

# 2008 Ohio Student Research Forum

The Ohio State University

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## RESEARCH ABSTRACT FORM

**TITLE:** Carbon dynamics and chemical weathering on agricultural land

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A critical environmental challenge is degradation of the resource soil. Population growth places greater stress on this resource for infrastructure and food production. Agriculture is among the leading causes of land degradation. Erosion and other soil disturbances are key factors in determining whether an agricultural soil acts as a carbon sink or source. In order to lessen the impact of soil erosion by agriculture and to preserve productivity, farmers changed tillage practices in the mid 1970s. Tilling the soil brings deep, carbon rich layers to the surface exposing them to physical and chemical weathering and erosion that helps to oxidize the organic matter. In this study, soils were sampled in an experimental watershed in central Ohio to compare the effects of tillage practices on organic matter content and elemental concentrations within the soil profile (0-61 cm). Three sites were sampled: a conventionally tilled corn crop, a no-till corn crop and a pasture (control). Carbon and nitrogen (C/N) analyses were carried out to determine the quantity and quality of organic matter in the soils. X-ray fluorescence (XRF) measured concentrations of major, minor and trace elements. The chemical analyses confirmed that the tilled soils had lower concentrations of carbon, nitrogen and phosphorus. The chemical index of alteration (CIA), and mobile elements to zirconium profiles suggest that all three soil profiles are weathered to a similar extent.