# Identifying Factors Mediating Changes in Soil Methane Consumption Under Elevated Carbon Dioxide Using Stochastic Smoothing. (S03-martens142305-Poster)

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### Abstract:

Rising atmospheric CO2 has been of great concern for several decades, yet the impacts of this disturbance on ecosystem carbon cycling are not yet fully understood. The high variability of data from field plots exposed to elevated CO2 has hindered efforts to draw definite conclusions. We hypothesized that additional insight could be gained by using a statistical technique, stochastic smoothing, to reveal the spatial and temporal localization of both main and treatment effects. Using Free Air CO2 Enrichment (FACE) technology, three forest plots were exposed to ambient + 200ppm CO2 beginning in 1996, with three additional plots serving as ambient controls. Soil temperature and moisture, porespace concentrations of CO2 and CH4, and surface CH4 fluxes were measured over a 2-year period. Graphic representation of the analyzed data revealed pronounced treatment effects for all measured parameters except temperature, with elevated CO2 corresponding to increased soil moisture, increased porespace CO2 and CH4, and decreased CH4 flux into the soil surface. Our modeling results clarify several important interactions governing the treatment effects of elevated CO2 on soil carbon cycling in this forest ecosystem, and they provide an illustration of the utility of a new mathematical approach in elucidating complex ecological phenomena.

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