Response of Geochemical Proxies in Coastal Lakes to Storm Events

Research Goals

➢ To develop high-resolution records of storm history and environmental changes during the late Quaternary, based on multi-proxies in coastal lake sediments, for the Gulf Coast of northern Florida and the upper Atlantic coast of eastern Florida.

➢ To understand the long-term pattern in hurricane activity and its relation to climate change.

Purpose

To calibrate geochemical proxies in the modern environment in coastal lakes as they vary natural vs how they respond to storm events.

Background Information

Isotopes of Interest and Their Natural Abundance

Carbon

\[ ^{12}C \quad 98.89\% \quad ^{13}C \quad 1.11\% \quad ^{14}C \quad \text{radioactive} \]

Nitrogen

\[ ^{14}N \quad 99.64\% \quad ^{15}N \quad 0.36\% \]

Oxygen

\[ ^{16}O \quad 99.63\% \quad ^{17}O \quad 0.0375\% \quad ^{18}O \quad 0.19995\% \]

\[ d^{18}O \] (Two stages, lake carbonates and lake solids)

Sources of Geochemical Proxies

➢ Sources of the OM in sediments
➢ Coastal Lake environment

Data Analysis

Procedure

1. Collect water samples from coastal lakes under both pre and post storm flooding conditions on a seasonal basis.

2. Accumulate particulate organic matter from the water samples onto glass fiber filter paper and allow to dry out thoroughly.

3. Gently scrape off the POM using a sterile blade, onto clean weighing paper cautiously using gloves and tweezers so that no organic material from hands contaminates the lake matter.

4. Carefully place POM into sterile glass tubes with clean tweezers and label tubes appropriately.

5. Using a calibrated analytic balance measure desired amount of POM into the appropriately sized pressed tin capsules and fold capsules gently using tweezers to eliminate as much air as possible. Be sure to prepare at least 2 sets of capsules for each sample.

6. Prepare at least 2 sets of each standard material into tin capsules for comparison. (YW1, YW2, YW3, YW4, YW5, U2).


8. Monitor Carbon and Nitrogen peaks from the lake material against the standard material as samples are combusted to determine whether or not sufficient lake material was included. When results indicate, adjust amounts then repeat steps 5 - 9.

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