# Monitoring and Modeling CO2 Isotopic Exchange Between the Atmosphere and the Terrestrial Biosphere

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Abstract

The development of a next-generation model of terrestrial biogeochemistry to predict the isotopic composition of CO2 fluxes, including fractionation during photosynthetic carbon assimilation, the isotopic composition of various carbon pools of varying ages at multiple depths in the soil, and the isotopic composition of water in the terrestrial hydrologic cycle. This model will be derived from the Simple Biosphere Model (SiB2) at UCSB.

Development of a model of global air-sea exchange of 13CO2 and CO18O at seasonal as well as annual time scales. This will be done in the context of the Ocean Biogeochemistry Model at Princeton University, by combining remotely sensed ocean color data with existing physical, chemical, and biological oceanmodels.

Coupling of the above-mentioned terrestrial and marine flux models to three atmospheric circulation and chemical tracer transport models, to investigate the influence of surface isotope exchanges on the spatial and temporal variability of atmospheric CO2 and its isotopes.

Inverse calculation of sources and sinks of atmospheric CO2 using the results of the three atmospheric models coupled to the terrestrial and marine isotope BGC models, as constrained by atmospheric observations. The results from these inversions will also be used to suggest improvements to the component models.

Proposal

Final Report

Publications

Students