



13C and 18O isotopic signatures of CO uptake and release by soil

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CO is important for atmospheric chemistry, is a pollutant, and it has been recognized as an important indirect greenhouse gas. Soil uptake is globally one of the main sinks for atmospheric CO.

Isotopic measurements can help constraining the global and regional CO budget, but the isotopic signature of the various components of the CO cycle are not all well known.

In this study we performed soil chamber experiments in order to determine the isotopic signature of the exchange of CO between soil and atmosphere. We found that the uptake of CO by soil is associated with a small positive fractionation (the lighter CO is taken up faster). In our experiments, even when soil uptake dominated the net flux, a concurrent emission of CO from soil was always present. We were able to determine separately the isotopic effects of the two fluxes, uptake and emission. The isotopic composition of the emitted CO is depleted in ^{13}C compared to atmospheric CO, and compatible with a source from plant and soil organic matter oxidation.