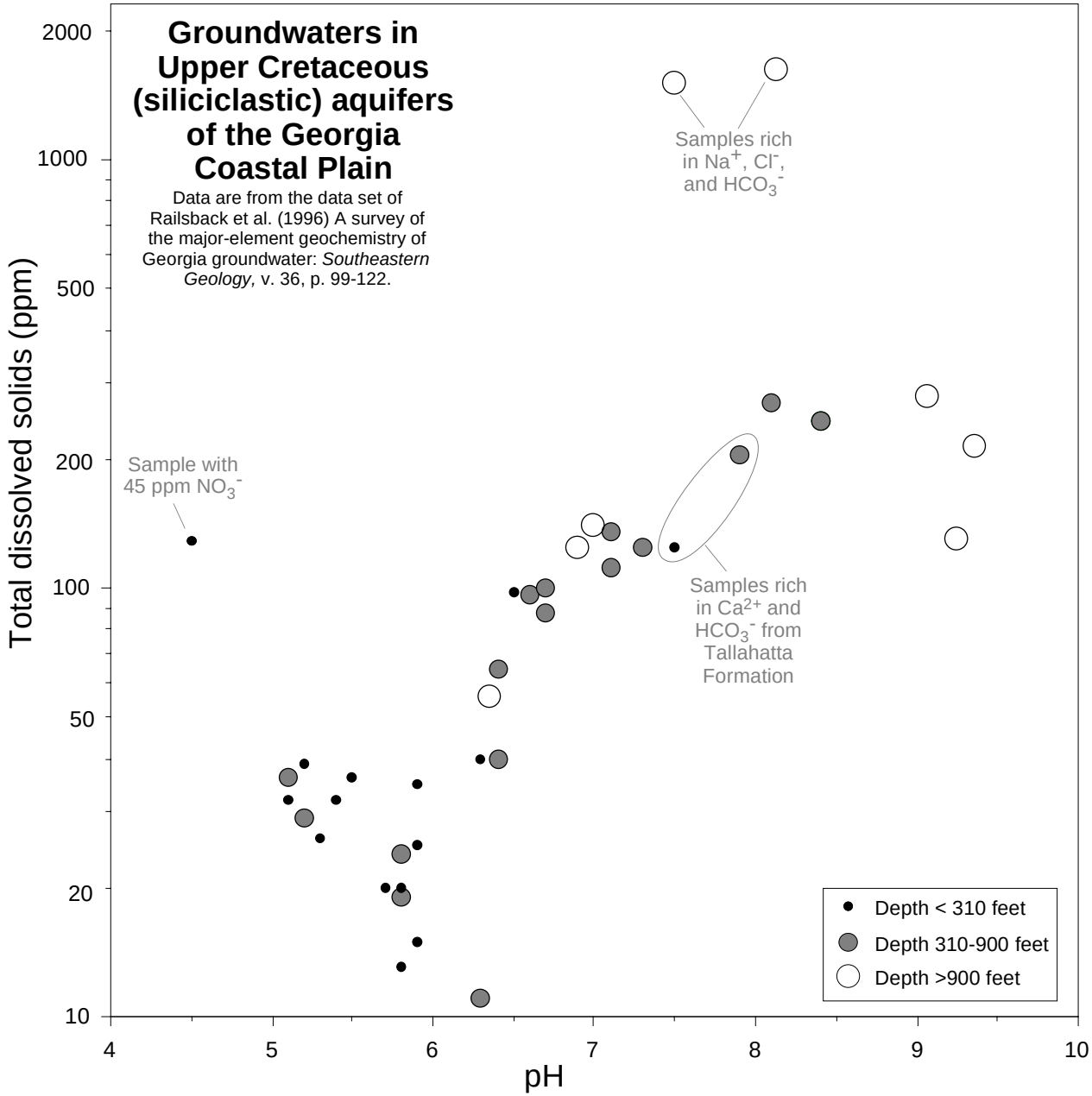
Variation in groundwater pH and total dissolved solids with depth



As water moves into and downward through a confined aquifer, one would expect it to react with minerals in weathering reactions or diagenetic reactions. One would thus expect the water's initially low pH to be buffered by those reactions, and one would expect the water's total dissolved solids content to increase from its initially dilute (i.e., rainwater-like) level.

The data plotted below are from confined siliciclastic aquifers in the Coastal Plain of the U.S. state of Georgia. They generally conform to the expectations above, but the scatter of the data with depth are indicative of the vagaries in reaction rate, rate of flow, mineralogy of the aquifers, and pathways of flow. The low-pH sample with a high nitrate concentration comes from a well only 12 feet deep. The two samples from the Tallahatta Formation may have equilibrated with calcite, explaining the anomalously high pH and TDS of the shallower sample of the two.