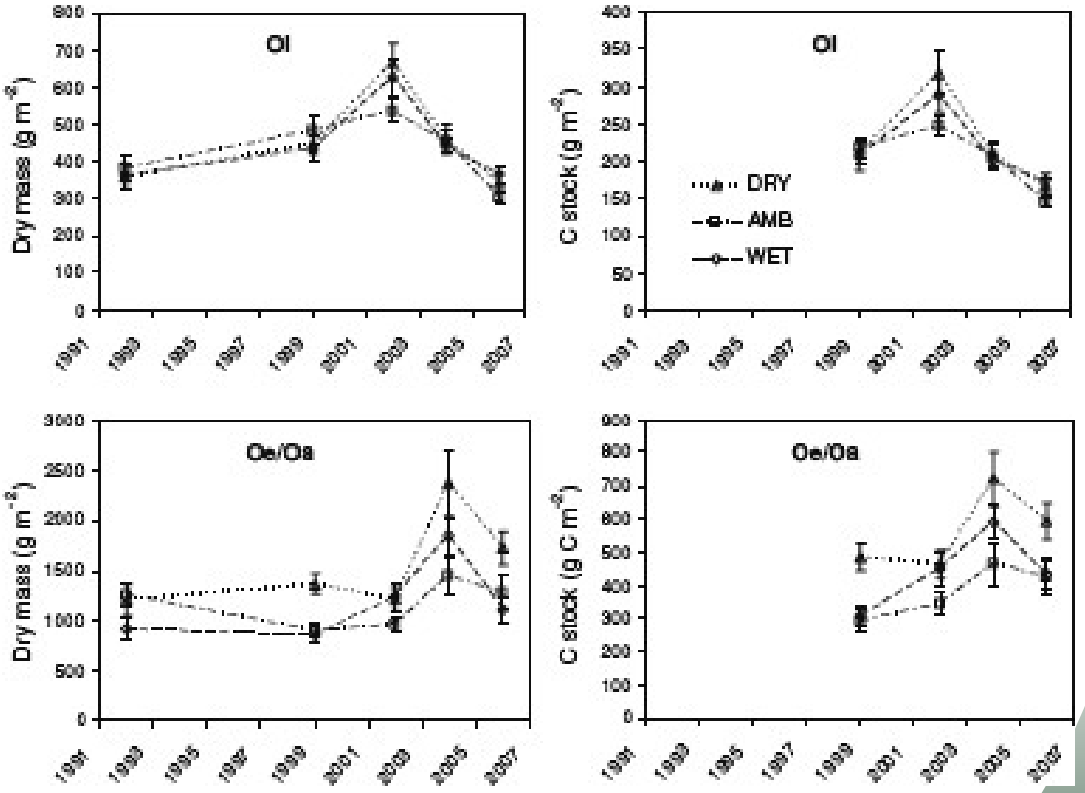
Sustained Decadal Precipitation Manipulations Modify Organic Layer Carbon Stocks

Contact: Paul J. Hanson, *hansonpj@ornl.gov*, 865-574-5361
DOE/Office of Science/Biological & Environmental Research

- Throughout a 13-year period, the Throughfall Displacement Experiment sustained both increased (+33; wet) and decreased (-33%; dry) throughfall into an upland oak forest in Tennessee.
- Higher C stocks were observed in the dry treatment compared to the ambient and wet. The dry treatment accumulation was attributable to a combination of enhanced litter inputs and reduced decomposition.
- Immobilization of N within accumulating organic layers would be replaced by current atmospheric inputs, but K, Ca and Mg immobilization were estimated to logically inhibit plant development with time if not returned to available forms through decomposition.



OAK RIDGE National Laboratory

Sustained Decadal Precipitation Manipulations Modify Organic Layer Carbon Stocks

Contact: Paul J. Hanson, *hansonpj@ornl.gov*, 865-574-5361
DOE/Office of Science/Biological & Environmental Research

- **Throughout a 13 year period, the Throughfall Displacement Experiment sustained both increased (+33; wet) and decreased (-33%; dry) throughfall into an upland oak forest in Tennessee. Organic (O) horizon carbon (C) stocks were measured at several occasions before, during and after the experiment and mineral soil C stocks before and after the experiment. In the O horizon, higher C stocks were observed in the dry treatment compared to the ambient and wet, attributable to a combination of enhanced litter inputs and reduced decomposition. No precipitation treatment effects on mineral soil C stocks were found to a depth of 60 cm. Conversely, long-term reductions in surface mineral soil C stocks were surprisingly high for all treatments (3.5–2.7% C in the 0–15 cm layer and from 0.6 to 0.5% in the 15–30 cm layer) over the duration of the experiment. A clear explanation for this temporal trend in C storage was not readily apparent.**

Fröberg M, Hanson PJ, Todd DE, Johnson DW (2008) Evaluation of effects of sustained decadal precipitation manipulations on soil carbon stocks. *Biogeochemistry* 89:151-161.