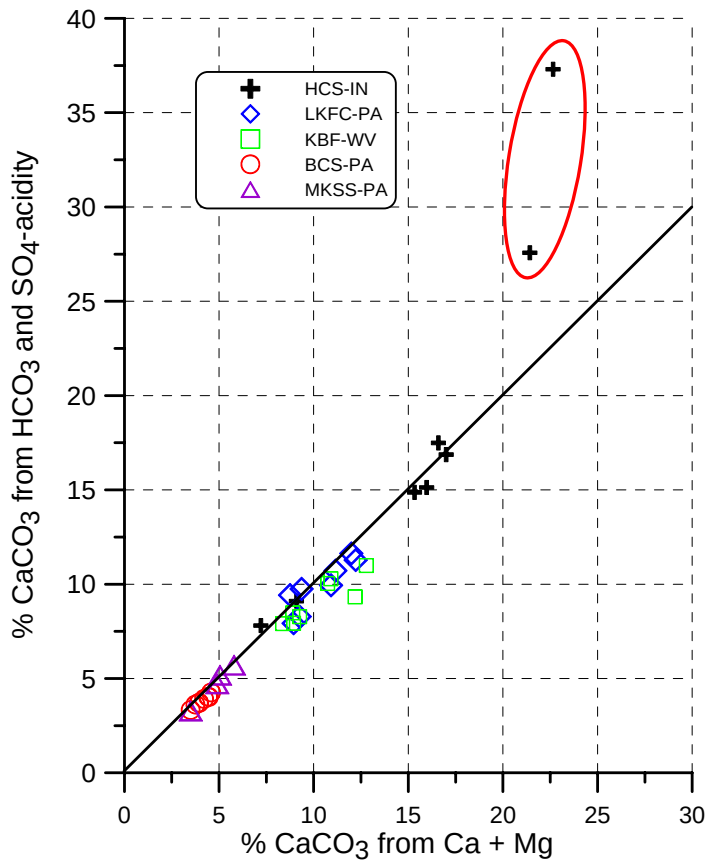

Figure 7.34. Comparison of the "anion" and "cation" methods of determining carbonate dissolution. The cumulative value at the end of 14 weeks leaching was used to construct this plot. As can be seen, most data fall on or near the diagonal line, which represents where data would fall if both methods produce the same answer. The circled values indicate columns that became acidic.

The Race to the Finish

Whether a sample through time will produce acidic or alkaline water is a function of the relative weathering rates of the carbonates and pyrite. If the carbonates exhaust first, the sample will probably become acidic. If the pyrite is exhausted first, the sample will remain alkaline. In order to determine which will win the race (remain the longest) the pyrite oxidation rate will also need to be determined. The same approach that was used for determining carbonate dissolution rates is used to determine pyrite oxidation rates and the amount of sulfur weathered each week. This is then compared to the mass of sulfur in the rock. The sulfur in the rock is determined during acid-base accounting. The examples below are analyses of the Brush Creek Shale and are for the same leaching event used above for the carbonates. The average sulfur shown in Table 7.5 was used for these calculations.