A. Quasi-steady flow through a heterogeneous porous medium. Fluid injected at z=0, with flow parallel to the dashed curves, and Darcy velocity in gray scale with an average magnitude of 9.4 m³/m²/yr: a value between typical fluxes in soils and typical column kinetic dissolution experiments (e.g., White and Brantley, 2003, used a value of 175 m³/m²/yr in their experiment). Solid curves are the silicic acid concentration normalized as \((c - c_{eq})/c_{eq}\) to indicate the deviation from the equilibrium value \(c_{eq}\). Initial conditions: 24.5 vol. % quartz in an otherwise inert matrix, porosity=0.02, T=25 °C, \(\log_{10}(\text{permeability (m}^2\))): (min,mean,max)=(-14.5,-13.1,-12). Faster flow favors greater deviation from equilibrium.

B. Concentration along vertical cuts of part A, at each x location of the grid. The considerable variation observed increases with stronger permeability heterogeneity used in other simulations. from V31B-0592, Fall Meeting, AGU, Bolton (2006)