Supplement of

To what extent does river routing matter in hydrological modeling?

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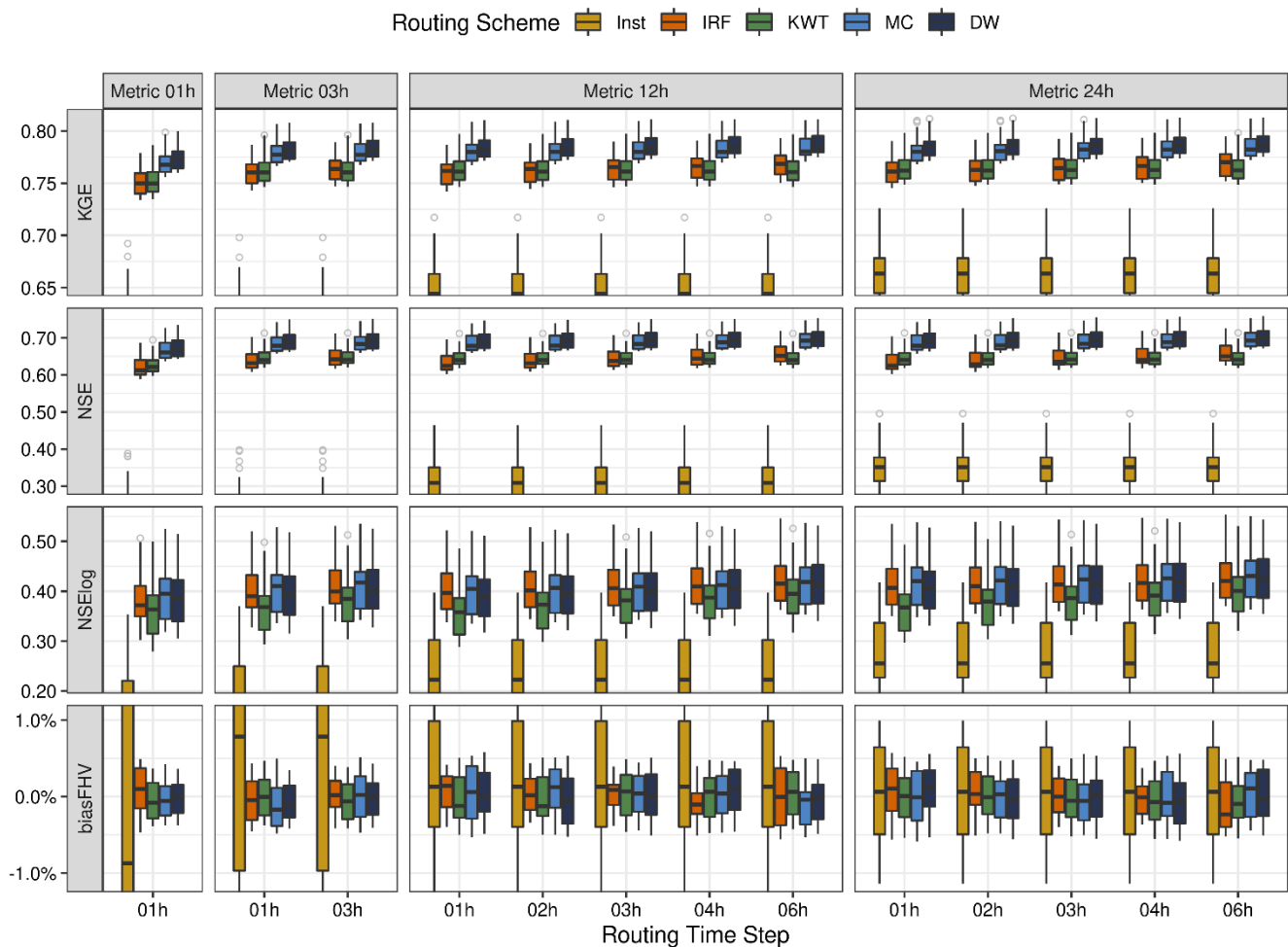
Figure S1. Impact of routing scheme and routing time step on performance metrics (rows) for the period April/2008-March/2012 at Cautín at Cajón, computed with different discharge temporal resolutions (columns) and the 1% best parameter sets among those obtained through Latin Hypercube Sampling (see text for details). The results are presented for instantaneous runoff (Inst), Impulse Response Function (IRF), Kinematic Wave Tracking (KWT), Muskingum-Cunge (MC) and Diffusive Wave (DW).
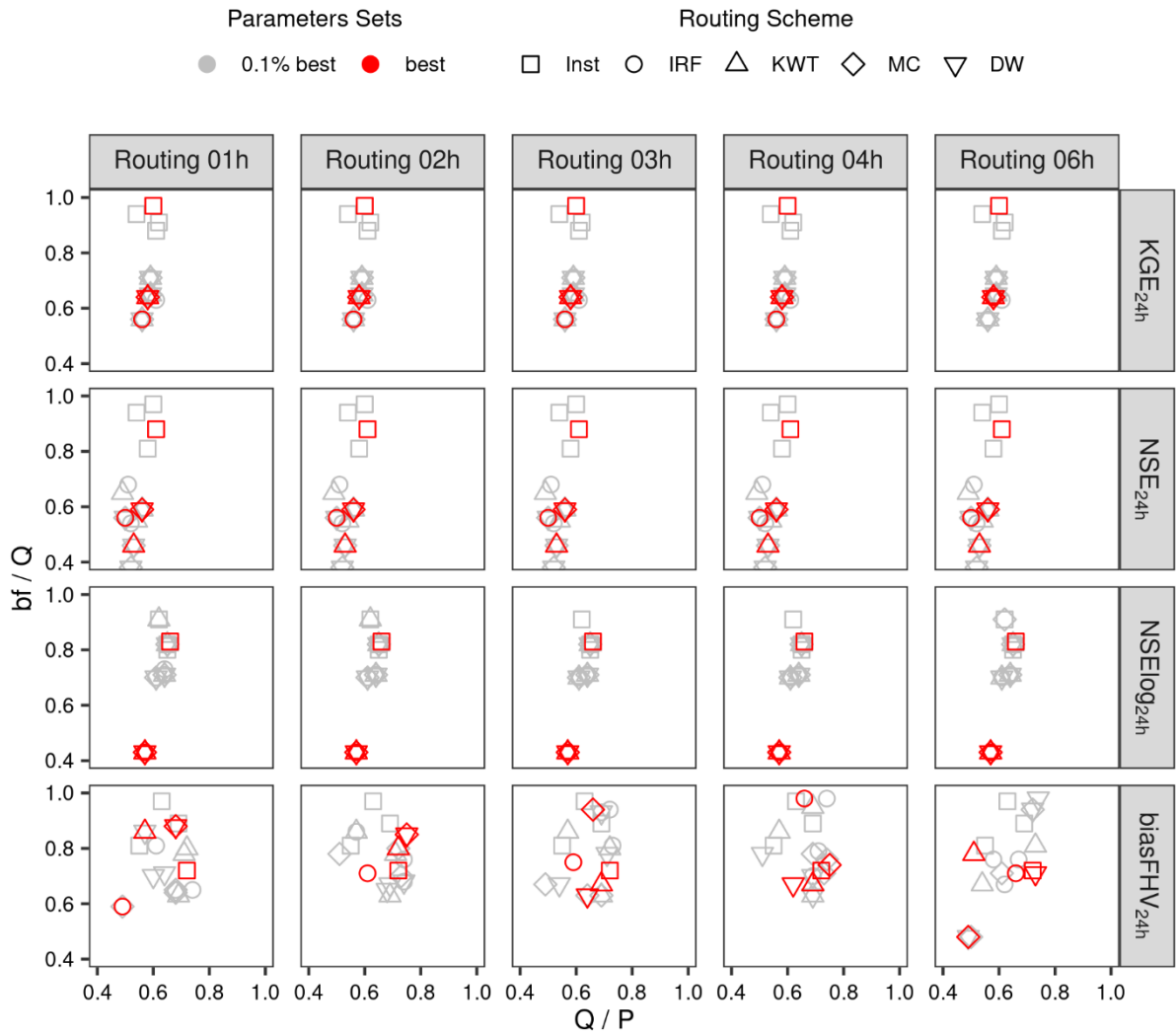
Figure S2. Effects of performance metric (rows), routing time step (columns) and routing scheme on simulated mean annual water balance (characterized with the annual runoff ratio, x-axis) and the baseflow ratio (y-axis) obtained for the 0.1% best parameter sets at Cautín at Cajón (period April/2008-March/2012). The results are presented for instantaneous runoff (Inst), Impulse Response Function (IRF), Kinematic Wave Tracking (KWT), Muskingum-Cunge (MC) and Diffusive Wave (DW). In each panel, the results obtained with the parameter set (among the 3500 samples) that maximizes each metric are displayed in red, the results from a small ensemble (n = 4) with the best 0.1% VIC parameter sets are displayed in grey.
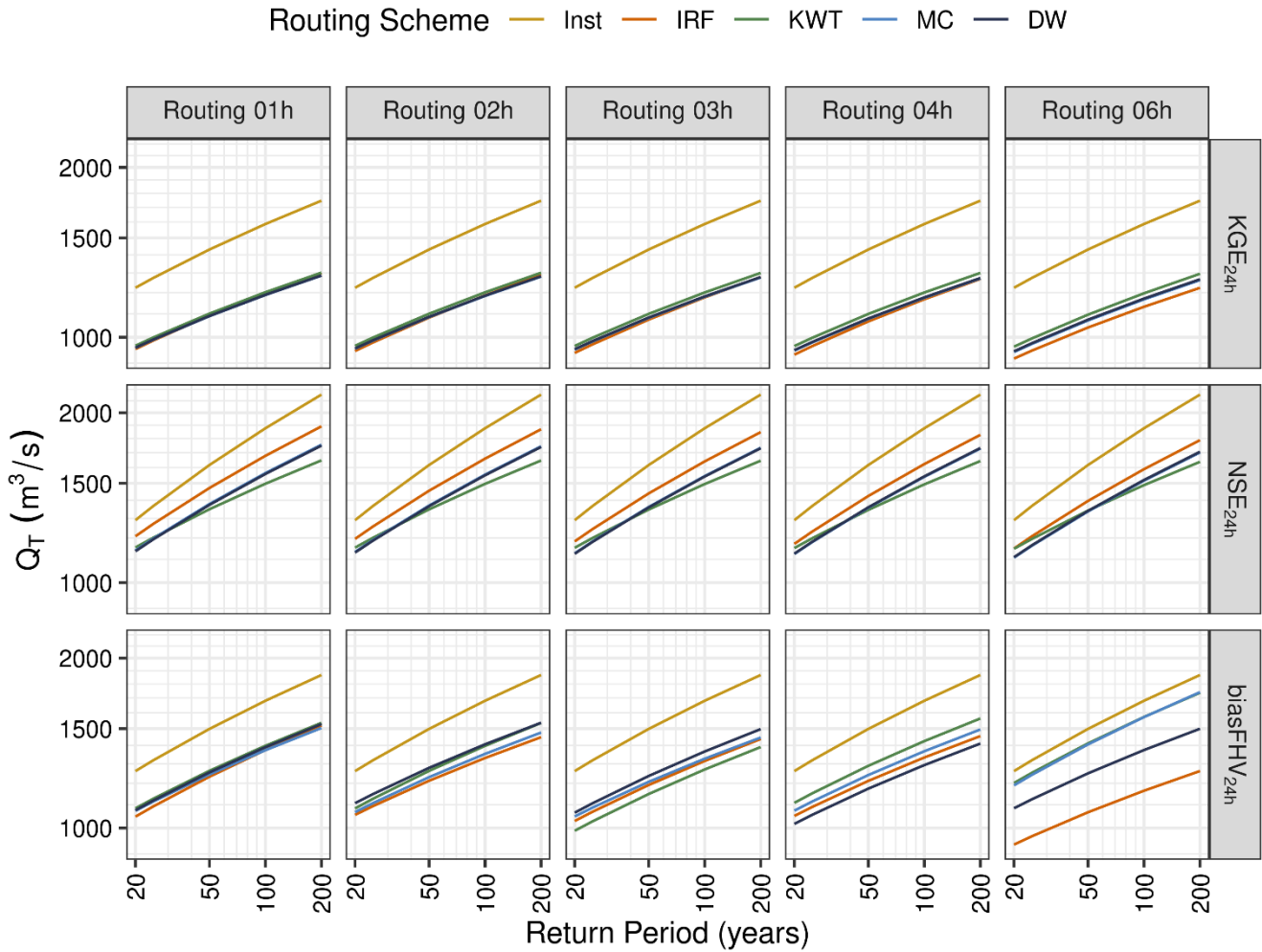
Figure S3. Frequency curves for annual maximum daily flows (y-axis) in Cautín at Cajón, derived from numerical simulations conducted with different routing schemes, routing time steps (columns) and performance metrics (rows). All frequency curves are computed from annual time series of n = 35 annual maximum daily flows (April/1985 – March/2020) using a Log-Normal density function. The results are presented for instantaneous runoff (Inst), Impulse Response Function (IRF), Kinematic Wave Tracking (KWT), Muskingum-Cunge (MC) and Diffusive Wave (DW).
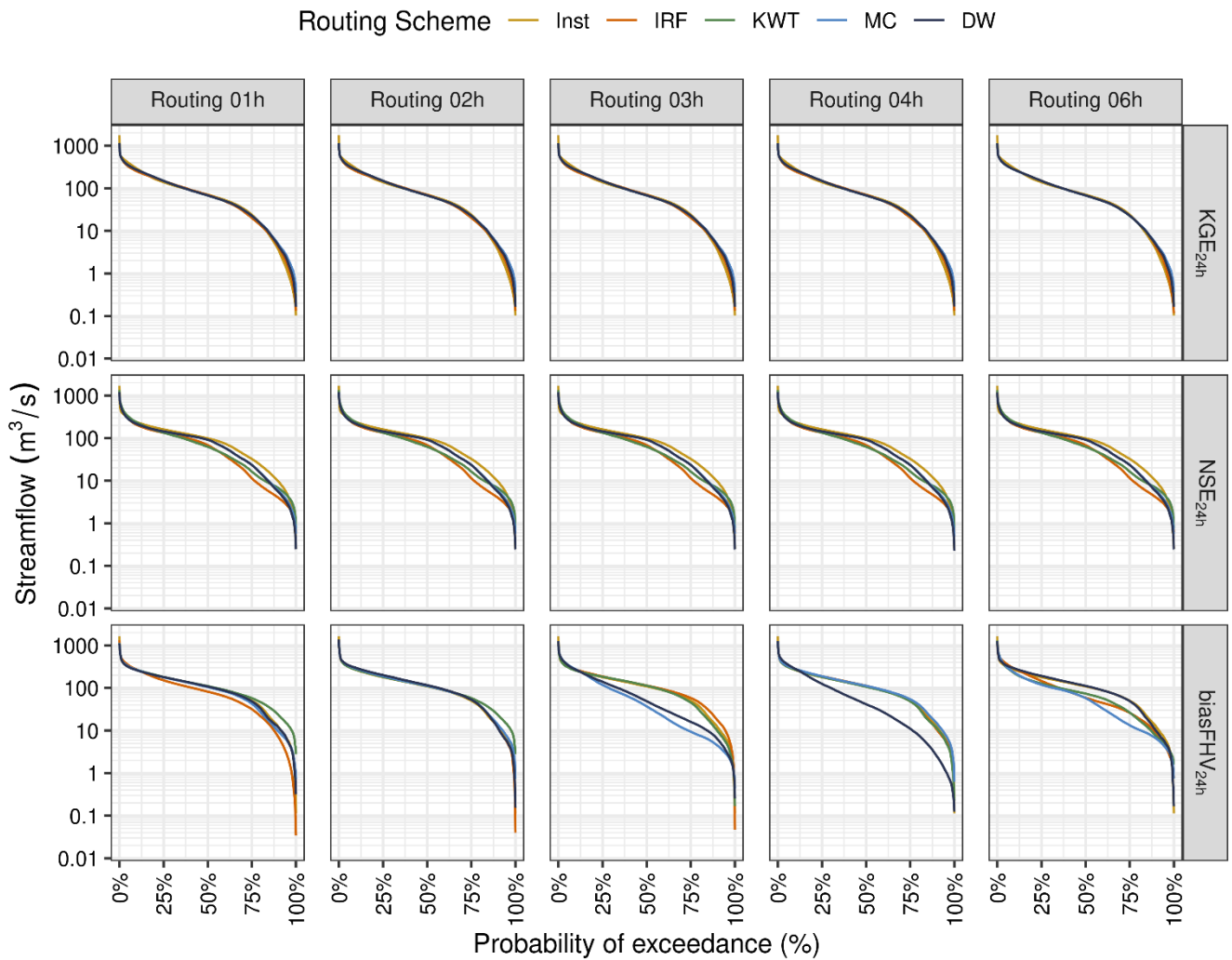
Figure S4. Mean daily flow duration curves for the period April/1985 – March/2020 in Cautín at Cajón derived from different routing schemes, routing time steps (columns) and performance metrics (rows). The results are presented for daily instantaneous runoff (Inst), Impulse Response Function (IRF), Kinematic Wave Tracking (KWT), Muskingum-Cunge (MC) and Diffusive Wave (DW) routing schemes.