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ABSTRACT TITLE: Photosynthetic Activity and Net Carbon Uptake in a Drought-Prone Temperate Deciduous Forest

ABSTRACT: Canopy function greatly influences carbon relations in forest ecosystems. Changes in photosynthetic capacity of foliage as well as leaf area and environmental constraints during the growing season can greatly alter canopy function and carbon uptake by photosynthesis. These attributes have received some study (e.g., Wilson et al., 2000), but there has been little comprehensive study of seasonal patterns of leaf function from the perspective of morphology, biochemistry and environmental constraints at the canopy scale. We studied canopy structure and function during two growing seasons with wide variation in climatic conditions, particularly in soil moisture availability. Dominant species at the site (white oak, *Quercus alba* L., black oak . *Q.velutina* Lam., shagbark hickory, *Carya ovata* Mill, sugar maple, *Acer saccharum* Marsh. and eastern redcedar, *Juniperus* v*irginiana* L.) were chosen for study. We found that inter-annual variation in net carbon uptake at this deciduous forest site is substantial and can vary by a factor of more than two on a decadal scale. Meteorological drought (and its absence) appears to play a dominant role in control of the carbon cycle at MOFLUX.