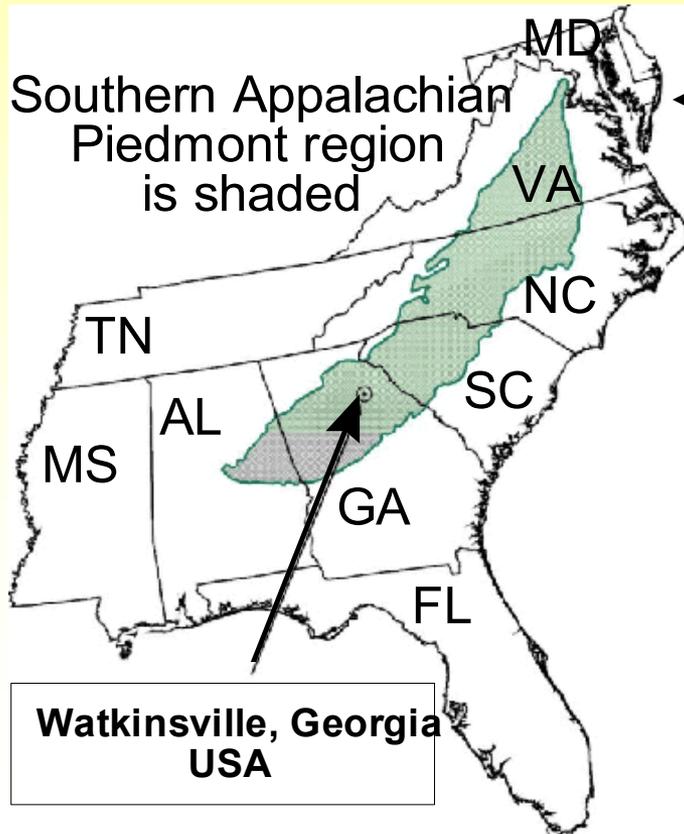


# **Can the Soil Conditioning Index Predict Soil Organic Carbon Sequestration with Conservation Agricultural Systems in the South?**



**31<sup>st</sup> Southern Conservation Agricultural  
Systems Conference, Eastern Shore of  
Virginia, 20-23 July 2009**

**Alan J. Franzluebbers**

USDA – ARS, Watkinsville GA

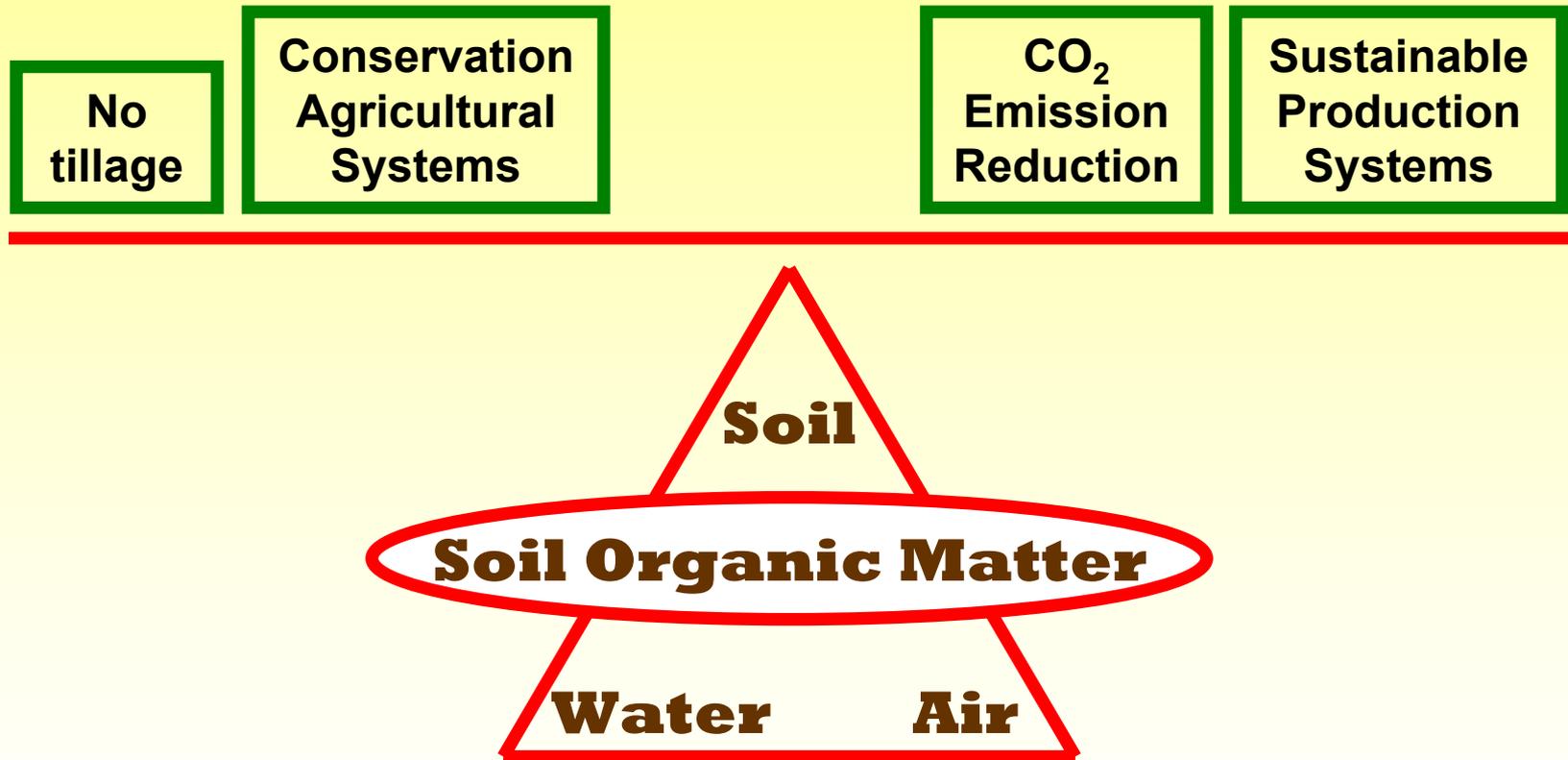
**Hector J. Causarano**

National University of Ascuncion, Paraguay

**M. Lee Norfleet**

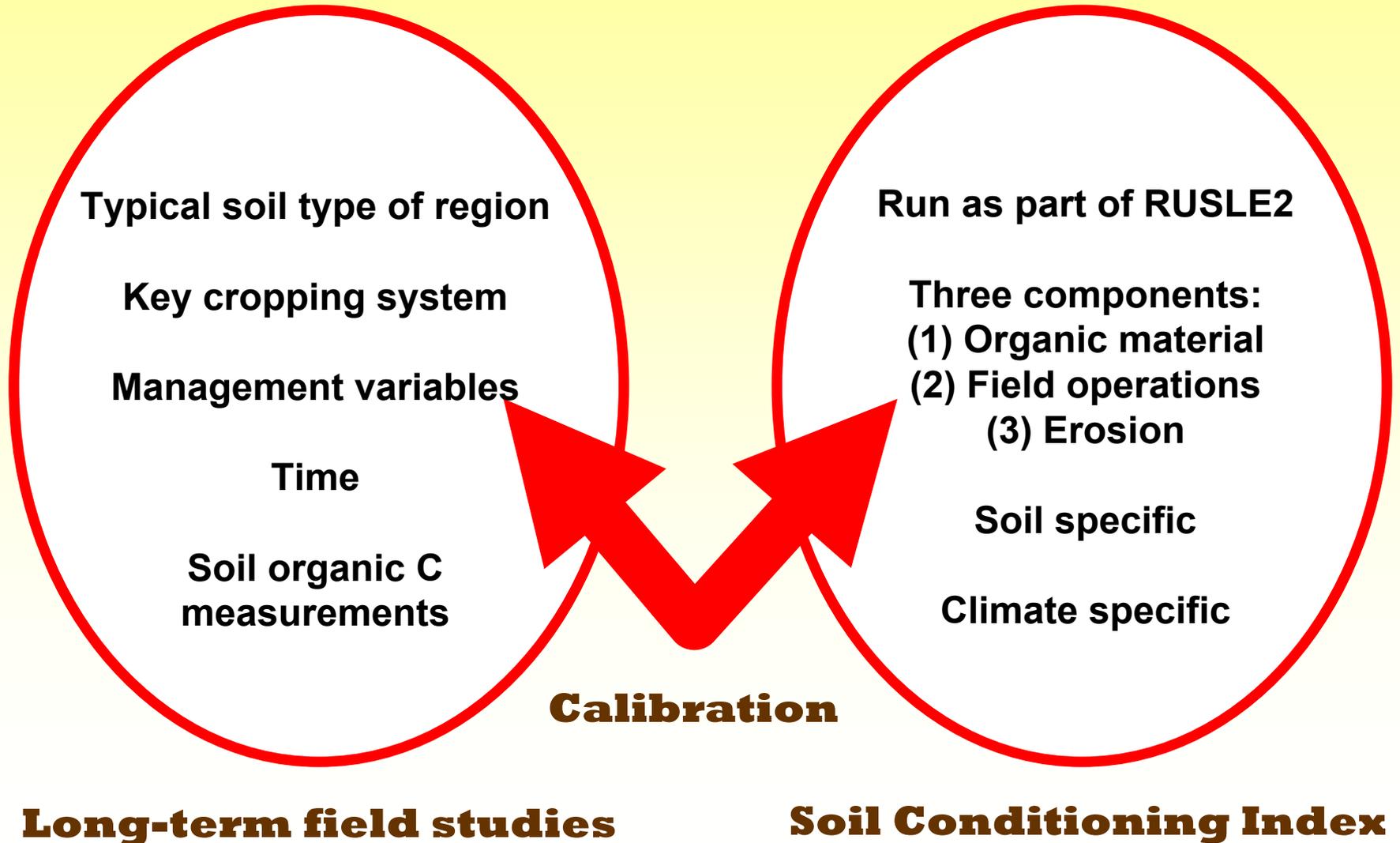
USDA – NRCS, Temple TX

# What are the issues?



**Key Ecosystem Services and Functions**

# How to evaluate across diversity of conditions?



**Can Soil Conditioning Index (SCI) be calibrated against soil organic C from a diversity of field studies throughout the southeastern USA?**

**Are there conditions that require unique calibrations within the region?**

**Can the same calibration of SCI on SOC be obtained for the southeastern region as for the Midwest?**

# Who is supporting this research?

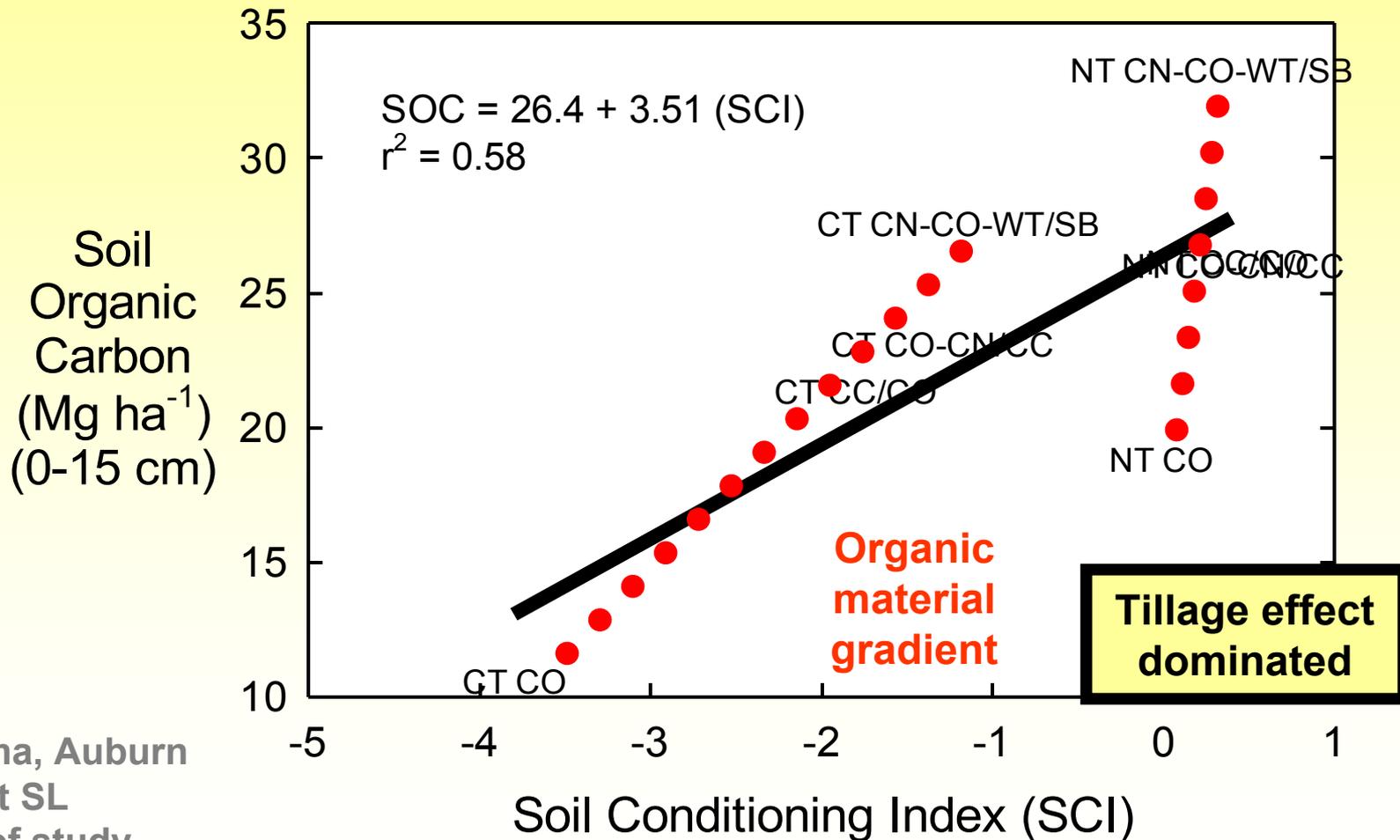
**Cotton Incorporated  
(Agr. No. 05-712)**



**USDA-ARS Global Change CRIS  
(5402-11120-NEW-00L)**

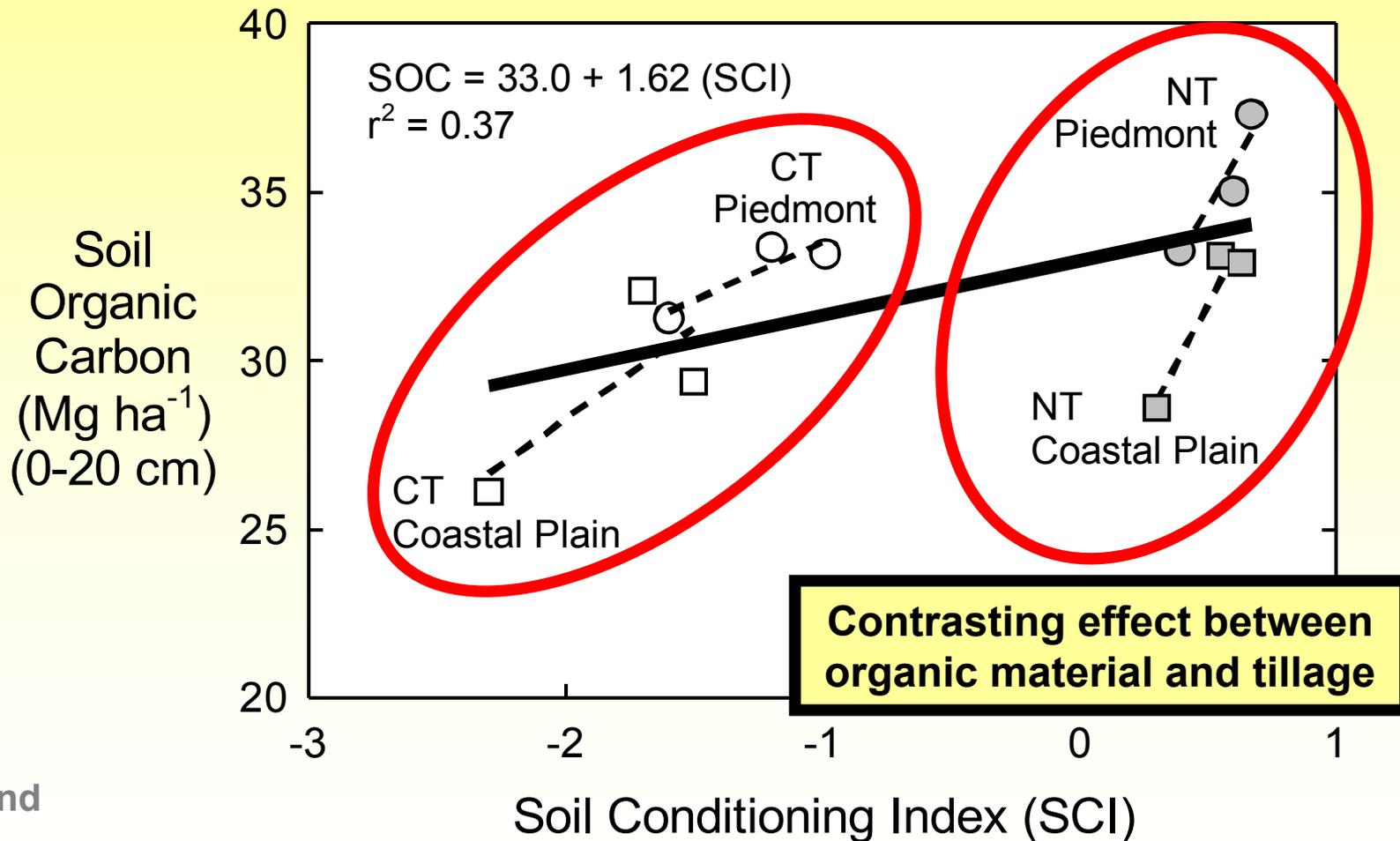
***“GRACEnet (Greenhouse Gas Reduction through  
Agricultural Carbon Enhancement network):  
An Assessment of Soil Carbon Sequestration and  
Greenhouse Gas Mitigation by Agricultural  
Management”***

# Calibrations within selected experiments



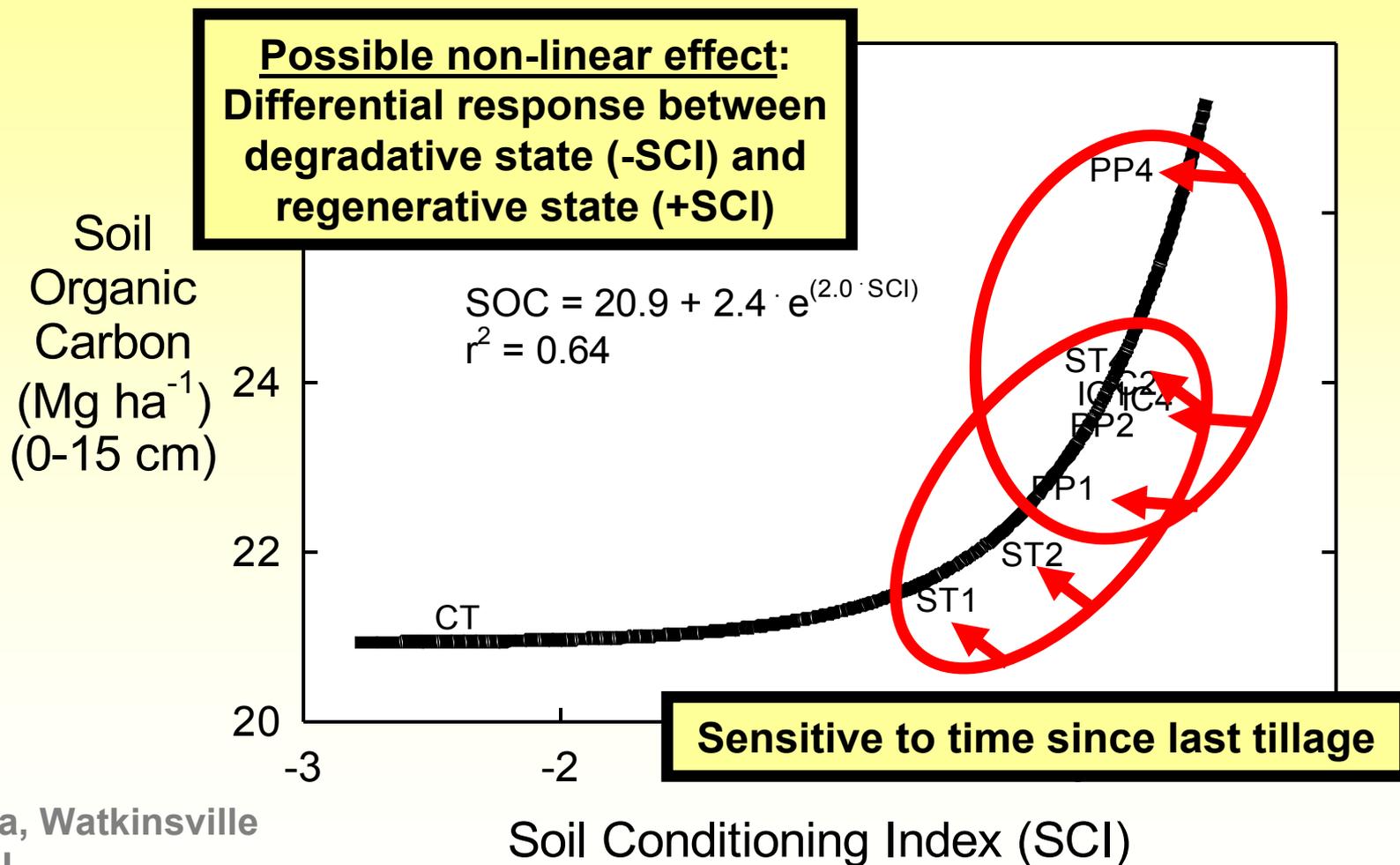
Alabama, Auburn  
Pacolet SL  
3.5 yr of study  
Tillage  
Cropping complexity

# Calibrations within selected experiments



Maryland  
Tillage  
Location  
N fertilization

# Calibrations within selected experiments

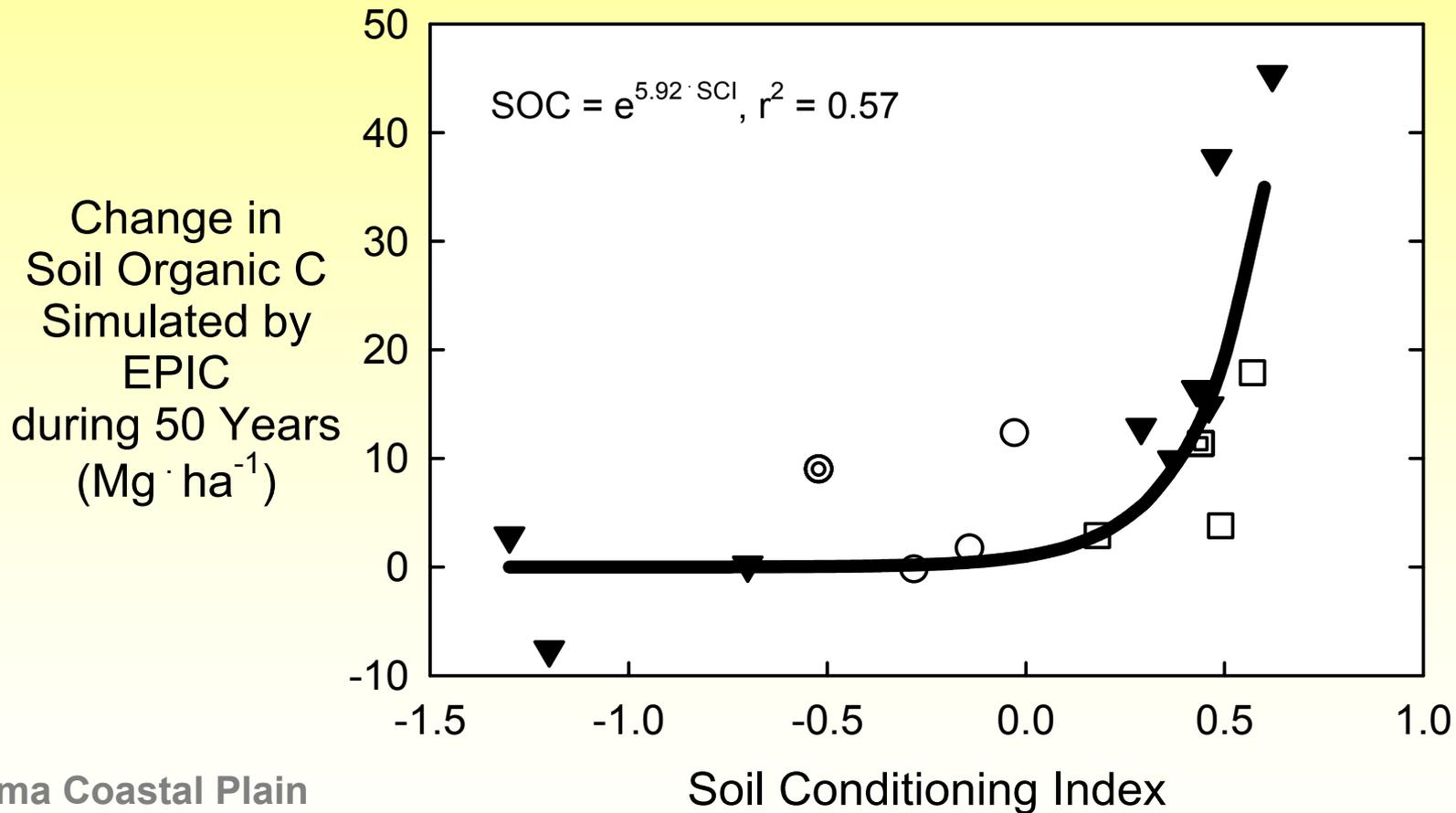


Georgia, Watkinsville  
Cecil SL  
4 yr of study  
Tillage type & frequency

Franzluebbers et al. (1999; Soil Sci. Soc. Am. J. 63:349-355)



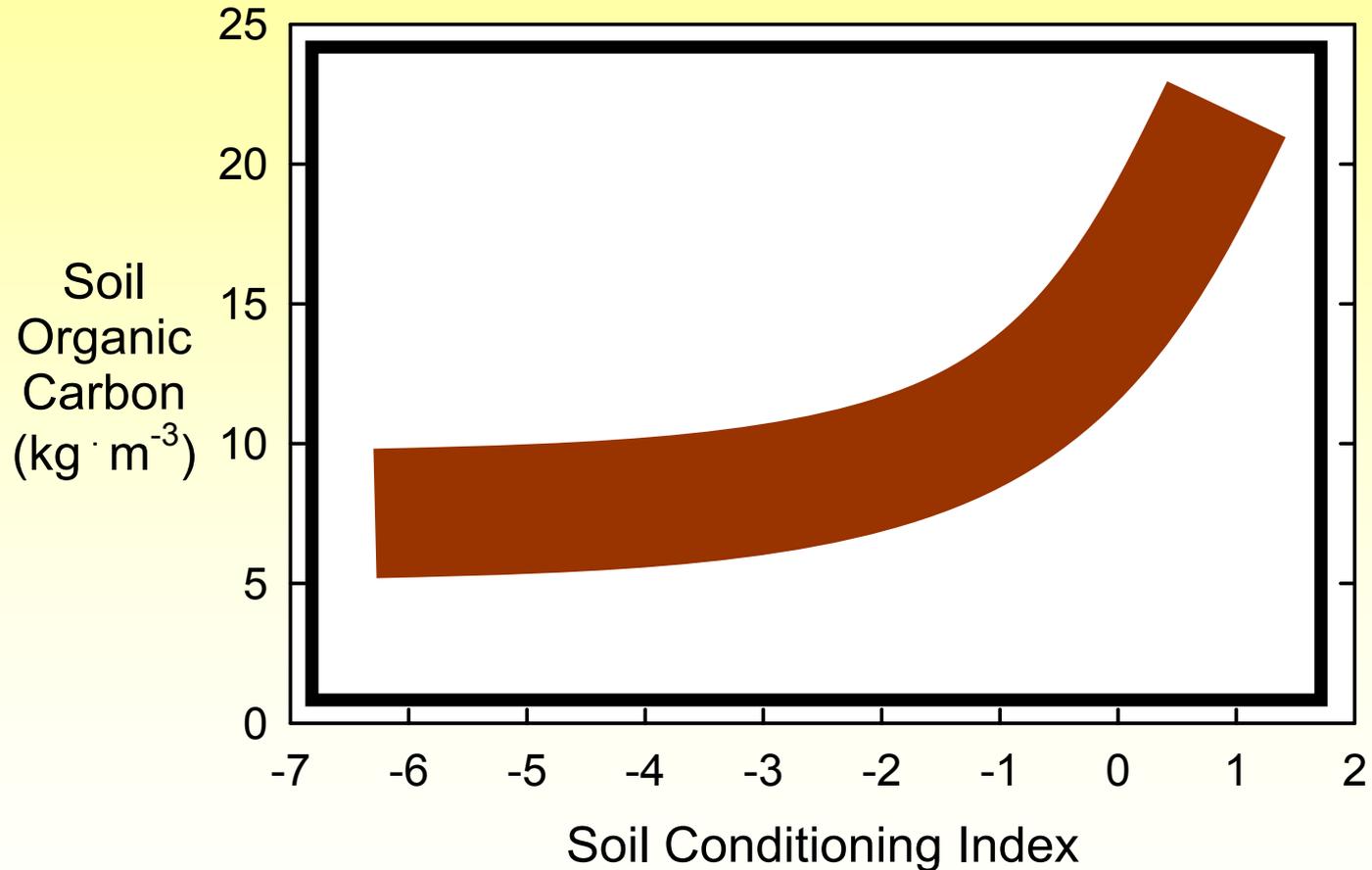
# Calibrations within selected experiments



Alabama Coastal Plain  
Georgia Piedmont  
Mississippi Upland  
South Carolina Coastal Plain  
Texas Blackland Prairie

Abrahamson et al. (2009; J. Soil Water Conserv. 64:134-144)

# Calibrations across experiments



Soil organic C data from field experiments summarized in Franzluebbers (2005; Soil Till. Res. 83:120-147) and (2009; Soil Sci. Soc. Am. J., in press)

# Summary

- ✓ **The soil conditioning index (SCI) could be reasonably calibrated to changes in soil organic carbon (SOC) within site-specific experimental conditions, although...**
  - **Divergent responses occurred due to organic material (OM) and tillage (FO) variables in the model**
  - **Both linear and non-linear relationships were observed between SOC and SCI**
  
- ✓ **Further work is needed to...**
  - **Better define the relationship between SCI and SOC at high SCI values (i.e., to better characterize the expected curvilinear response)**
  - **Find acceptable mechanisms to pool SOC data from experiments with divergent sampling protocols**