



## **The impact of atmospheric nitrogen deposition on carbon sequestration in boreal forests**

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It is proposed that increases in anthropogenic reactive nitrogen (Nr)-deposition may cause boreal forests to sequester a globally significant quantity of carbon (C); however, long-term data from boreal forests describing how C sequestration responds to realistic levels of chronic Nr-deposition are scarce. Using a long term (14-17 years) stand scale (0.1 ha) N-addition experiment (three levels: 0, 12.5, and 50 kg N ha<sup>-1</sup>yr<sup>-1</sup>) in the boreal zone of northern Sweden, we evaluated how chronic N additions altered N uptake and biomass of understory communities, and whether changes in understory communities explained N uptake and C sequestration by trees. We further explored whether N additions resulted in changes in soil C. Our data reveal that N additions resulted in increased C sequestration in both trees and soil (between 20-30 parts C per unit of N), with approximately 1/3 of this C sequestered in the humus layer, and 2/3 in plant biomass. The total quantity of C sequestered per unit N was far less than proposed by some modeling studies, and thus could account for only a very small portion of the unidentified terrestrial sink for anthropogenic CO<sub>2</sub>.