SUPPLEMENTARY MATERIAL

This file contains supporting online material that relates to the following publication:

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Hydrodynamic and Primary Production Effects on Seasonal DO Variability in the Danube River

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We already submitted our data sets from this manuscript to PANGAEA (http://www.pangaea.de) in March 2025. Until its publication all data are available upon request.
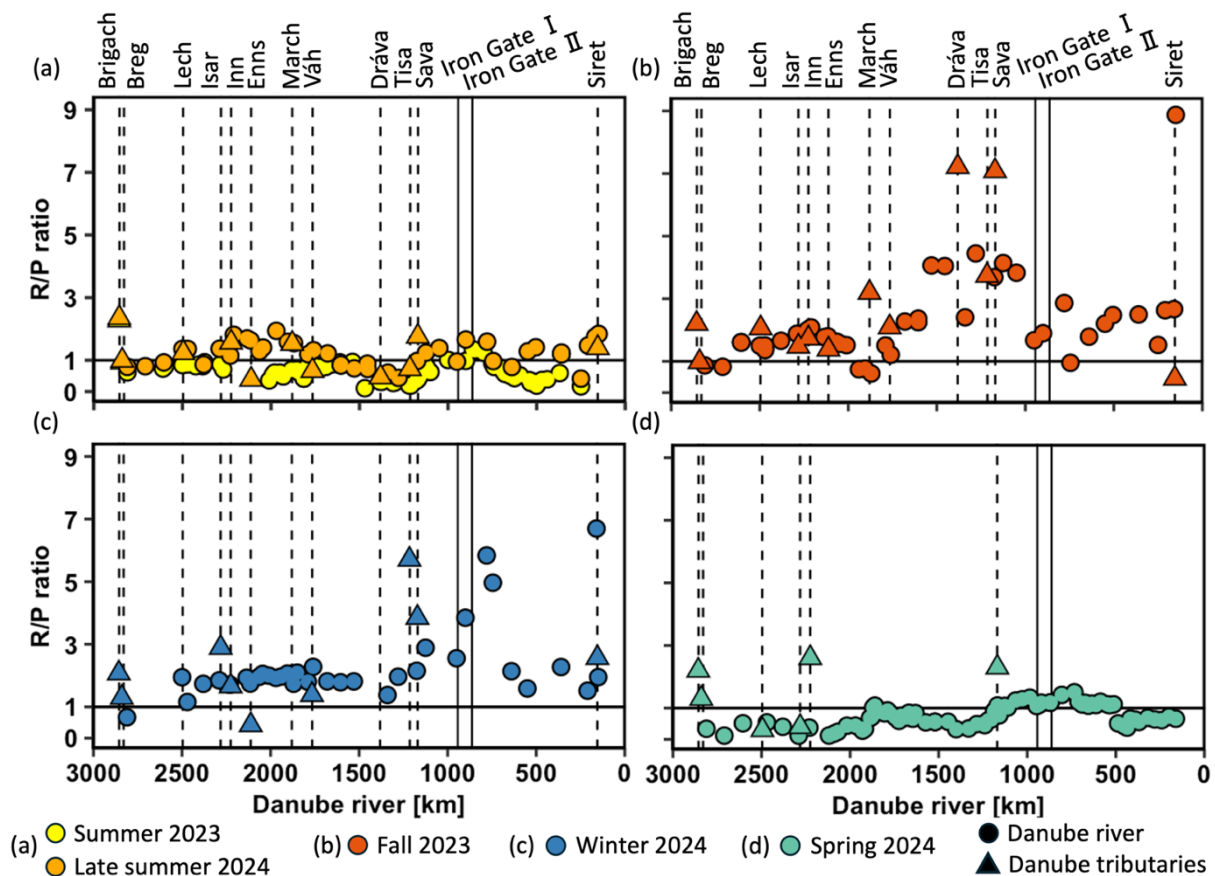
Figure S1: Respiration/photosynthesis (R/P) ratios in the Danube River at various distances from the river mouth. The vertical line at R/P = 1 denotes the transition between photosynthesis and respiration. R/P values <1 indicate photosynthesis and R/P >1 respiration. Triangles denote tributary samples, and dotted lines indicate the river km where tributaries enter. Vertical solid lines represent Iron Gate I and II dams.
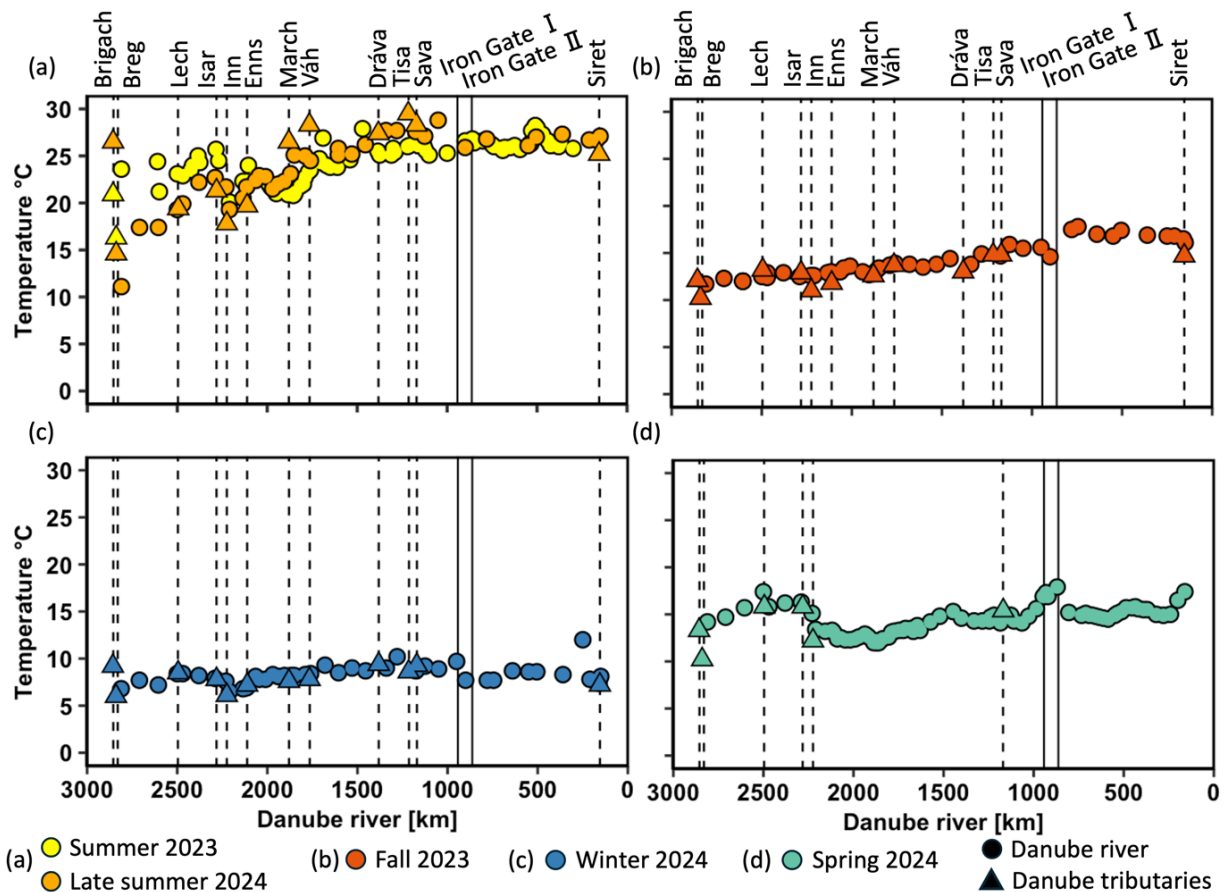
Figure S2: Temperature (°C) in the Danube River at various distances from the river mouth. Standard error bars are within the symbol size. Triangles denote tributary samples, and dotted lines indicate the river km where tributaries enter. Vertical solid lines represent Iron Gate I and II dams.
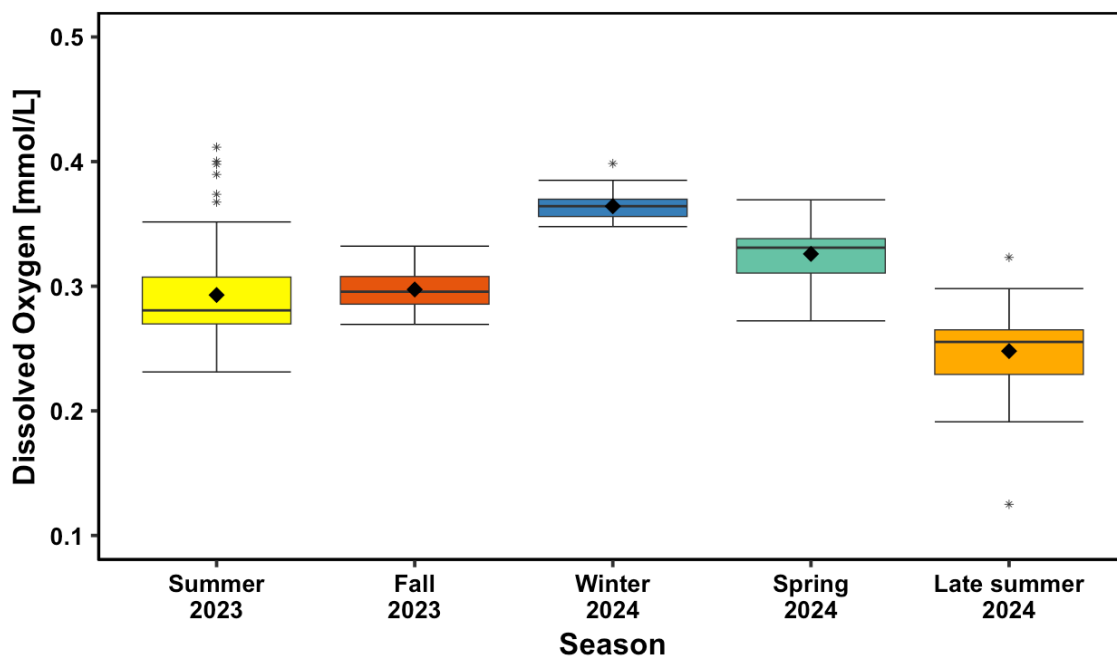
Figure S3: Boxplots of dissolved oxygen (DO) concentration (mmol/L) during summer, fall, winter, spring, and late summer in 2023 and 2024. Each data point represents all sampling values along the Danube for a given season. The lower and upper quartiles correspond to the 25th and 75th percentiles, with the median in between. The whiskers extend to the 10th and 90th percentiles. Bars represent 10th and 90th percentiles.
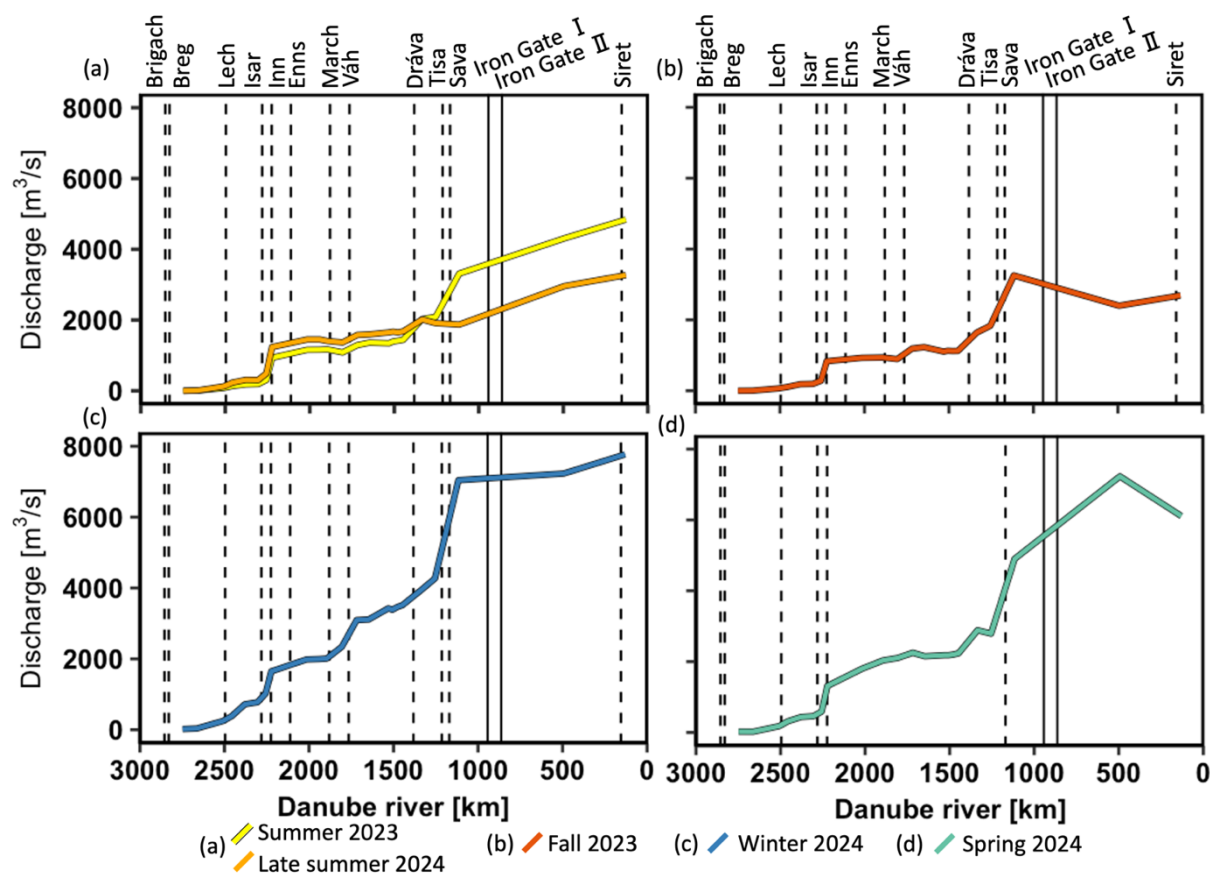
Figure S4: Discharge data (m³/s) in the Danube River at various distances from the river mouth. Discharge data provided by https://www.danubehis.org (last access: 11 March 2025; ICPDR, 2024). Note that the displayed values represent the discharge at the hydropower station on the sampling day, serving as an approximation to visualize the discharge conditions during each sampling season. Dotted lines indicate the river km where tributaries enter, and vertical solid lines represent Iron Gate I and II dams.
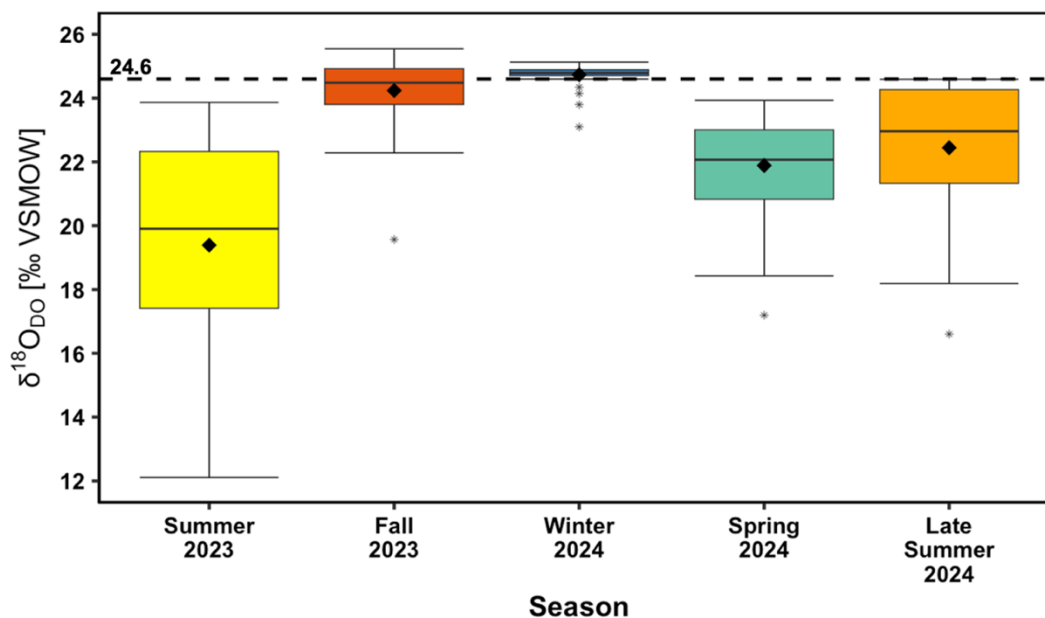
Figure S5: Boxplots of stable oxygen isotopes values (δ¹⁸O_DO) during summer, fall, winter, spring, and late summer in 2023 and 2024. Each data point represents all sampling values along the Danube for a given season. The lower and upper quartiles correspond to the 25th and 75th percentiles, with the median in between. The whiskers extend to the 10th and 90th percentiles.
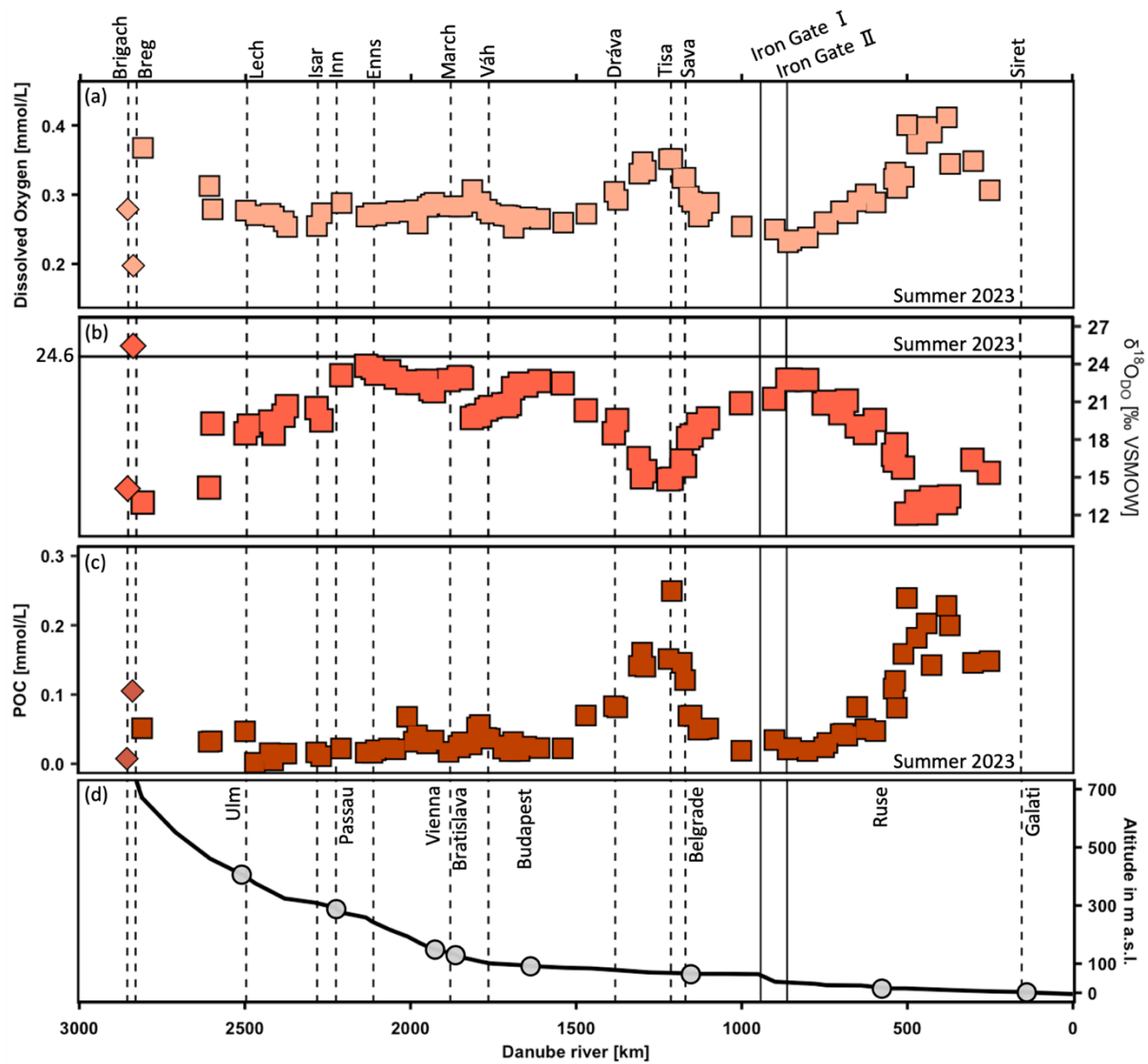
Figure S6: Measurements along the Danube River at various distances from the River mouth during Summer 2023: (a) Dissolved oxygen concentration (mmol/L), (b) Stable isotopes of dissolved oxygen ($\delta^{18}O_{DO}$), (c) Particulate organic carbon (POC) concentration (mmol/L) and (d) Altitude (meters above sea level). Squares represent Danube River samples, diamonds indicate tributary samples, and grey dots mark main cities along the river.
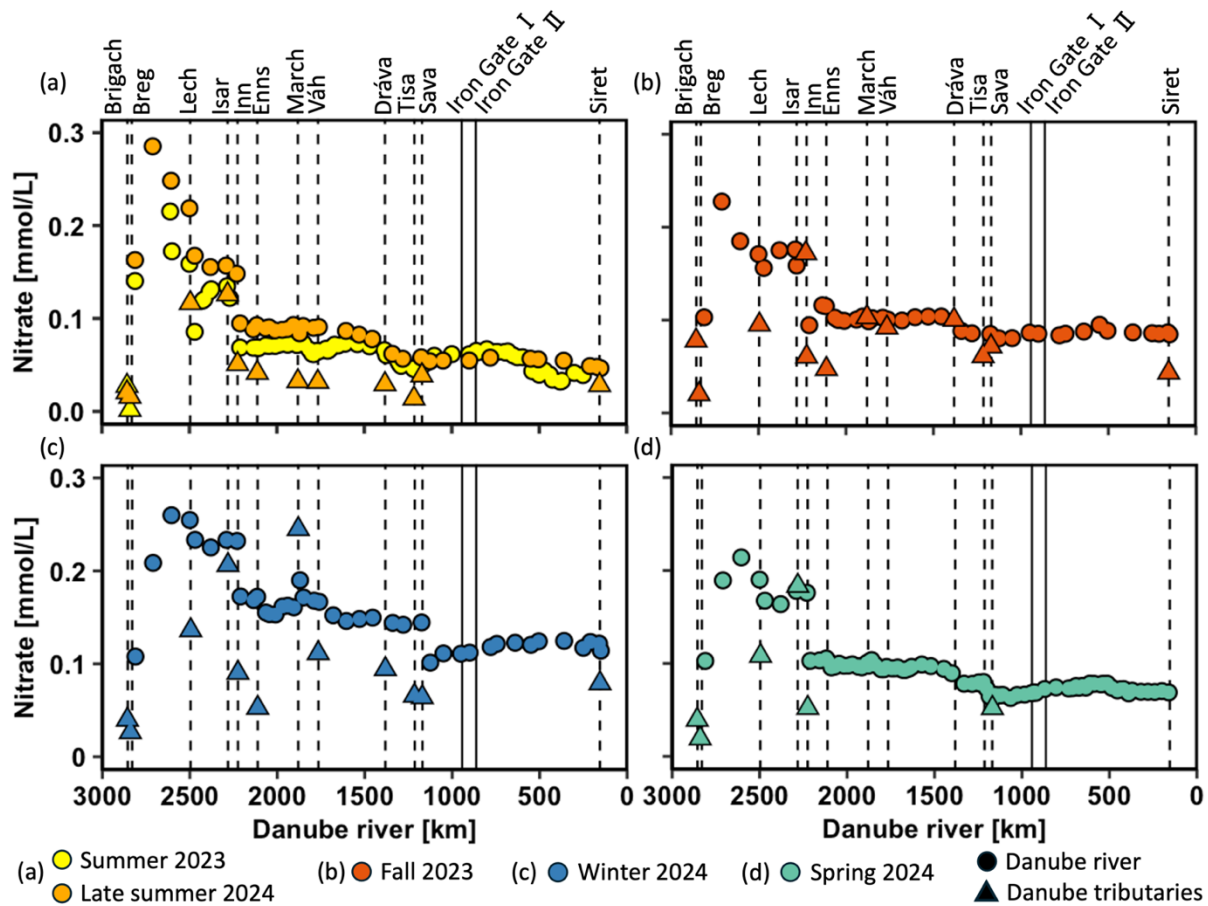
Figure S7: Nitrate concentrations (mmol/L) in the Danube River at various distances from the river mouth. Standard error bars are within the symbol size. Triangles denote tributary samples, and dotted lines indicate the river km where tributaries enter. Vertical solid lines represent Iron Gate I and II dams.
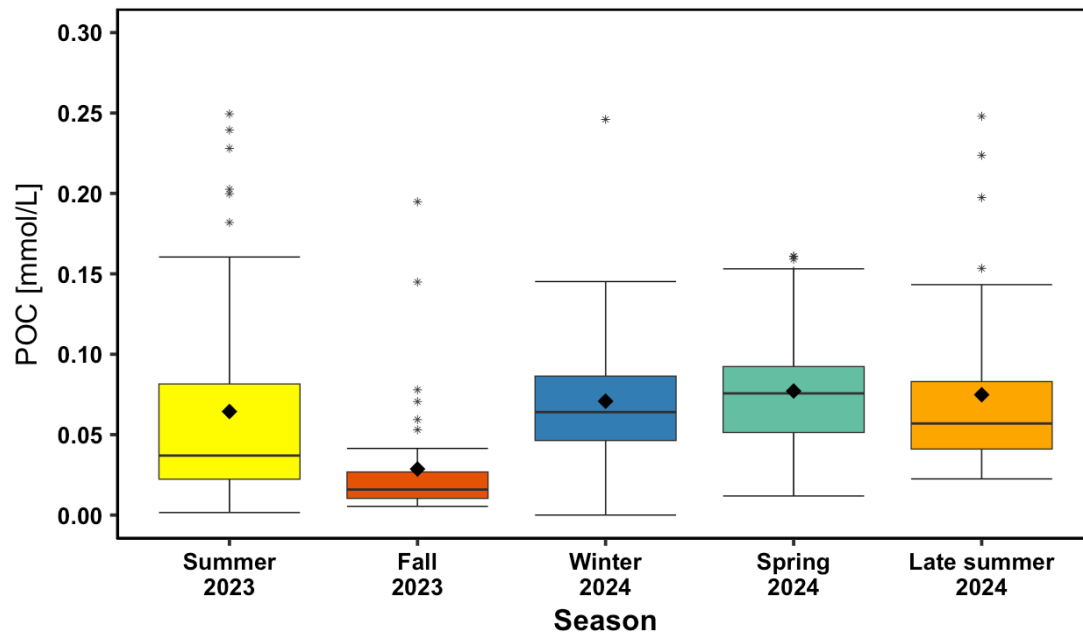
Figure S8: Boxplots of particulate organic carbon (POC) concentration (mmol/L) during summer, fall, winter, spring, and late summer in 2023 and 2024. Each data point represents all sampling values along the Danube for a given season. The lower and upper quartiles correspond to the 25th and 75th percentiles, with the median in between. The whiskers extend to the 10th and 90th percentiles.