**THE ROLE OF AFRICA IN TERRESTRIAL CARBON EXCHANGE AND ATMOSPHERIC CO2: REDUCING REGIONAL AND GLOBAL CARBON CYCLE UNCERTAINTY**

NOAA

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Much uncertainty remains in our understanding of the ways in which atmospheric, terrestrial and oceanic carbon reservoirs interact, and the controls, magnitude and location of fluxes that determine atmospheric CO2 mixing ratio and terrestrial and oceanic sequestration. Analysis of the rate of increase of atmospheric [CO2] suggests that carbon uptake by terrestrial ecosystems offsets fossil fuel emissions by 1.5-2.0 Gt per year. Several studies suggest that a significant proportion of that sink lies in northern deciduous and boreal ecosystems, but the range of estimates by different techniques is large and research also indicates a strong tropical sink. Furthermore, inverse estimates of the role of tropical regions in global carbon exchange may be underestimated because of the paucity of real data and because deep convection in the tropics may mask the tropical signal in the existing network of [CO2] measurements. With expanded research in neo-tropical regions during the last few years, the weakest link in our current understanding of the global carbon cycle, and concomitant potential for greatest return on research effort, is in the old-world tropics, particularly in Africa. With joint funding from the US National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) this project is addressing some of these shortcomings in our understanding of the temporal and spatial dynamics of carbon exchange in Africa. The project includes both biogeochemical forward modeling, using remote sensing data and land surface models, and atmospheric inverse modeling of carbon dynamics across the African continent. Field measurements in support of the modeling activities are being carried out in Southern Africa (Kruger National Park, South Africa) and West Africa (the Gourma region of northern Mali). The field component is a directed effort to obtain vital new data and process understanding to constrain and parameterize models for regional and continental carbon cycle assessments. We are planning an additional field site in under-represented Central Africa for the coming year, with possible site locations in Zambia or Congo-Brazzaville.

Full Proposal

Final Report

Publications

Students