# Using analytical pyrolysis-GC/MS to evaluate the chemistry of environmental samples.

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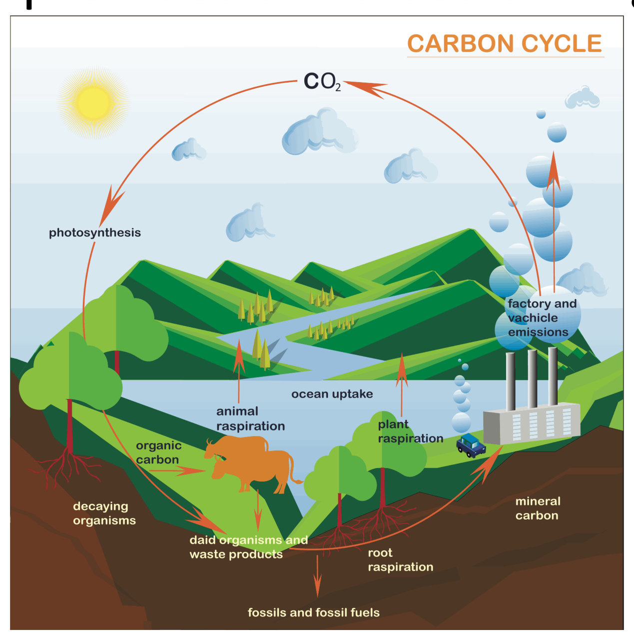
## Background

Analytical pyrolysis GC/MS is a technique used for investigating structural features of complex macromolecules. This technique has been successfully applied to studies of environmental science because it provides a molecular fingerprint of organic compounds.

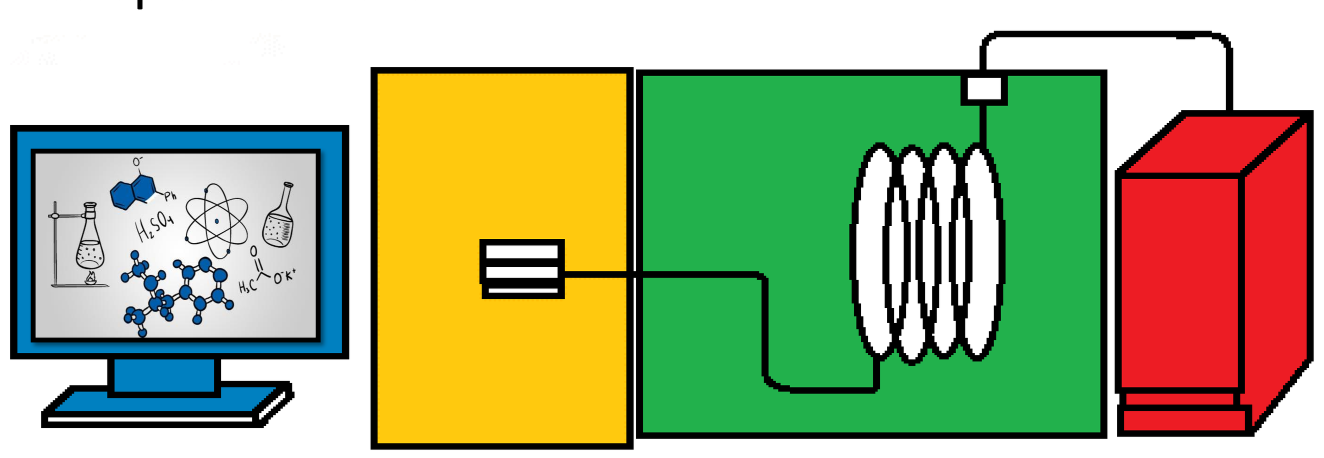



Understanding the chemical structure of soil organic carbon and its relationship to biological processes is needed to create models of carbon balance under changing patterns of climate, land use and other factors.

## Method

**Instruments configurations.**

CDS Pyroprobe 5150 pyrolizer is connected to a Thermo Trace GC Ultra gas chromatograph in line with an ITQ 900 mass spectrometer.

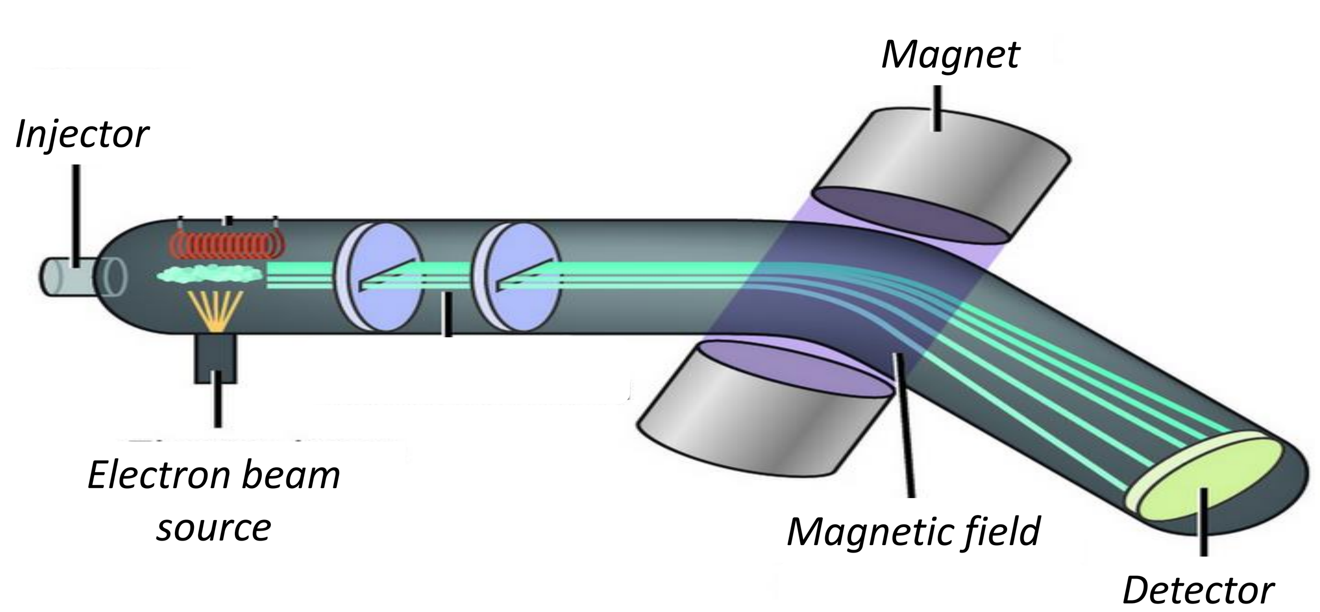


**Principles of mass spectrometry.**

**1.** Sample is injected in a gas phase.

**2.** Molecules pass a beam of high intensity electrons; this will induce ionization.

**3.** After ionization, all these different ions pass through a magnetic field and are distributed according to their mass/charge ratio.




## Data Analytics

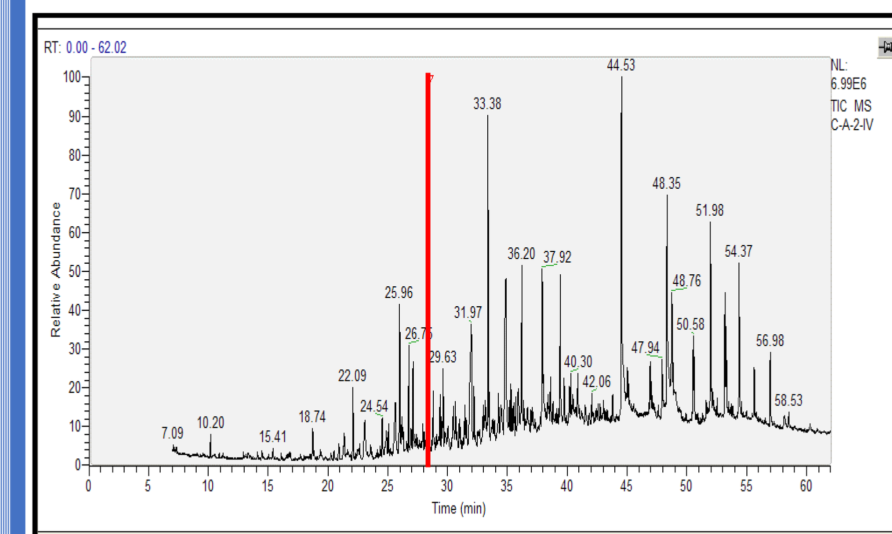


Figure 1. Chromatogram view.

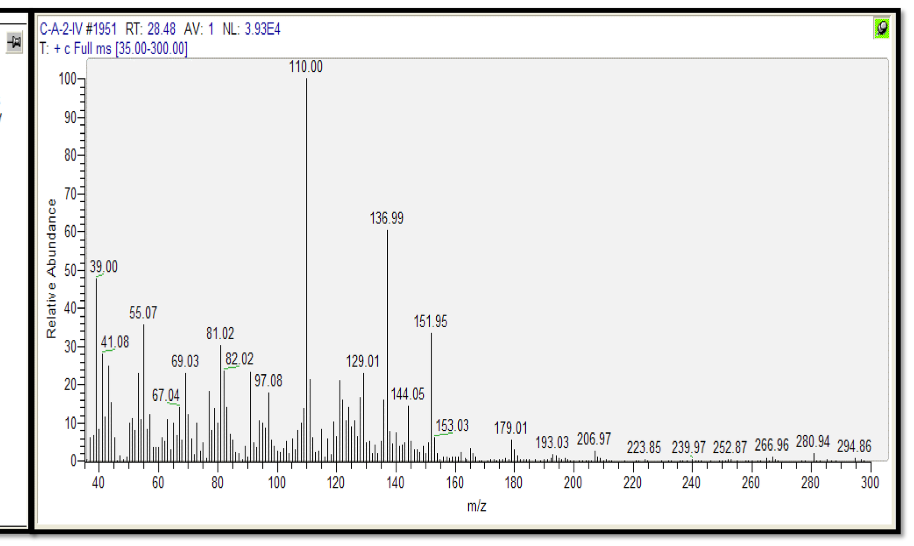


Figure 2. Spectrum view.

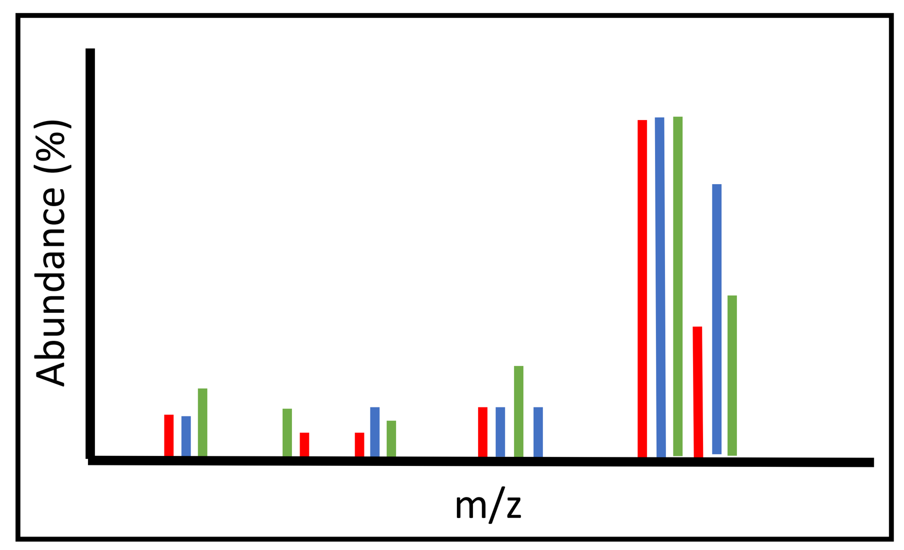



Figure 3. Raw view of ion extraction.

**DECONVOLUTION**

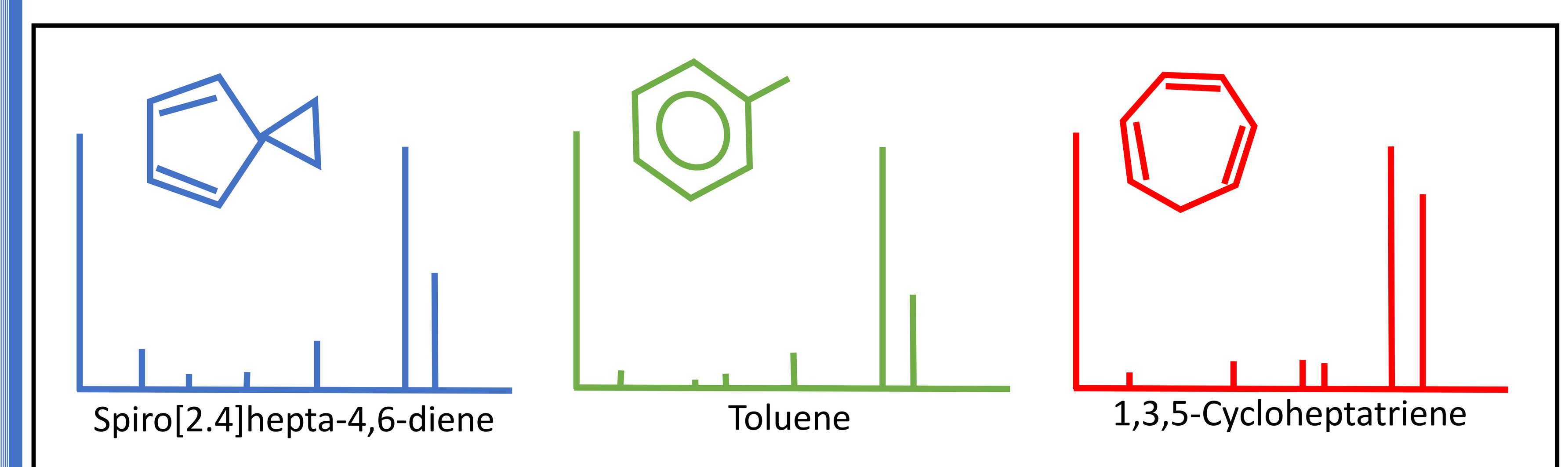



Figure 4. Deconvoluted ions.

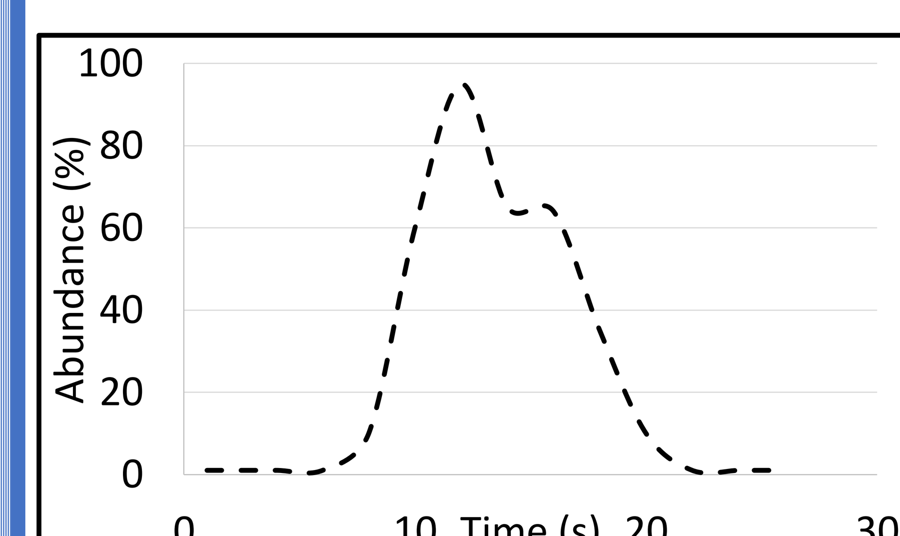



Figure 5. Raw view of a peak.

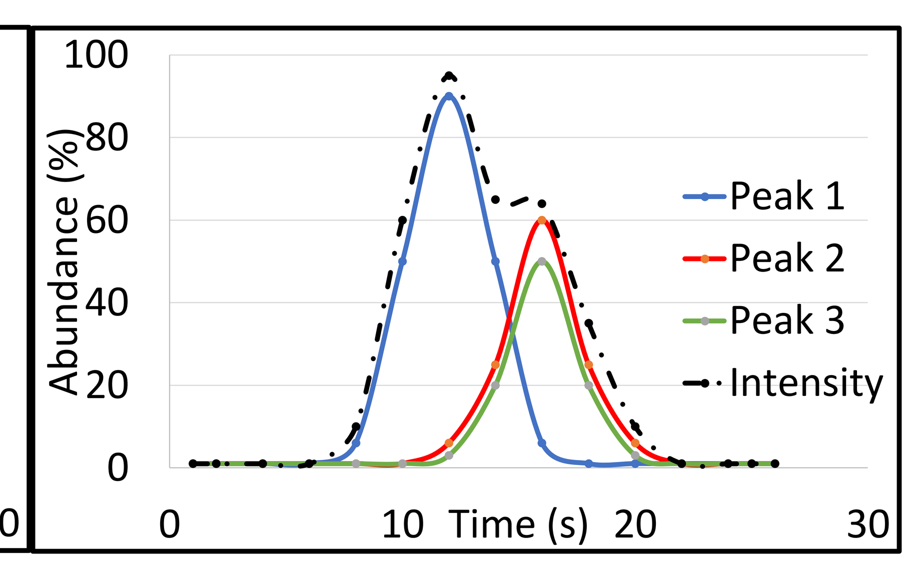
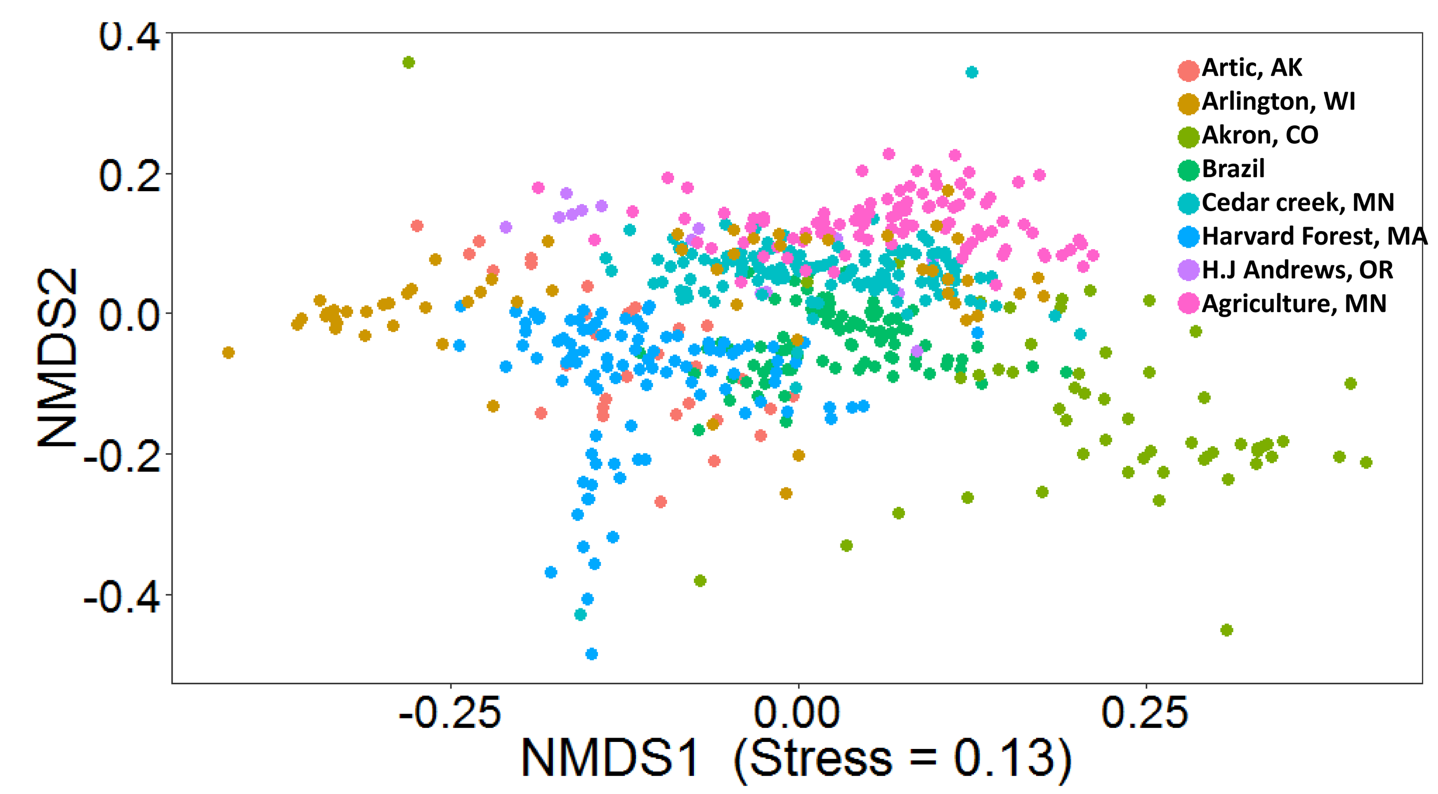


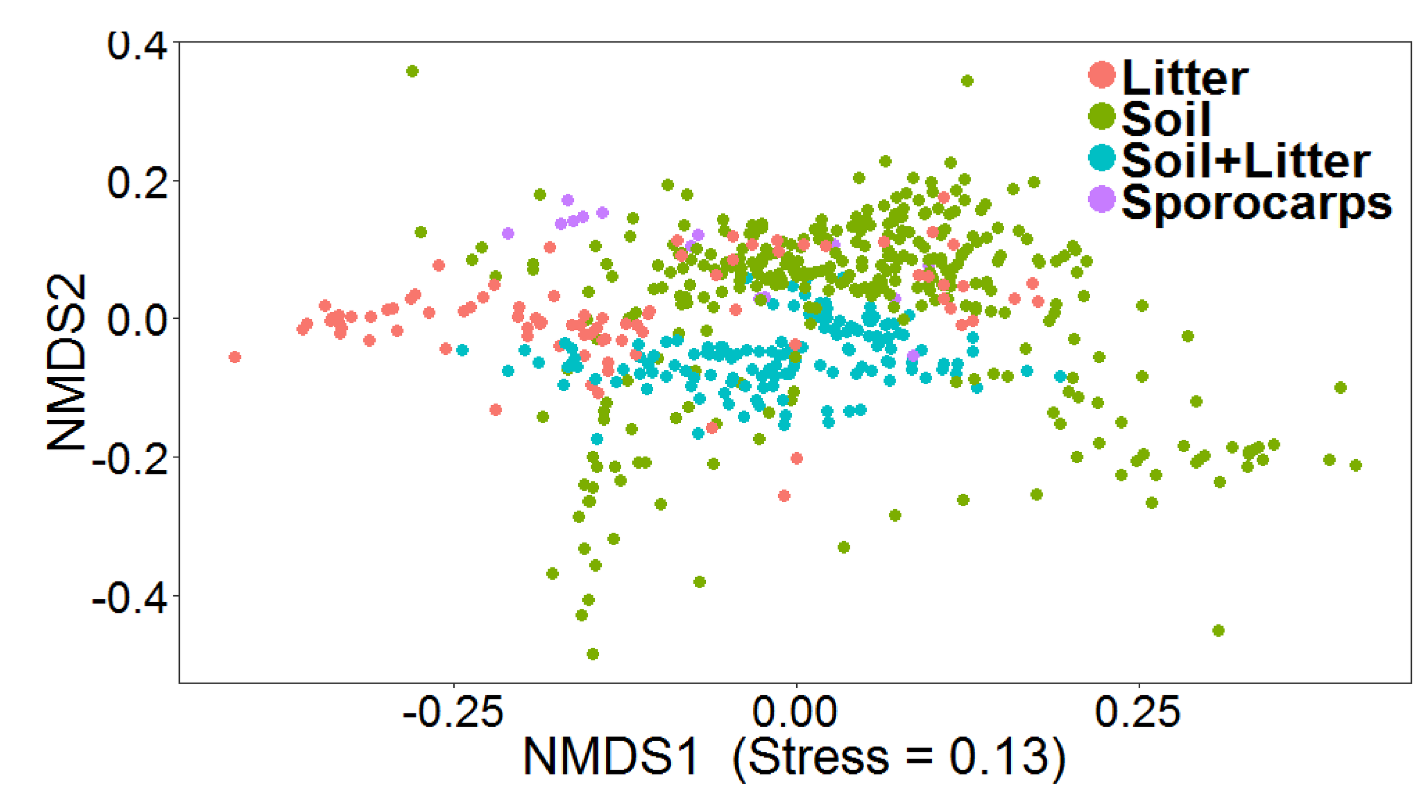

Figure 6. Deconvoluted peaks

## Preliminary Results

**Sampling sites:**

- ❑ Artic LTER, AK.
- ❑ Cedar Creek LTER, MN.
- ❑ H.J Andrews LTER, OR.
- ❑ Agricultural sites, MN.
- ❑ Akron, CO.
- ❑ Brazil
- ❑ Arlington Agricultural Research Station, WI.
- ❑ Chronic Nitrogen Amendment Study at the Harvard Forest LTER, MA.




## Potential Study

This method can be utilized to understand the correlations between carbon pools and climate variables such as changes in precipitation patterns, temperature, N depletion rates and altitude.