Fire, Soils and the Global Carbon Cycle. (S07-post143327-Oral)

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Abstract:

Estimates of carbon release to the atmosphere from terrestrial ecosystem fires vary between 0.4 to 5.0 PgCy-1. Most carbon is thought to be from aboveground vegetation and litter. Under some conditions soil carbon is lost by burning, either volatilized or converted to leachable forms. Longer-term effects of fire such as direct reduction of litter inputs by combustion or reduction of average NPP may significantly curtail the amount of soil carbon inputs to soil when fire frequency is high. Increased erosion, increased decomposition from altered microclimate, or production of hydrophobic compounds that alter soil moisture may also result in soil carbon losses. There are processes whereby soil carbon may increase as the result of fire. Charcoal, a nearly inert form of organic carbon can accumulate. Increases in organic matter inputs to soil may result from fire. Mechanisms include wood ash fertilization, pulse inputs of fire killed plant material, and shifts to growth of more productive species, especially legumes. We examine terrestrial ecosystem carbon cycle models that explicitly treat fire to determine what aspects of fire impacts on terrestrial ecosystems are incorporated.

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