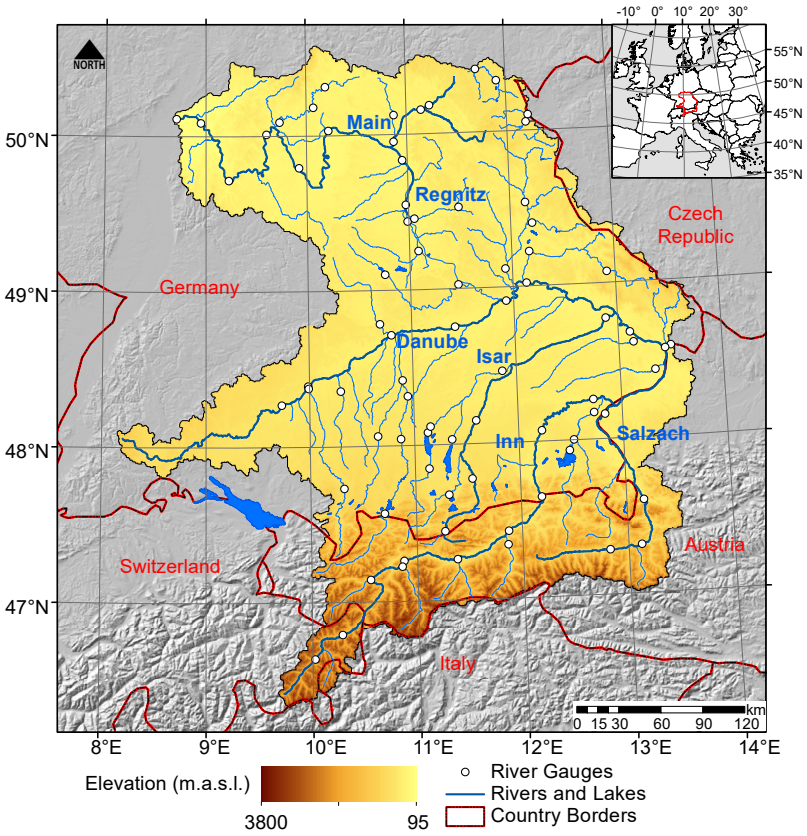
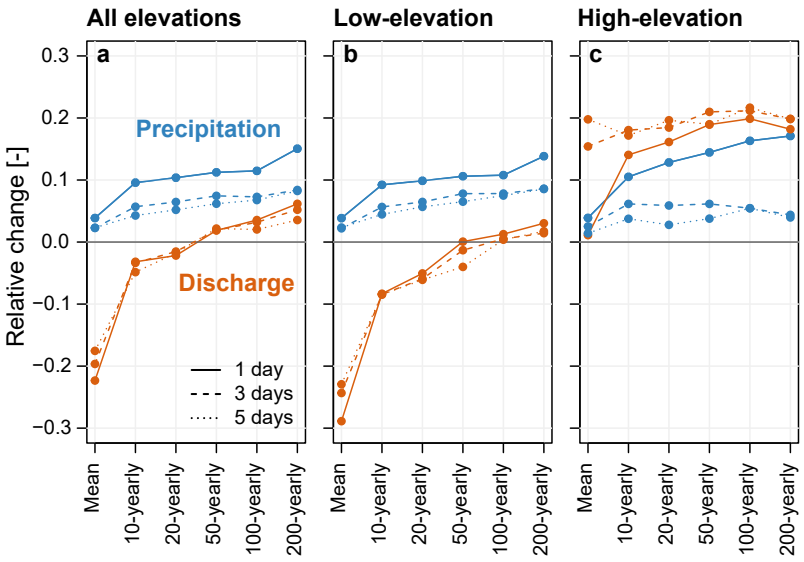
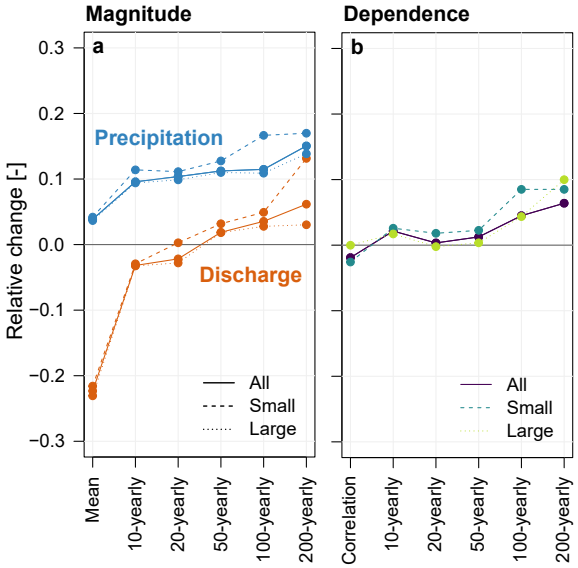
Supplementary Material



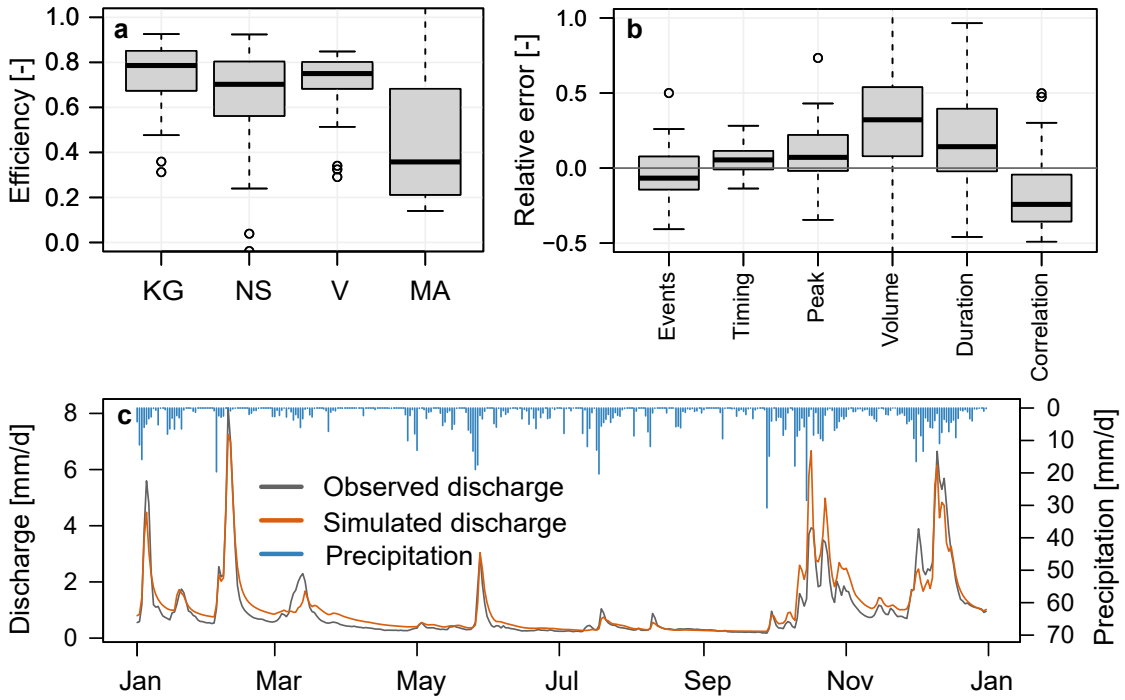
Supplementary Figure 1: **Map of Hydrological Bavaria:** Main, Danube, and the Inn river with their major tributaries and set of 78 catchments with nearly natural flow conditions used for the analysis.



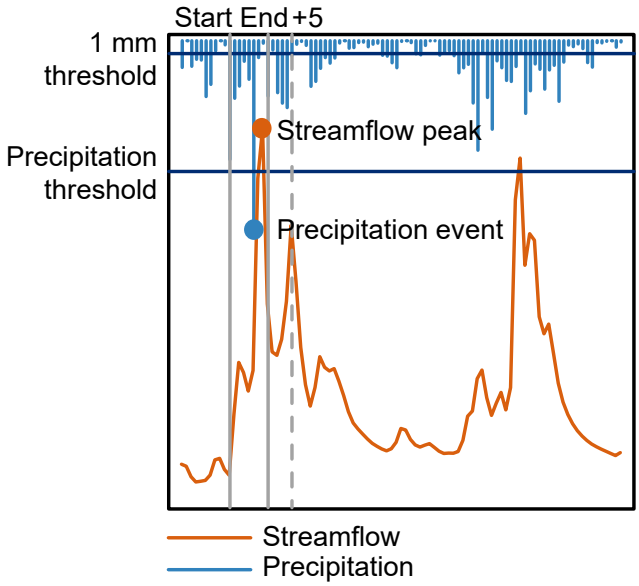
Supplementary Figure 2: **Effect of precipitation aggregation level on future precipitation and discharge changes for different levels of extremeness.** Median relative change [-] in P and Q magnitude for (a) all catchments, (b) low-elevation, and (c) high-elevation catchments for events extracted using 1-day, 3-day, and 5-day precipitation sums and for mean and progressively more extreme events (those with 10, 20, 50, 100, and 200-year return intervals, respectively). Relative changes are computed by comparing event characteristics of a future period (2060–2099) to characteristics of a historical period (1961–2000).



Supplementary Figure 3: **Effect of catchment size on future precipitation and discharge changes and their relationship for different levels of extremeness.** Median relative change [-] in (a) P and Q magnitude and (b) $P-Q$ relationship for catchments of all sizes and for small ($<$ 1000 km^2) and large ($>$ 1000 km^2) catchments across all elevations for mean and progressively more extreme events (those with 10, 20, 50, 100, and 200-year return intervals, respectively).



Supplementary Figure 4: **Hydrological model evaluation across 78 catchments in Hydrological Bavaria using observed precipitation.** (a) Evaluation for general efficiency metrics: Kling–Gupta efficiency (KG), Nash–Sutcliffe efficiency (NS), volumetric efficiency (V), and mean absolute error (MA); (b) Evaluation for flood-specific efficiency metrics: number of events, timing, peak discharge magnitude, flood volume, duration, and $P - Q$ dependence. (c) Observed vs. simulated discharge time series for an example low-elevation catchment over one year. Meaning of boxplot elements: central line: median, box limits: upper and lower quartiles, upper whisker: min(max(x), $Q_3 + 1.5 * IQR$), lower whisker: max(min(x), $Q_1 - 1.5 * IQR$), outliers displayed.



Supplementary Figure 5: **Illustration of event definition procedure**: Identify precipitation threshold exceedances ($>$ 99th percentile of daily streamflow). Define start (day when precipitation exceeds 1 mm prior to the first threshold exceedance) and end (day when precipitation falls below 1 mm after the final threshold exceedance) of precipitation events. Identify the corresponding streamflow peaks (mm d^{-1}) within a time window from the start of the precipitation event to 5 days after the end of the precipitation event.