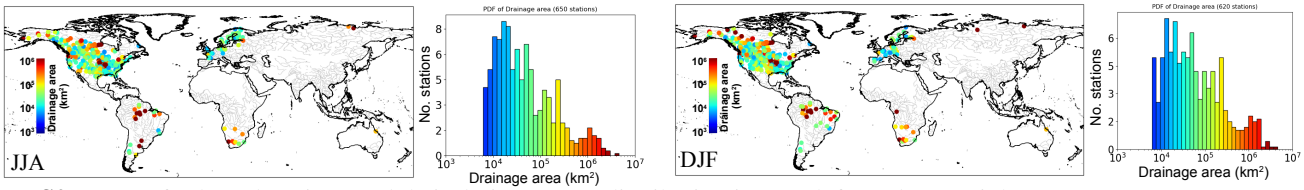

Figure S2. Maps of selected stations and their drainage area distribution in JJA (left) and DJF (right).

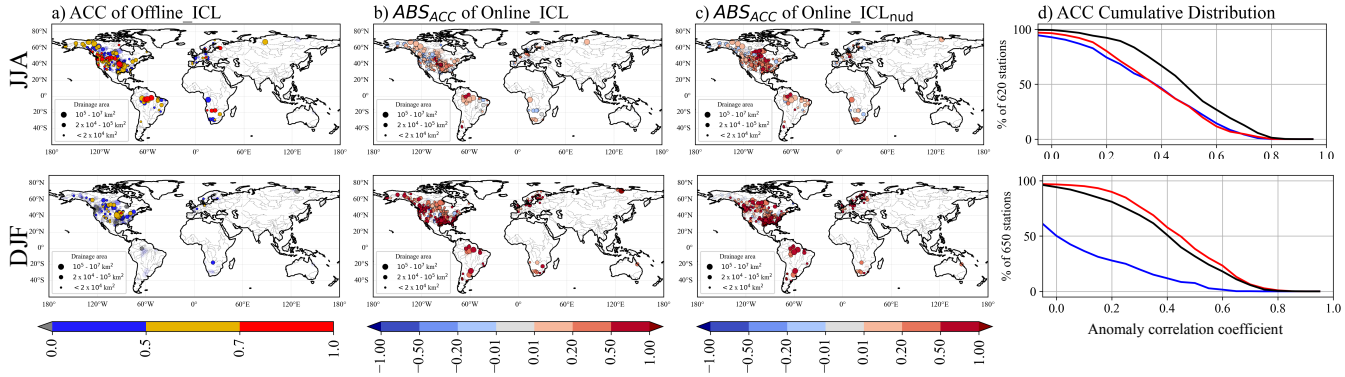

Figure S3. ACCs of bias-corrected streamflow hindcasts computed against observation in JJA (first row) and DJF (second row). ACCs of Offline_ICL benchmark (a) and the corresponding absolute skill score ABS of ACC for the online coupled configurations with conventional initialisation (b) and improved initialisation (c). Cumulative distribution of the anomaly correlation coefficient (d). This figure presents the stations where at least one hindcast provides ACC ≥ 0.6 and no negative lower confidence interval with a 95% of confidence level.