Geophysical Research Abstracts
Vol. 20, EGU2018-3122-3, 2018
EGU General Assembly 2018

Amendment rate and depth effects on residue decomposition

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Decay of plant residues is tied to many ecosystem functions, affecting atmospheric CO_2, plant-available nutrients, microbial diversity, soil organic matter quality, among others. The rate of decay, in turn, is governed by soil type and management, location in the soil profile, and environmental variables, some of which may be changing in coming decades. Our objective in this study was to elucidate the decomposition dynamics of plant-derived C when two rates of residue were applied either at the soil surface or mixed to a depth of 10 cm. To do this we established a long-term study at a site in Lincoln, New Zealand. We applied 13C-labelled barley straw (13C = 10.2 atom%; C = 37.9%; N = 0.95%; C:N = 40) at two rates equivalent to 2 and 4 Mg/ha. Soil water content and temperature was logged over the experimental period. Soil samples were collected at 7 times over 6 years. Data on recovery and kinetics of residue C occurring over the experimental period will be discussed as well as 13C-PLFA results.