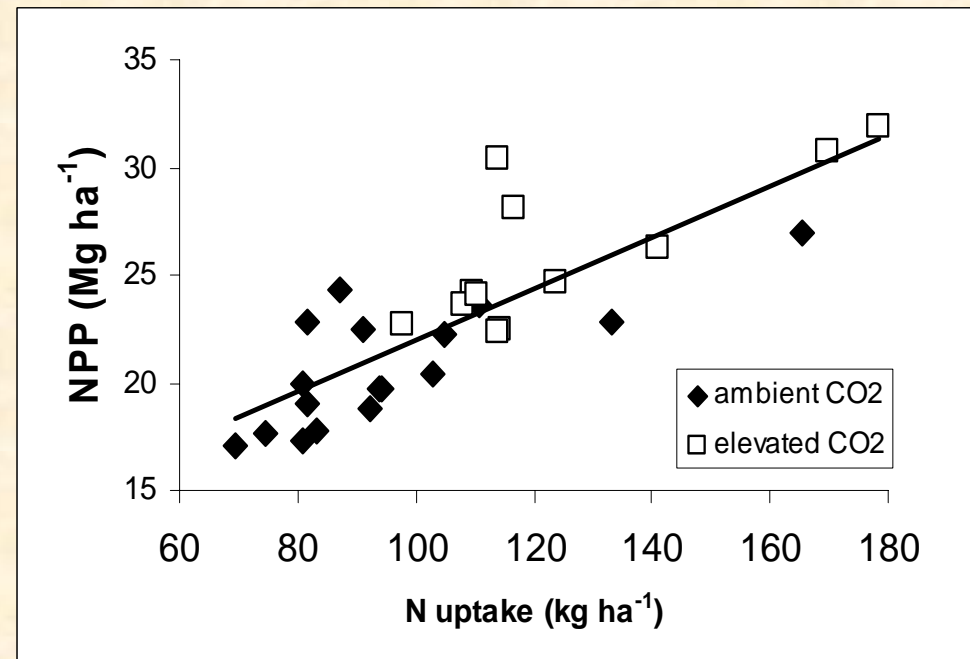


Nitrogen uptake but not nitrogen-use efficiency increases in a CO₂-enriched forest

Contact: Richard Norby, norbyrj@ornl.gov, 865-576-5261

DOE/Office of Science/Biological & Environmental Research

- ↪ Models suggest that carbon sequestration in forests in a future CO₂-enriched atmosphere will be limited by concurrent sequestration of nitrogen
- ↪ Nitrogen uptake and net primary productivity increased in concert in a sweetgum forest stand, and both were greater in elevated atmospheric CO₂
- ↪ Hence, nitrogen-use efficiency was not higher in elevated CO₂, in contrast with model assumptions
- ↪ An improved quantification of terrestrial ecosystem responses to atmospheric and climatic change requires a better understanding of the controls on nitrogen uptake



Nitrogen uptake but not nitrogen-use efficiency increases in a CO₂-enriched forest

Contact: Richard Norby, norbyrj@ornl.gov, 865-576-5261

DOE/Office of Science/Biological & Environmental Research

The potential role of forests in sequestering carbon from a future CO₂-enriched atmosphere and thereby moderating the relationship between anthropogenic carbon emissions and climate change is well established, but models suggest that concurrent sequestration of nitrogen in forests will limit the sustainability of the response. The concept of progressive nitrogen limitation of ecosystem response to elevated CO₂ was evaluated by analyzing nitrogen uptake and efficiency of use in a sweetgum forest stand in a free-air CO₂ enrichment (FACE) experiment in Tennessee. In conflict with many ecosystem models, nitrogen uptake increased in elevated CO₂ while nitrogen-use efficiency was unaffected, supporting increased forest productivity without any indication of a developing nitrogen limitation. These results demonstrate that improved quantification of terrestrial ecosystem responses to atmospheric and climatic change requires a better understanding of the controls on nitrogen uptake.

Norby RJ, Iversen CM. 2006. Nitrogen uptake, distribution, turnover, and efficiency of use in a CO₂-enriched sweetgum forest. [*Ecology* 87:5-14](#).