



Supplement of

CAMELS-Chem: augmenting CAMELS (Catchment Attributes and Meteorology for Large-sample Studies) with atmospheric and stream water chemistry data

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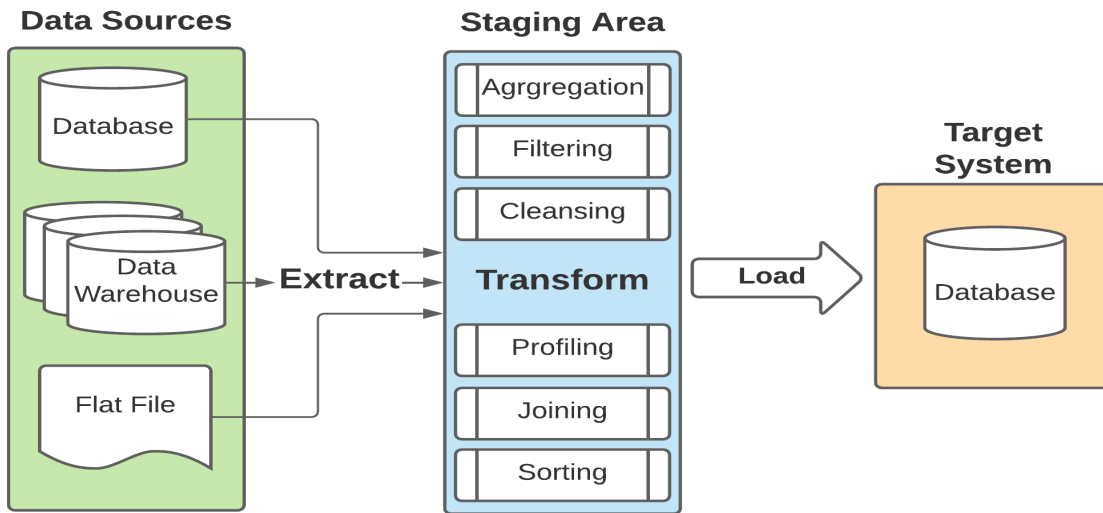
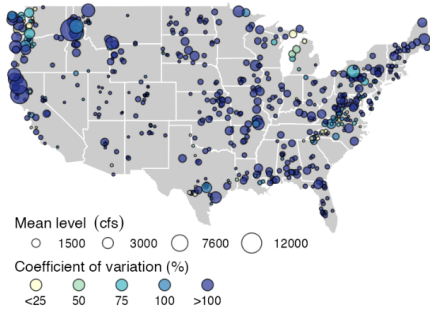
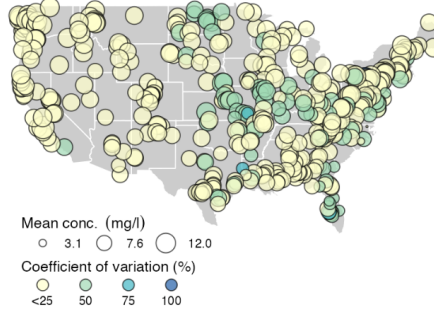


Figure S1: ETL process flow from source system to the data transformers and loading into target system.

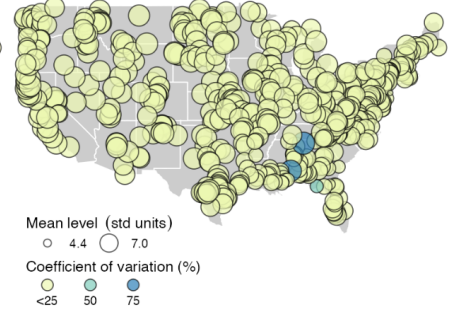
(a) Discharge ($n = 564$)



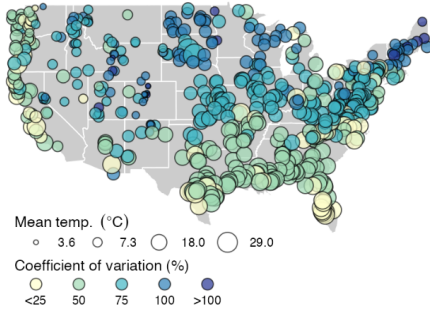
(b) DO ($n = 436$)



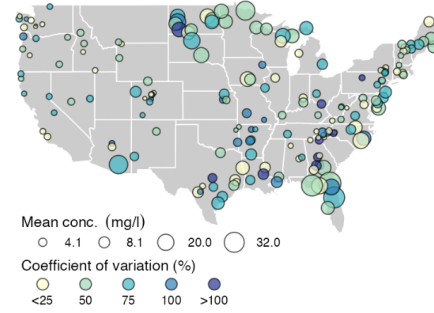
(c) pH ($n = 533$)



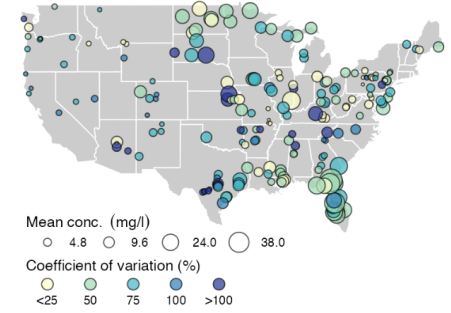
(d) Temperature ($n = 577$)



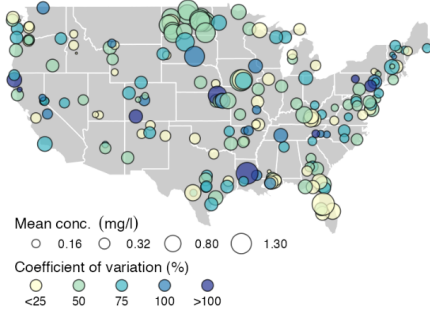
(e) DOC ($n = 185$)



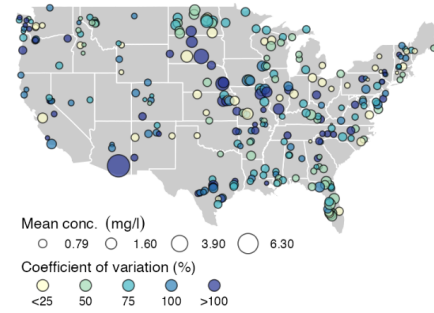
(f) TOC ($n = 198$)



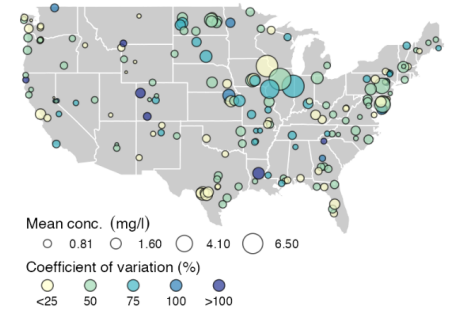
(g) DON ($n = 192$)



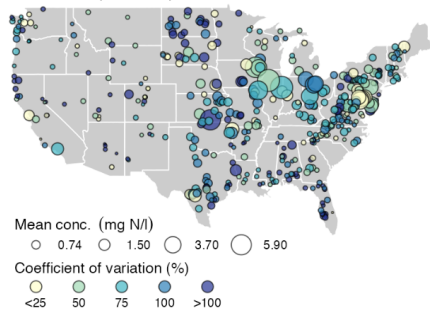
(h) TON ($n = 288$)



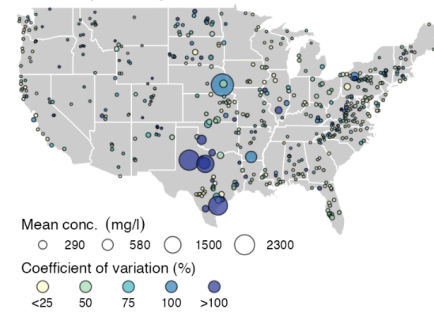
(i) TDN ($n = 183$)



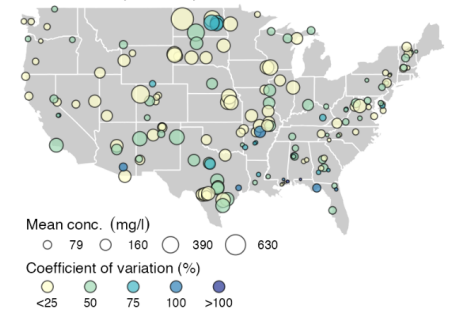
(j) NO₃ ($n = 444$)



(k) Cl ($n = 519$)



(l) HCO₃ ($n = 170$)



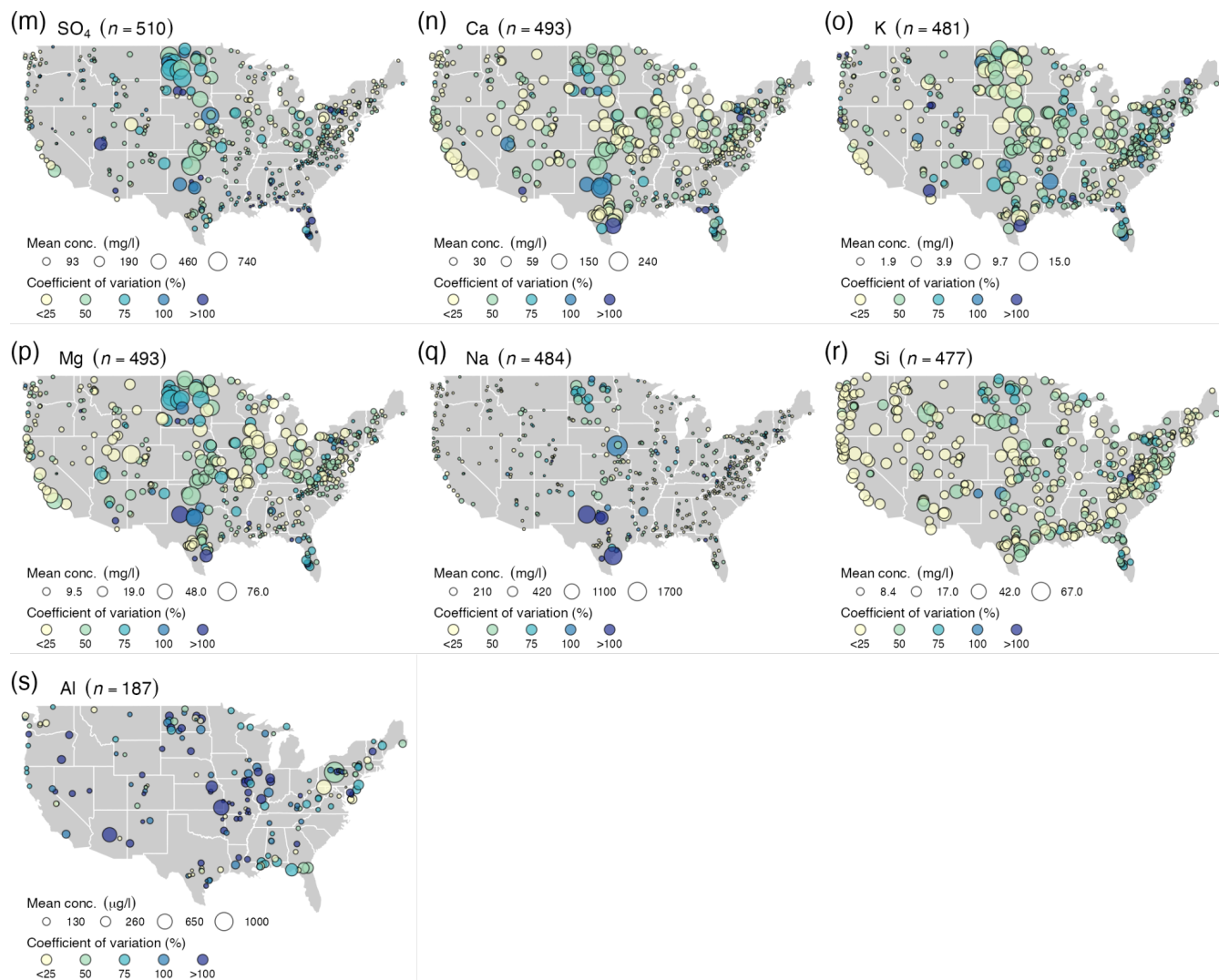


Figure S2: The mean concentration (symbol size) and coefficient of variation (in %, symbol color) for the stream data set since the beginning of the record for (a) discharge, (b) dissolved oxygen (DO), (c) pH (field), (d) temperature, (e) dissolved organic carbon (DOC), (f) total organic carbon (TOC), (g) dissolved organic nitrogen (DON), (h) total organic nitrogen (TON), (i) total dissolved nitrogen (TDN), (j) nitrate (NO_3), (k) Cl, (l) bicarbonate (HCO_3), (m) sulfate (SO_4), (n) Ca, (o) K, (p) Mg, (q) Na, (r) Si, and (s) Al. The inset histogram shows the number of samples by 20-year periods.

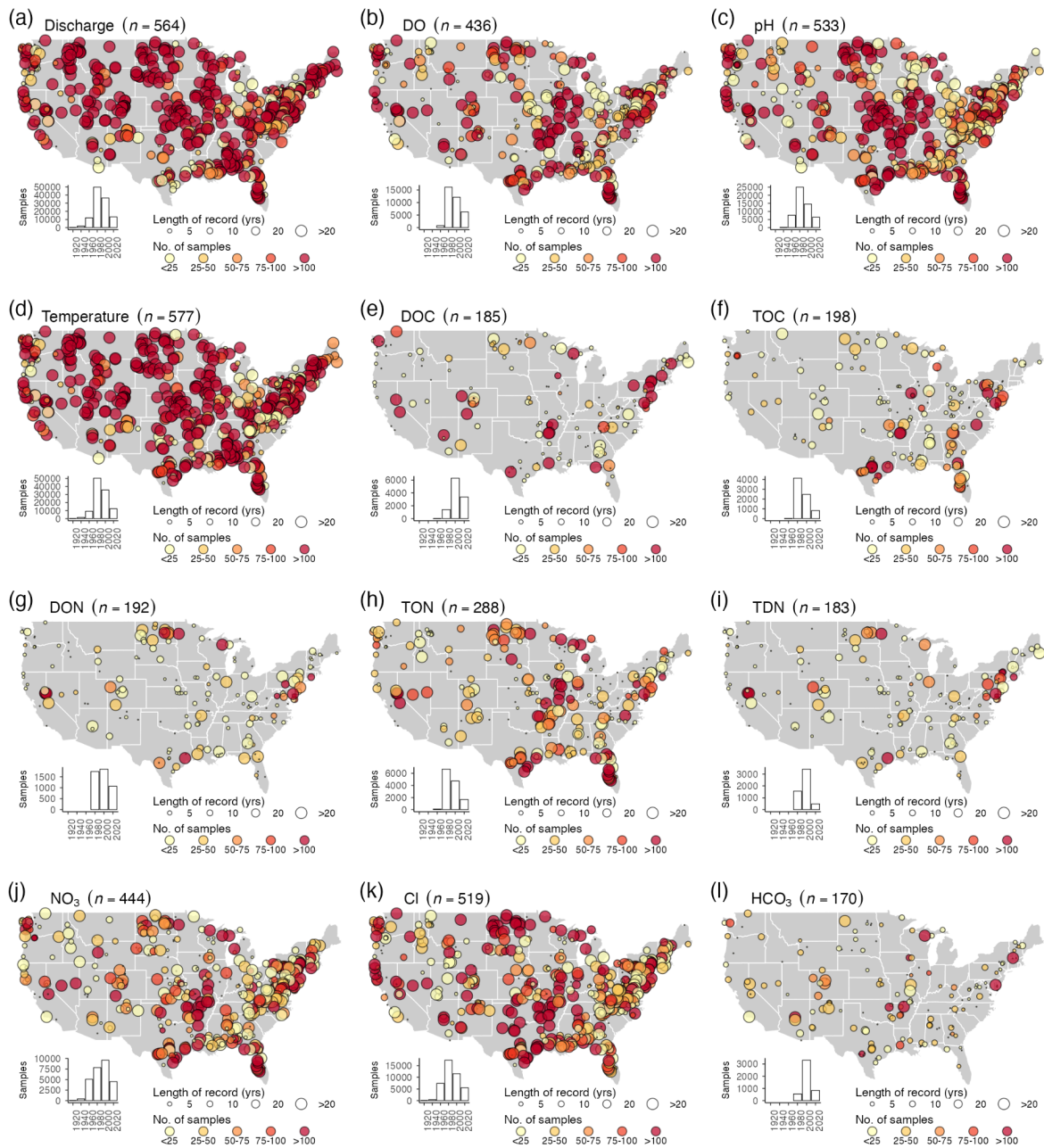




Figure S3: The number of samples (symbol color) and length of record (symbol size) for the entire stream data since beginning of the record and all flow conditions for (a) discharge, (b) dissolved oxygen (DO), (c) pH (field), (d) temperature, (e) dissolved organic carbon (DOC), (f) total organic carbon (TOC), (g) dissolved organic nitrogen (DON), (h) total organic nitrogen (TON), (i) total dissolved nitrogen (TDN), (j) nitrate (NO_3), (k) Cl, (l) bicarbonate (HCO_3), (m) sulfate (SO_4), (n) Ca, (o) K, (p) Mg, (q) Na, (r) Si, and (s) Al. The inset histogram shows the number of samples by 20-year periods.



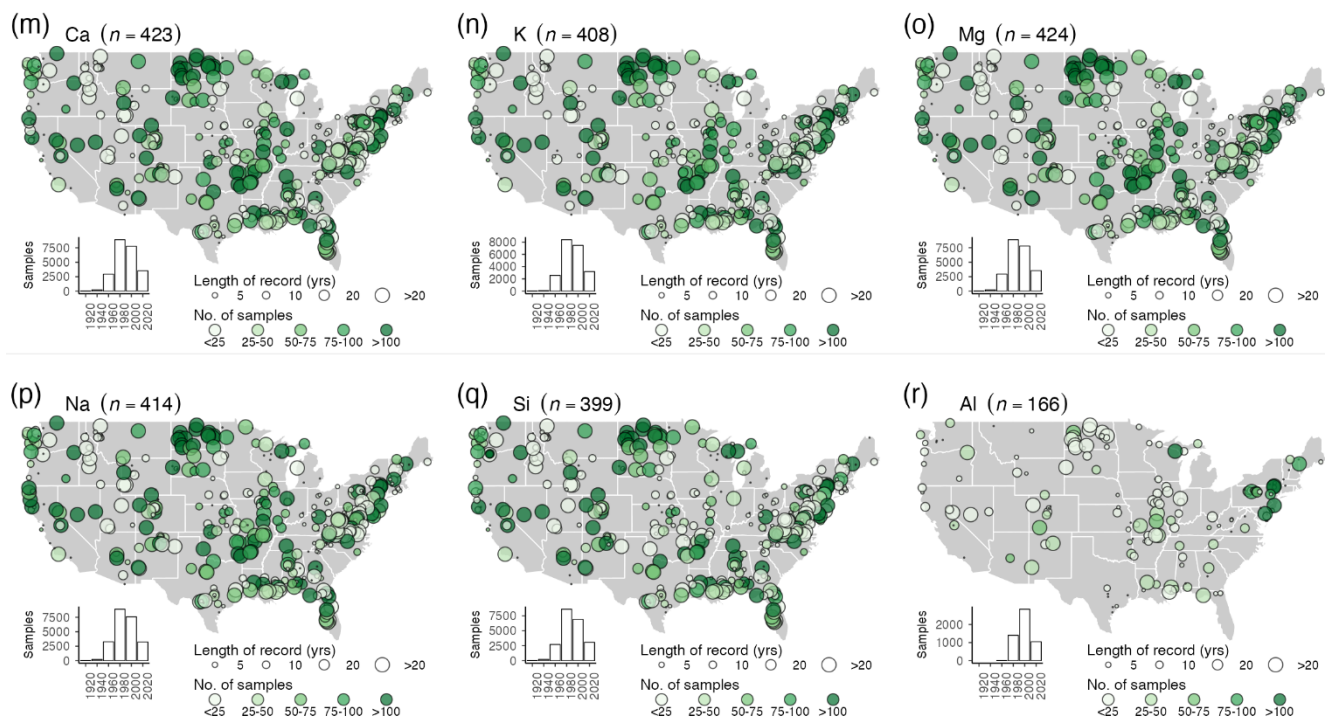


Figure S4: The number of samples (symbol color) and length of record (symbol size) for the entire stream data since beginning of the record and at low flows (flow duration curve >66%) for (a) discharge, (b) dissolved oxygen (DO), (c) pH (field), (d) temperature, (e) dissolved organic carbon (DOC), (f) total organic carbon (TOC), (g) dissolved organic nitrogen (DON), (h) total organic nitrogen (TON), (i) total dissolved nitrogen (TDN), (j) nitrate (NO₃), (k) Cl, (l) bicarbonate (HCO₃), (m) sulfate (SO₄), (n) Ca, (o) K, (p) Mg, (q) Na, (r) Si, and (s) Al. The inset histogram shows the number of samples by 20-year periods.

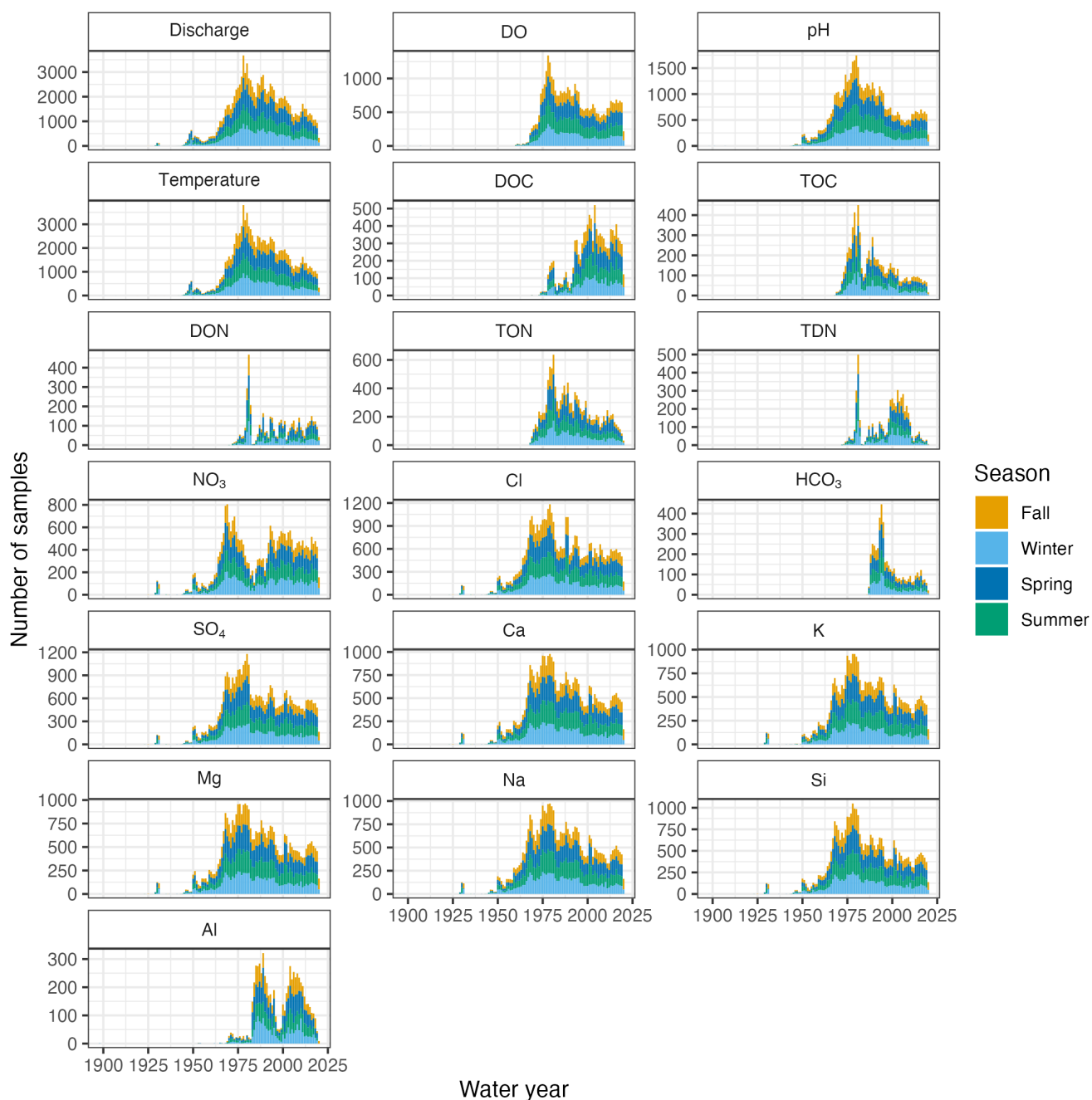
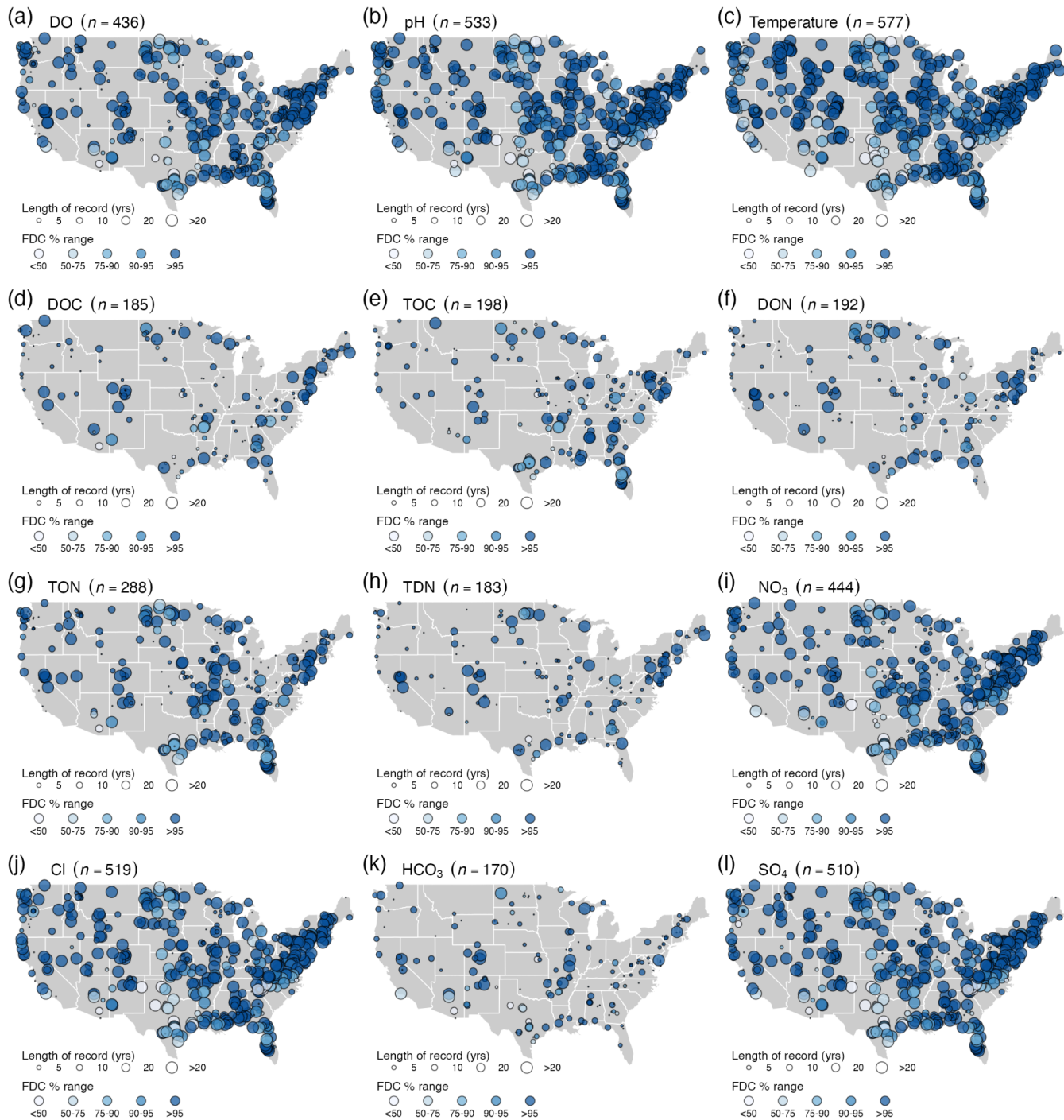


Figure S5: The number of samples by water year and seasons (color code) for the stream data since beginning of the record for discharge, dissolved oxygen (DO), pH (field), temperature, dissolved organic carbon (DOC), total organic carbon (TOC), dissolved organic nitrogen (DON), total organic nitrogen (TON), (i) total dissolved nitrogen (TDN), (j) nitrate (NO₃), (k) Cl, (l) bicarbonate (HCO₃), (m) sulfate (SO₄), (n) Ca, K, Mg, Na, Si, and Al.



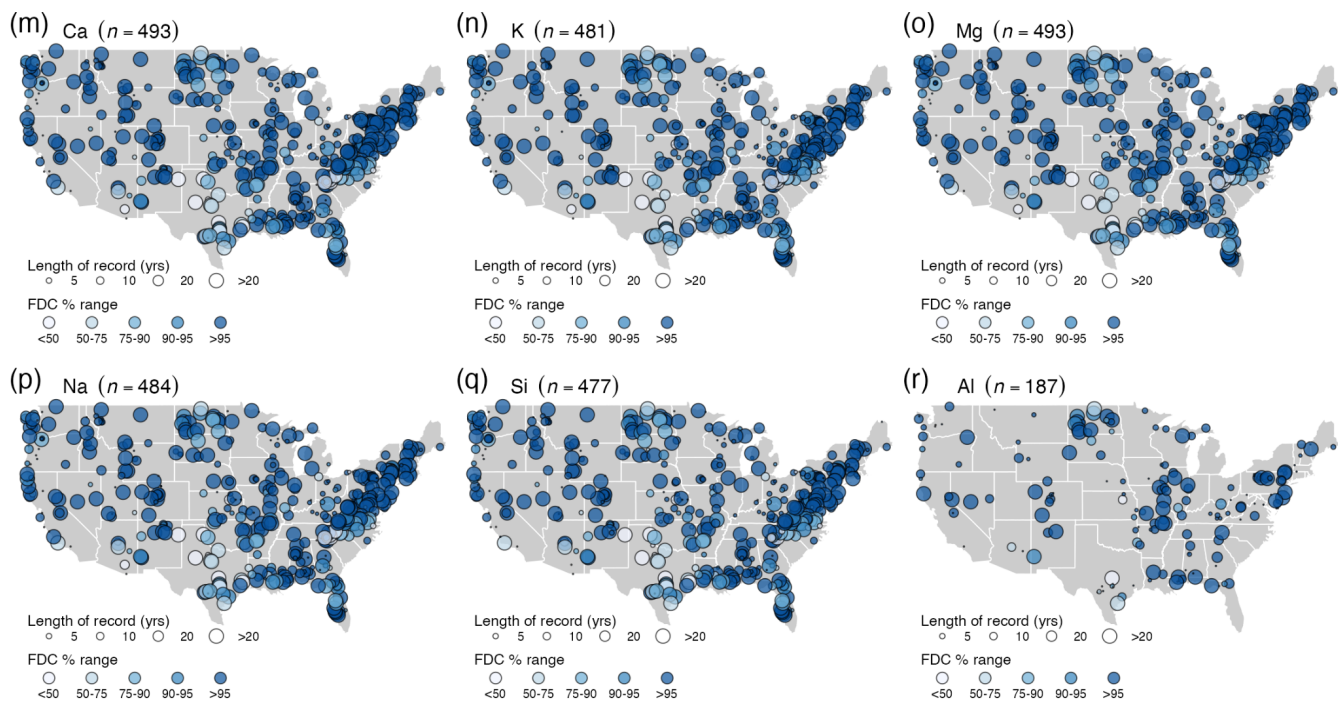


Figure S6: Range of the flow duration curve (% , symbol color) and length of record (symbol size) for the entire stream data since beginning of the record for (a) discharge, (b) dissolved oxygen (DO), (c) pH (field), (d) temperature, (e) dissolved organic carbon (DOC), (f) total organic carbon (TOC), (g) dissolved organic nitrogen (DON), (h) total organic nitrogen (TON), (i) total dissolved nitrogen (TDN), (j) nitrate (NO_3), (k) Cl, (l) bicarbonate (HCO_3), (m) sulfate (SO_4), (n) Ca, (o) K, (p) Mg, (q) Na, (r) Si, and (s) Al. The inset histogram shows the number of samples by 20-year periods.

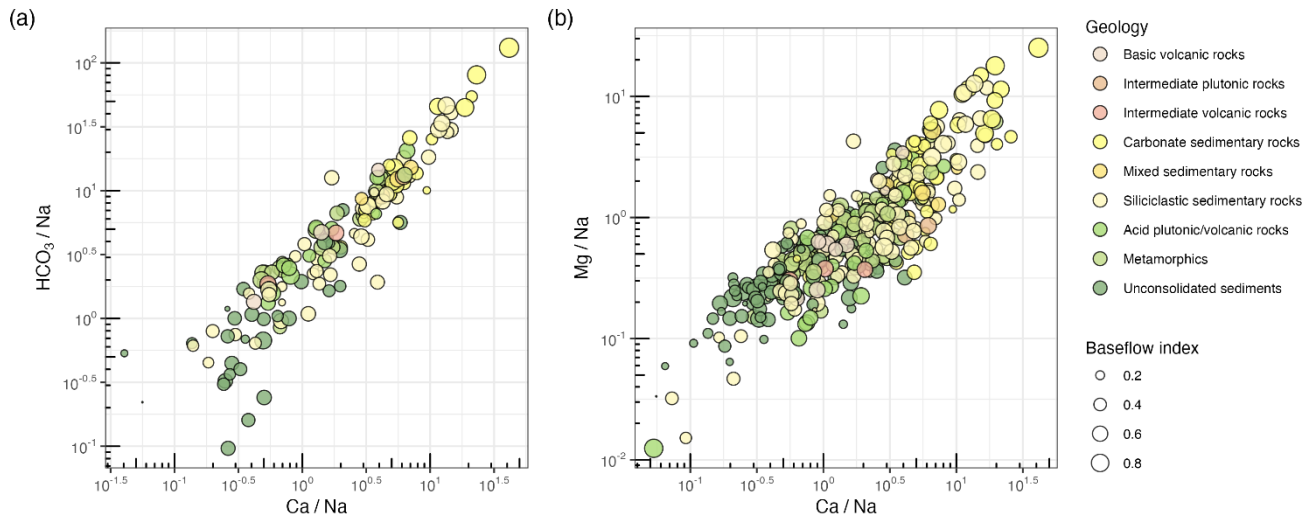


Figure S7: Catchment mean molar ratios of (a) bicarbonate (HCO_3^-) and Na (b) Mg to Na as a function of the molar ratio of Ca to Na for samples collected at flows >66th percentile (low flows) for the entire length of record. Symbol color represents the dominant geology and symbol size is proportional to the baseflow index. Two catchments with pyroclastic geology have been filtered out of (b) because these catchments are missing corresponding HCO_3^- concentrations.