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Supplemental Material

Figure S1. Fraction bicarbonate (relative to total dissolved solids) in relation to percentage of upstream basin containing carbonate rocks. Data are for the 19 sites of solute analysis summarized in Table S6. Box plot shows distribution (10th, 25th, 50th, 75th, and 90th) quantiles for sites of no mapped carbonate rocks, indicating approximate biologic and atmospheric contributions of HCO_3^- .

Figure S2. Comparison of mean annual TDS_{sil} with Dethier's (1986) estimates of net chemical denudation for nine sites evaluated in both studies. Horizontal error bars represent the mean standard error of the annual silicate solute loads for the period of available record (Table S4); no uncertainty estimates provided in Dethier's (1986) analysis. Uncertainty values are the standard errors of the regression coefficients.

Figure S3. Annual load plots for 19 sites of silicate solute load measurements in the study area. Also shown are available suspended sediment measurements for 17 of these sites, including total suspended solid measurements for the McKenzie River. Also indicated are periods of coincident suspended and silicate solute measurements for 16 stations, averaged and summarized in Figure 8. (No overlapping period available for McKenzie River, so average annual loads shown in Figure 8 are calculated from the disparate periods of record.) Average annual discharge and annual mass loads scaled similarly on all plots at a ratio representing a mass concentration of 0.63 grams per liter. Data tabulated in Table S5, derived from National Water System Information (<https://waterdata.usgs.gov/nwis>) for which annual loads and standard errors are calculated by USGS Fluxmaster software (Schwarz et al., 2006).

Figure S4. Scatter plot comparing basin-scale denudation rates estimated from in situ ^{10}Be measurements (recalculated from Balco et al., 2013) and those based on modern measurements, including (a) those estimated from bedload, suspended load, and solute load models (for 11 basins), and (b) for the 5 basins of measured fluxes shown in Figure 11. Data from Table S8

Table S1. Basin attributes and model results for 1264 12-digit Hydrologic Unit Code watersheds within the study area, as extracted from Geographic Information System processing.

Table S2. Estimated bedload, suspended load, and solute fluxes for major drainage basins in the study area. Fluxes tabulated for basin pour points. Independent basins entering the Pacific Ocean or Columbia River are distinguished as terminal basins from tributary basins nested within terminal basins.

Table S3. Suspended load calibration stations, associated streamflow measurement stations, and measured and model-estimated suspended load fluxes. Data from Wise (2018)

Table S4. Measurement station data.

Table S5. Annual measured estimates of silicate solute and suspended sediment fluxes for each of the 21 stations considered in the analysis.

Table S6. Bicarbonate measurements in relation to catchment carbonate rock content.

Table S7. Summary of solute constituents and loads for study area measurement stations.

Table S8. Estimates of basin-scale denudation rates, including those derived in situ ^{10}Be , recalculated from values in Balco et al. (2013), and those derived from this study (summarized in Table 2 and Tables S2 and S4).