



# Coring for Carbon

## Marsh Soil Percent Organic Content Loss-On-Ignition Procedure

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(edited from: [http://www.pitt.edu/~mabbott1/climate/mark/Teaching/GEOL\\_3931\\_PaleoAnalysis/0909LOIProtocol.pdf](http://www.pitt.edu/~mabbott1/climate/mark/Teaching/GEOL_3931_PaleoAnalysis/0909LOIProtocol.pdf))

### PROCEDURE:

1. Label and weigh aluminum dishes. Record all weights on data sheets.
2. Obtain about 1 cubic centimeter sub-samples from the marsh core of interest and transfer the sub-sampled material to the aluminum dish.
3. Measure the weight of the wet marsh soil and aluminum dish the SSNERR lab balance. Subtract dish weight from total weight and record wet marsh soil weight.
4. After recording the wet marsh soil weight, place the marsh soil in their dishes into SSNERR's low-temperature drying oven. Set the drying oven temperature to approximately 60°C. Allow the wet samples to dry in the oven at 60°C for no less than 36 hours.
5. Periodically weigh the drying marsh soil samples until the dry weights stabilize. Remember to subtract the aluminum dish weight from the total weight (marsh soil + aluminum dish weight) to determine the marsh soil weight (see data sheet).
6. Once dry marsh soil sample weights are stabilized, remove them from the oven and record the final total and dry soil weight. Turn on muffle furnace and set to 550°C.
7. When the temperature stabilizes at 550°C, place the sample-filled aluminum dishes in the muffle furnace. Seal the furnace door again and allow the temperature to return to 550°C. Note the time. Since the furnace is so hot, it will be safer to place the samples in the cold furnace, turn it on set to 550°C, and note the time it reaches temperature.
8. Following 4 hours of heating/sample ignition at 550°C, carefully remove the crucibles from the muffle furnace and transfer the hot samples to the 60°C drying oven for cooling. Allow at least one hour for sample cooling. Again, since the furnace is so hot, it will be safer to simply turn off the furnace and let it cool at least one hour before transferring the samples to the 60°C drying oven for further cooling.

9. When the post- 550°C ignition samples have cooled enough for safe handling, record the ash and dish weights.
10. Organic matter content is readily calculated then as the difference in weight between the sediment dried at 60°C and the ash created following ignition at 550°C within a high temperature muffle furnace:

$$\% \text{ Organic Matter} = [\text{Weight of Post } 550^\circ\text{C Ash}] / [\text{Weight Post } 60^\circ\text{C Dry Sample}] \times [100]$$

#### **Procedural Considerations:**

Atmospheric humidity may influence all dry sample weights. Dried soils as well as sample vessels (aluminum dishes, etc.) absorb water from ambient laboratory air, providing a potentially significant source of error within calculations. Laboratory personnel should store all samples at temperatures greater than (or equal to) 60°C throughout the procedure. Ideally, samples should not be left exposed on laboratory counters during weighing sessions or between high-temperature firings.



## Coring for Carbon - Student Worksheet

### Marsh Soil Core Percent Organic Content Data Sheet

**Total weight** = (soil weight + aluminum dish weight);

**Soil weight** = (total weight - aluminum dish weight)

All weights in grams (g)

Sample ID \_\_\_\_\_ Sample Location \_\_\_\_\_ Date \_\_\_\_\_

Collector's Name: \_\_\_\_\_

Wet weight (weigh dish first)

Total wet weight		Dish weight		Wet soil weight	

Dry Weight

1

Total dry weight		Dish weight		Dry soil weight 1	

Dry Weight

2

Total dry weight		Dish weight		Dry soil weight 2	

Dry Weight

3

Total dry weight		Dish weight		Dry soil weight 3	

Post-Furnace Ash Weight

Total ash weight		Dish weight		Ash weight	

% Organic Content = (Ash weight/dry soil weight) x 100 = % organic content

Ash weight		Dry soil weight		% organic content	



## Group Data Sheet

## Marsh Soil Core Percent Organic Content