

## Results of Weathering Tests

The leaching column and humidity cell weathering procedures were conducted in 2002 for a period of 16 weeks in the two laboratories. Evaluations were made of: (a) the effect of the CO<sub>2</sub>-enhanced gas mixture (i.e. 10% CO<sub>2</sub>) as compared to normal atmospheric air conditions (i.e. 0.035% CO<sub>2</sub>), (b) comparison of the leaching efficiency of the columns and cells, (c) comparison of calcite saturation indices and partial pressures of carbon dioxide within the columns and cells, (d) preliminary determination of the effects of the weathering procedure on particle size and surface area, (e) the abundance of iron-oxidizing bacteria related to rock type, and (f) the relative percent difference (RPD) of analyte concentrations produced between duplicate columns and cells, plus statistical comparison of gas mixtures.

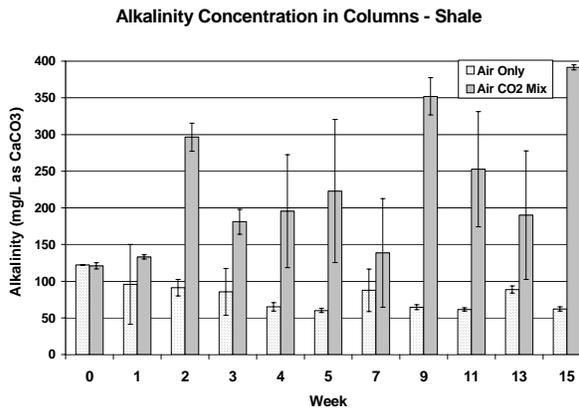


Figure 2.2a. Alkalinity concentrations from shale sample in leaching columns.

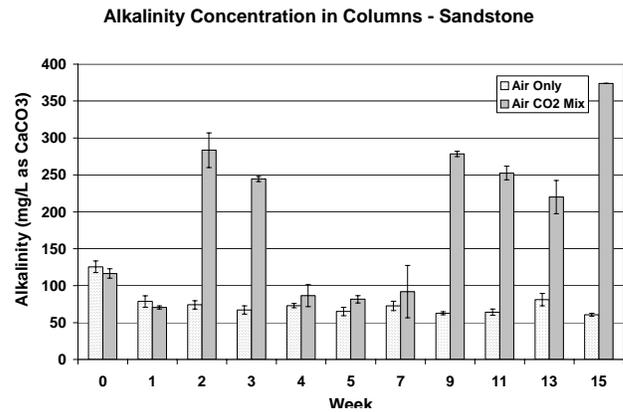


Figure 2.2b. Alkalinity concentrations from sandstone sample in leaching columns.

**comparison of gas mixtures:** Figures 2.2a and 2.2b were drawn from the alkalinity data set produced by Laboratory 1, but were developed specifically to facilitate the comparison of the air-only and CO<sub>2</sub>-enhanced gas mixtures for the shale and sandstone samples using each of the draft methods (humidity cell and leaching column). In Figure 2.2a for the shale leaching columns, the highest alkalinity concentration for the air-only columns is 122 mg/L, while the highest alkalinity for the CO<sub>2</sub>-enhanced columns is 394 mg/L; hence, the alkalinities were approximately three times greater in the columns with the additional CO<sub>2</sub> (in weeks 9 and 15 the alkalinities were 6 or 7 times greater). In the sandstone leaching column results shown in Figure 2.2b, the highest alkalinity concentration for the CO<sub>2</sub>-enhanced gas mixture is 374 mg/L, while the highest alkalinity for the air-only columns is 120 mg/L; therefore the alkalinities are approximately three times greater with CO<sub>2</sub> addition, similar to that found with the shale columns. The histograms in Figures 2.2a and 2.2b depict the average or median values of alkalinity, and the bar diagrams in the top center of each histogram show the range in alkalinity concentrations of the duplicate samples.

Figures 2.2a and 2.2b show a lack of consistency in alkalinity concentrations with the CO<sub>2</sub>-enhanced gas mixture from week to week, especially comparing the high values in weeks 2,