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Abstract Title:
Fire in a Mesic Appalachian Forest: Soil Charcoal Evidence from Cades Cove, Great Smoky Mountains National Park, U.S.A.

is part of the Paper Session:
Pyrogeography: Spatio-Temporal Variability in Fires and Fire Regimes

scheduled on Tuesday, 2/28/2012 at 16:00 PM.

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Abstract:
 Macroscopic charcoal fragments produced in forest fires in the southern Appalachian Mountains can persist in soils at burn sites for centuries or millennia. The recovery and radiocarbon dating of soil charcoal provides site-specific evidence of the occurrence of fires over the Holocene and sometimes earlier. These records complement and extend proxy records of past fire from dendrochronological analyses of fire-scarred trees or stratigraphic analyses of wetland sediments. Charcoal fragments >2 mm contain sufficient carbon to be individually dated using AMS methods, and often retain enough anatomical structure to be taxonomically identified, thus potentially revealing both the timing of past fire and the type of plant burned. Here we focus on the abundance, depth distribution, age, and taxonomic identity of macroscopic (>2 mm) charcoal in soils of a mesic forest in Cades Cove, Great Smoky Mountains National Park. We collected cores in 10-cm depth increments using a root corer (8 cm diameter), isolated charcoal by wet-sieving, and identified and dated 16 charcoal fragments. Uncalibrated age determinations ranged from 86-5057 14C years BP and indicate that much of the soil charcoal in this mesic forest was produced in fires that occurred long before the current forest stand was established. The dated fragments included ring-porous hardwoods (5), other unidentifiable hardwoods (3), undifferentiated pines (4), eastern white pine (2), southern yellow pine (1), and pitch (1). Application of this method, in conjunction with a more robust sample size, can produce a record of long-term fire history and stand composition.

Keywords:
 wildland fire, soil charcoal, forest disturbance, southern Appalachians

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