INTRODUCTION, METHODOLOGY AND OBJECTIVES

Problem Statement
- Millions of tons of rich topsoil are being lost each year through tillage and rainfall induced erosion while conducting agricultural land management
- Carbon redistribution is highly variable within an agricultural watershed

Carbon Fluxes: Mass Balance Approach

Where: 
- Aboveground: 
  - Biomas (plant) production
  - Photosynthesis
- Belowground:
  - "Black Box Approach"
  - Total Belowground Carbon Allocation (TBCA)

\[ TBCA = \frac{R_s + F_L - F_E}{1 + \frac{C_N}{C_S}} \]

- Biomas (plant) production
- Photosynthesis
- \( R_s \): Soil Respiration
- \( F_L \): Loss of soil carbon due to erosion
- \( F_E \): Flux of litterfall
- \( C_N \): Carbon content of soil
- \( C_S \): Carbon content of litter

Methodology: Field Work
- Hypothesis:
  - Microbial biomass
  - C:N ratio
  - Crop biomass

Methodology: Numerical – Site Description
- Location: South Amana Catchment, Iowa County, Iowa
- Drainage Area: ~26 km²
- Average gradient: 8%
- Main soil series:
  - Coln Floodplains
  - Tones uplands
- Average precipitation: ~890 mm/yr
- Over 80% of land is in Corn-Soybean rotation

Objectives of Research
- Identify “Hotspots” of high variation in carbon fluxes
- Analyze temporal and spatial trends in carbon fluxes and isolate key parameters
- Use geospatial tools and numerical models for larger global prediction with verification from highly sensitive field data

RESULTS AND CONCLUSIONS

Experimental Results
- Soil Respiration
- Soil Respiration Trends from Experimental Plot Data

Numerical Results
- "Hotspot" Identification
- Soil Redistribution Temporal Trends
  - May soil erosion related to tillage
  - June has combined effects of tillage and rainfall

Conclusions
- Agricultural landscapes are highly dynamic in the interaction of aboveground and belowground processes
- Geospatial tools can be used to isolate erosion prone landscapes
- Highly accurate testing plan can be developed with these preliminary results to implement agricultural best management practices