

Abstract Submitted
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Plant Physiology Studies Using Positron-Emitting Isotopes M.R. KISER, C.R. HOWELL, A.S. CROWELL, Duke University Physics Department and TUNL, C.D. REID, R.P. PHILLIPS, Duke University Biology Department — Over the past century the atmospheric carbon dioxide CO₂ concentration has increased by more than 25%, and climate experts predict that CO₂ levels will double by the end of this century. Understanding the mechanisms of resource management in plants is important for predicting how plants will respond to the increase in atmospheric CO₂ concentration. We use short-lived radioisotope labeling techniques to measure carbon and nitrogen translocation in plants under different global change conditions to gain insight on how plants respond to elevated CO₂ levels. Carbon-11 dioxide is produced at TUNL using the $^{14}\text{N}(p,\alpha)^{11}\text{C}$ reaction. The plants are labeled under environmentally controlled conditions in a specially equipped growing chamber at the Duke University Phytotron facility. The close proximity of TUNL and the Duke University Phytotron creates a unique opportunity for these global change studies. These experiments use single detectors collimated to restrict the field of each detector to one of three regions of the plant (uptake leaf, shoot, and root). Recent results will be presented.

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