A REGIONAL ATMOSPHERIC CONTINUOUS CO_2 NETWORK IN THE ROCKY MOUNTAINS (ROCKY RACCOON)

B.B. Stephens, S. De Wekker, D. Schimel, and A. Watt

National Center for Atmospheric Research, 1850 Table Mesa Dr., Boulder, CO 80307-3000, USA; stephens@ucar.edu

ABSTRACT

We are establishing a continuous CO_2 observing network in the Rocky Mountains, building on technological and modeling advances made during the Carbon in the Mountains Experiment (CME), to improve our understanding of regional carbon fluxes and to fill key gaps in the North American Carbon Program (NACP). We will present a description of the Rocky RACCOON network and early results from the first three sites.

DISCUSSION

There are strong scientific and societal motivations for determining CO_2 exchanges on regional scales. NACP aims to address these concerns through a dramatic expansion in observations and modeling capabilities over North America [*Wofsy and Harris*, 2002]. Mountain forests in particular represent a significant potential net CO_2 sink in the U.S. and are highly sensitive to land-use practices and climate change [*Schimel et al.*, 2002]. However, plans for new continuous CO_2 observing sites have omitted the mountain west (Fig. 1). This resulted from expensive instrumentation in the face of limited resources, and a perception that current atmospheric transport models are not sophisticated enough to interpret CO_2 measurements made in complex terrain. Through our efforts in CME, we have a new autonomous, inexpensive, and robust CO_2 analysis system [*Stephens et al.*, this volume] and are developing mountain CO_2 modeling tools that will help us to overcome these obstacles.

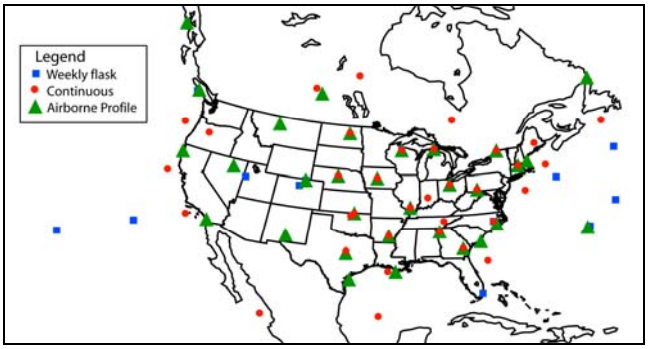

Fig. 1. Existing and future NACP observations, as planned in fall of 2004 (courtesy of S. Denning).

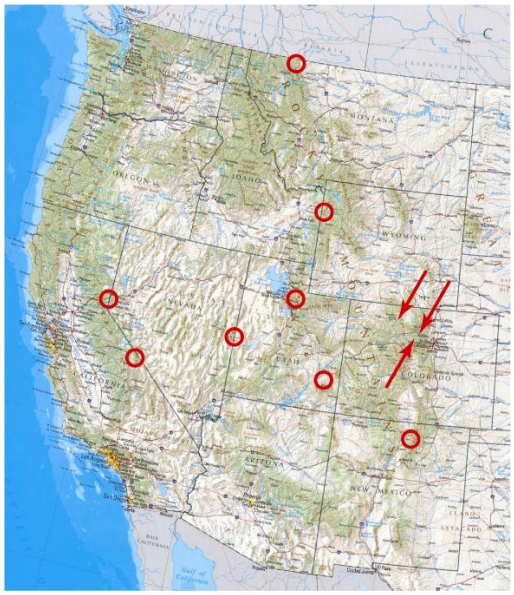

Fig. 2. Planned RACCOON network sites. Arrows indicate deployments scheduled for July 2005 and circles indicate potential future locations.

Preliminary observational and modeling results give us confidence that continuous CO_2 observations from mountain top observatories will provide useful constraints on regional carbon cycling and will be valuable in the continental inverse modeling efforts planned for NACP. We are beginning at three Colorado sites in July 2005 and hope to add three to six sites in other western states in subsequent years, utilizing existing observatories to the maximum extent possible (Fig. 2). The first three sites will be at Niwot Ridge, allowing us to have an ongoing intercomparison with flask measurements made by NOAA CMDL; at Storm Peak Laboratory near Steamboat Springs, allowing us to investigate comparisons between these two relatively nearby sites; and at Fraser Experimental Forest, allowing us to investigate nocturnal respiration rates across a large intermountain valley. Our data will be available to the public on the internet in near real-time to support quality control, local science, and larger scale synthesis efforts.

REFERENCES

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