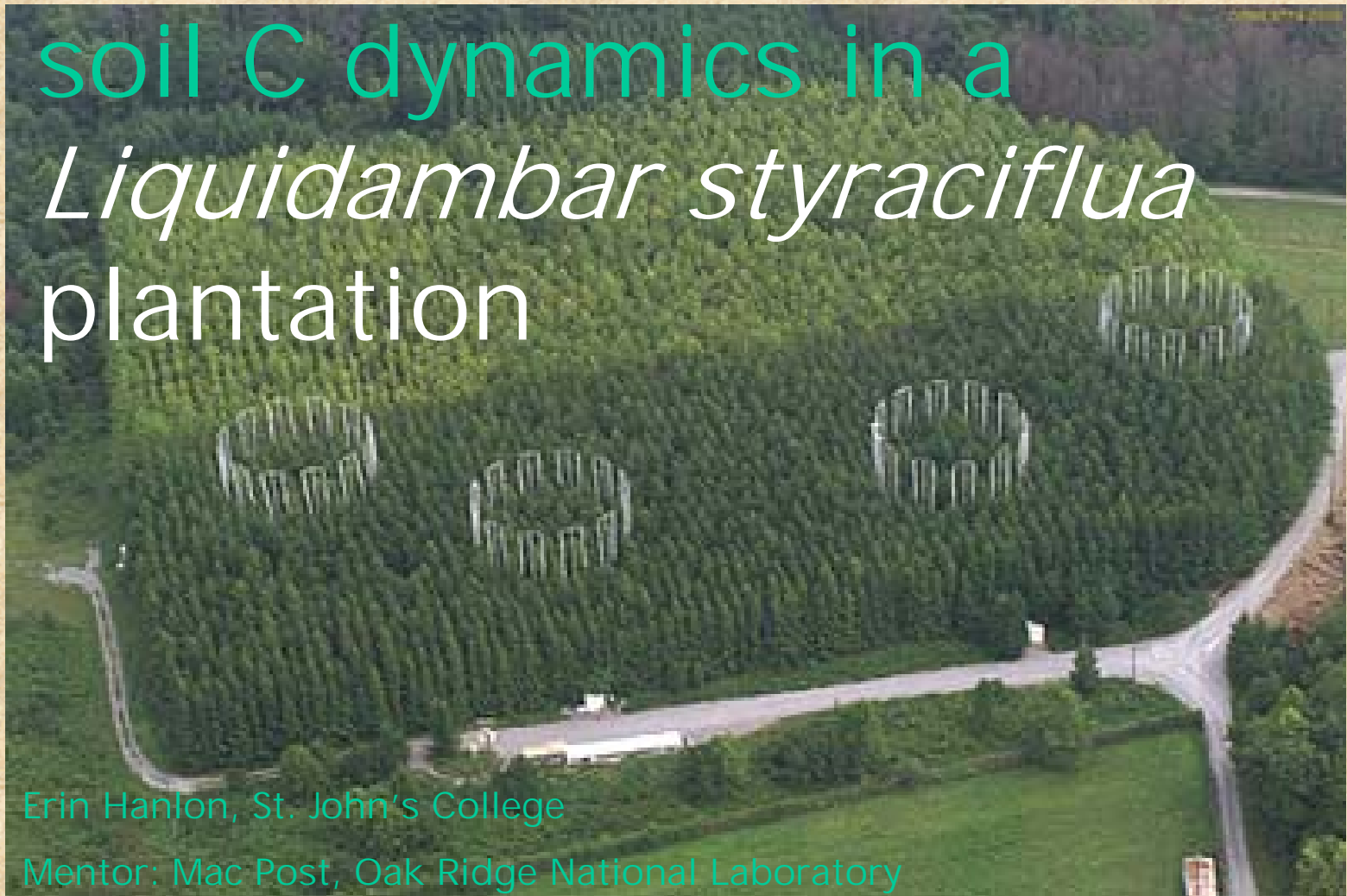


Elevated CO₂ effects on soil C dynamics in a *Liquidambar styraciflua* plantation



Erin Hanlon, St. John's College

Mentor: Mac Post, Oak Ridge National Laboratory

Free Air CO₂ Enrichment (FACE)

Currently 32 ongoing experiments - 2 in intact forest plantations

- Aboveground response to CO₂ enrichment consistent among experiments.
- Belowground response - NO CONSENSUS!!!



What's happening to the soil carbon?



- Rhizosphere
- Lower soil horizons
- Priming effect [microbes]
- N fertilization/limitation
- Root exudates
- Heterotrophic respiration

Soil carbon and root exclusion bags

- Six 30cm long soil cores randomly placed in each of 4 rings
- Samples collected every 2 years: 1999, 2001, and 2003





Don

Mac

Roll of filter membrane

Original core wrapped in filter membrane and placed in apple mesh bag

Marking flag

Our techniques



Our techniques

Mac and Don extracting a core from the soil



Side core soil being put into a scintillation vial



Mac removing soil from a core

Mixer Mill



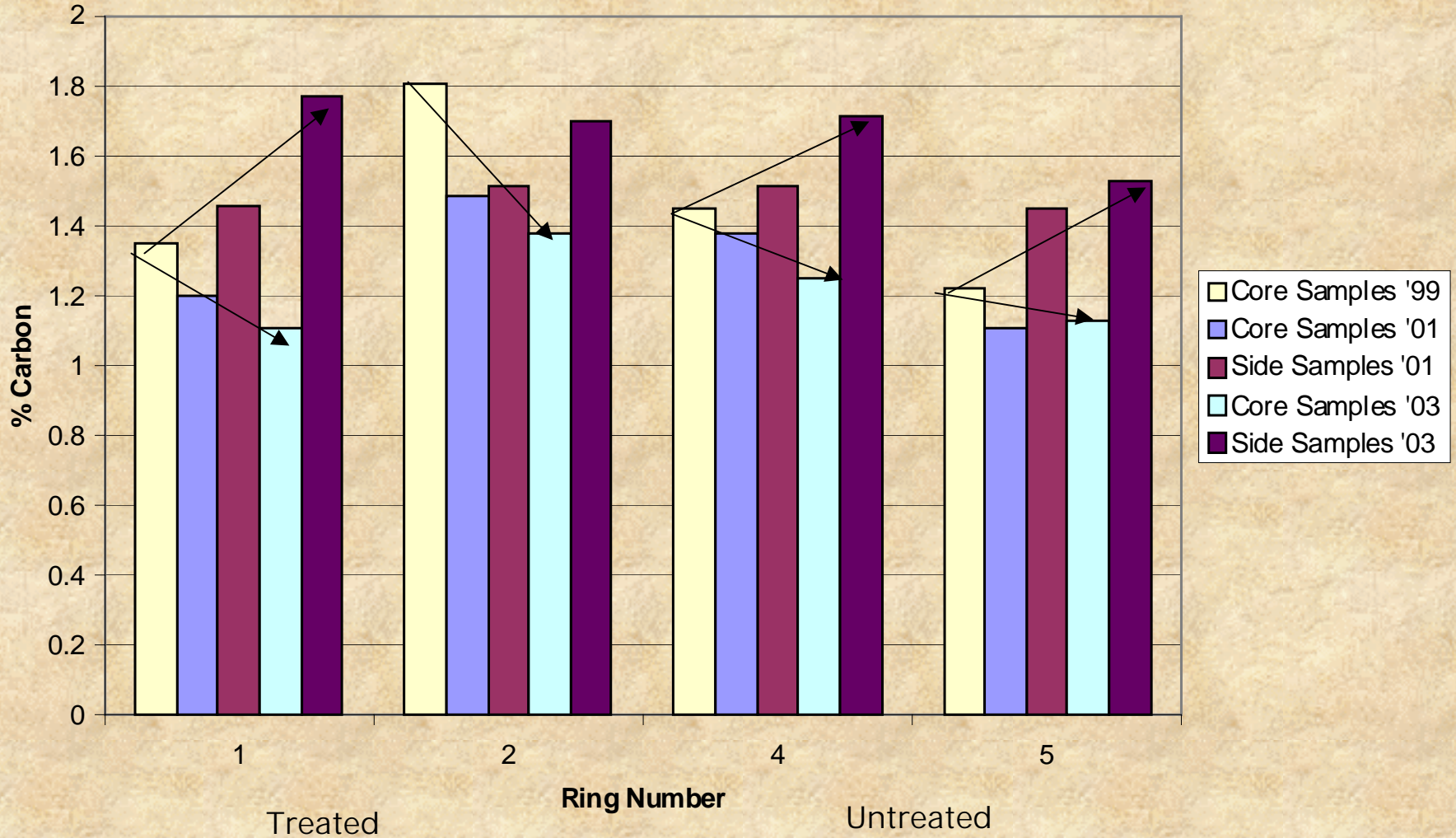
Original core



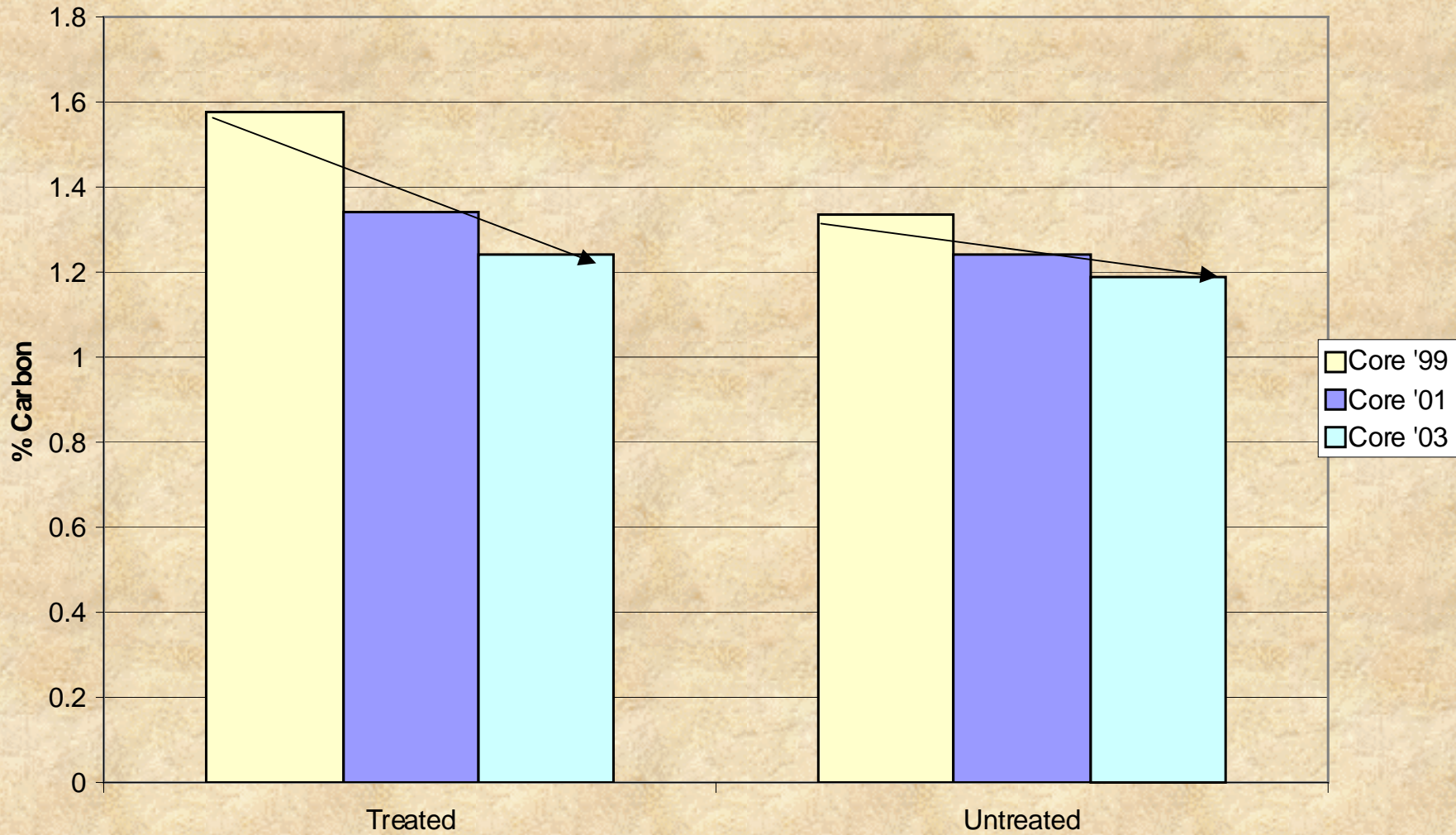
Place where side core of undisturbed soil would be taken from

Results

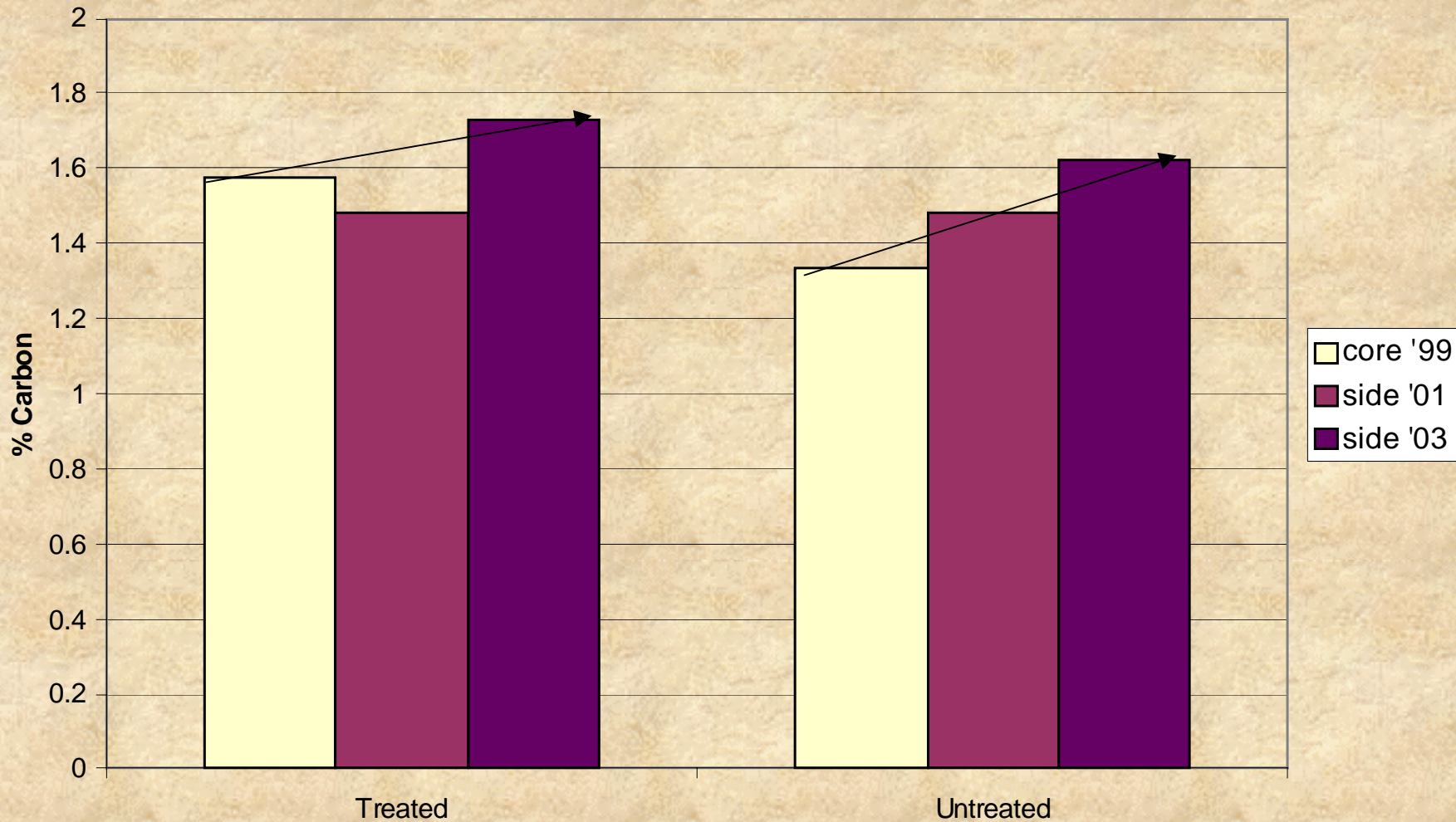
**Average % carbon by weight for soil samples
in 0-10cm range of each ring**



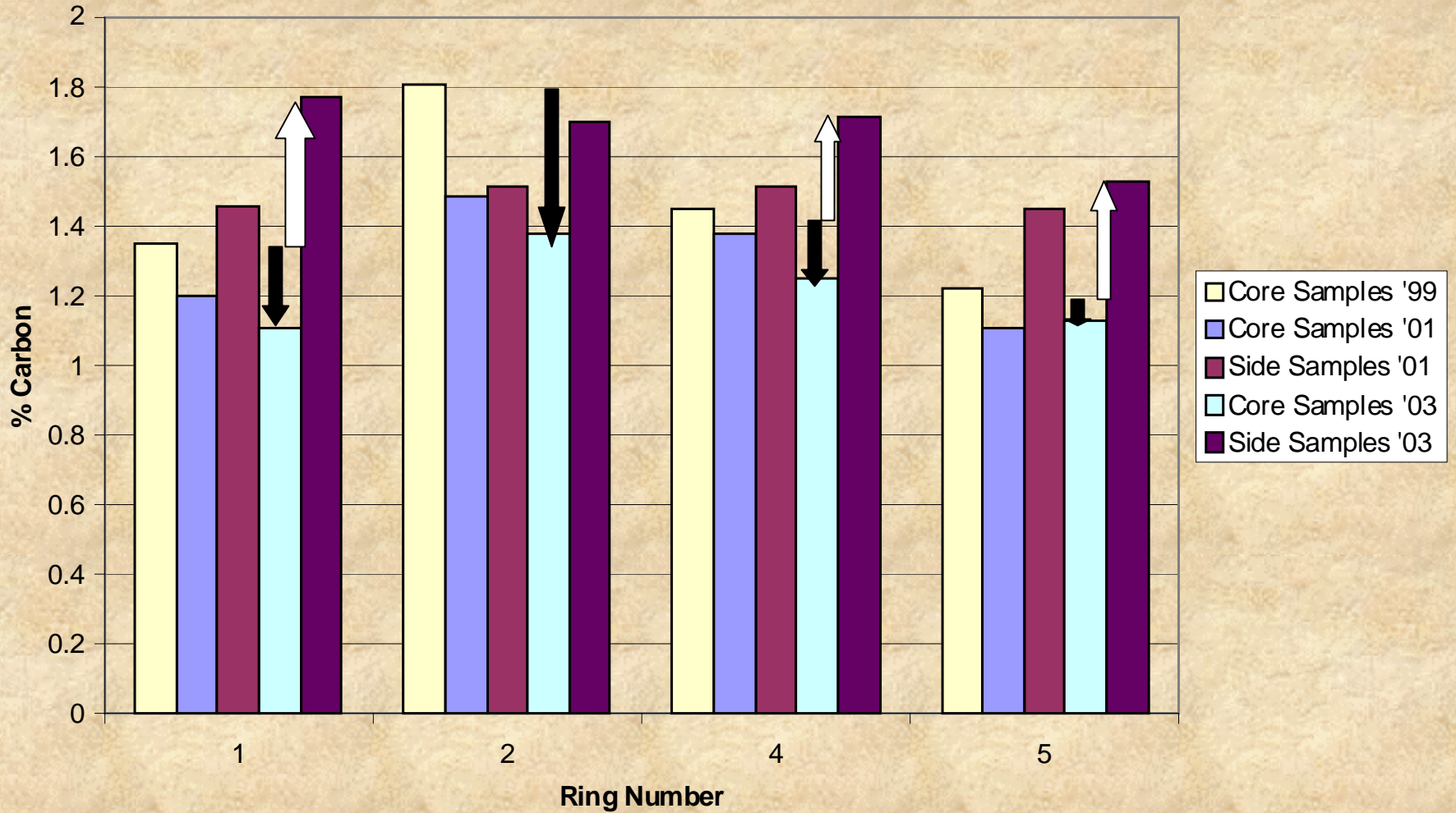
Average % carbon by weight for soil samples in 0-10 cm range of both treated and untreated sites



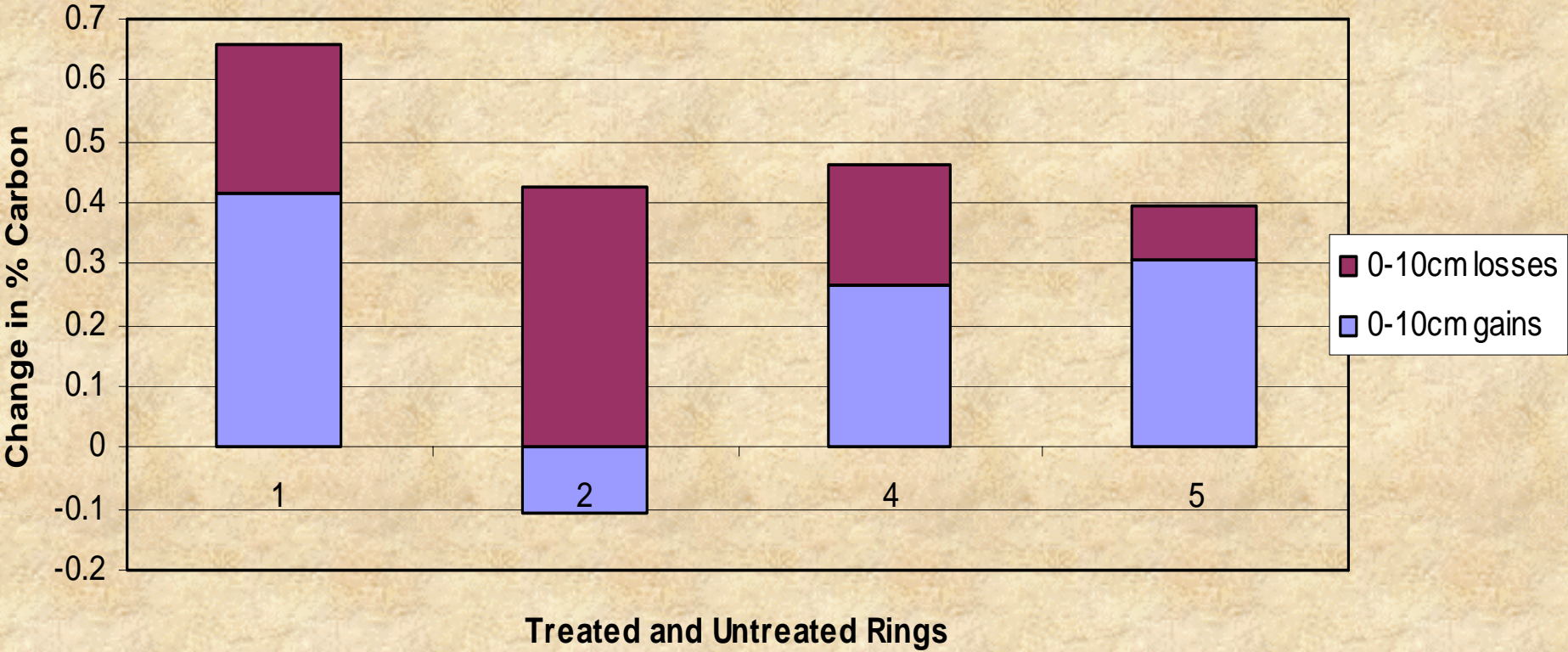
Average % carbon by weight for soil samples in 0-10 cm range of both treated and untreated sites



Average % carbon by weight for soil samples in 0-10cm range of each ring



Amount of new carbon in 0-10cm depth by ring



What's next?



- Statistical analysis
- Analysis for $\delta^{13}\text{C}$
- Estimate the magnitude of organic matter inputs

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