A SEDIMENT ANALYSIS OF THE THREE DOG SITE (SS21), SAN SALVADOR ISLAND, COMMONWEALTH OF THE BAHAMAS

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Background

- Earliest known archaeological site within the Bahamian Archipelago.
- Dated between 660-865 AD

50 100 km

North Atlantic Ocean

50 100 mi

Eleuthera

- Once inhabited by the Lucayans, or Lukki-Ciari
- Excavated 1984 -1994

The Excavation Revealed the Following Site Structure:



7.5

10

0 1.252.5

Methods



- From 104 1x1m² excavation unit a sediment sample was taken from the overburden, cultural level, and "sterile" dune Samples taken from the wall

Sediment Samples were Bagged and Stored at the Gerace Research Center



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SS21 2009

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Hypothesis

- 1. Can chemical anomalies within the cultural unit of the Three Dog Site be traced to anthropogenic activities?
- 2. Can these chemical anomalies be used to better characterize usage patterns within ancient Lucayan settlements?

Advantages of Using the Three Dog Site for this Study

- The site was excavated at an extremely high resolution
- The relatively pure calcium carbonate nature of Bahamian sediments reduces the number of ambient contaminants within them



Inductively Coupled Plasma-Mass Spectrometer (ICP-MS)

Trace elemental concentrations examined:

-Mg, Al, P, Ti, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Rb, Sr, Zr, Cd, Sn, Ta, and Pb.

- Elements with the highest concentrations included:

P, Sr, Fe, Al, and Ni

Data Were Discriminated Using ANOVA Tests



Phosphorous Concentrations were Highest in the Midden



P value = 0.355

P Concentrations displayed Stratigraphically







Increased Quantities of Phosphorous Have Been Associated Human Activities

- Activities including food consumption, food preparation, and fecal material
- Phosphorous occurred at the highest levels in the midden area and activity (food preparation) area
- Waste was being deposited in the Midden area

Strontium Concentrations were Highest in the Midden and Activity Area



P Value = 0.000

Sr concentrations displayed Stratigraphically









The Sr enrichment of midden Sediments may have been due to the presence of shell material

 Open excavation the Midden contained the highest density of shell material

 Little to no shell material was found in the house structure

Iron Concentrations were Highest in the Midden Area



P Value = 0.012

Fe Concentrations Displayed Stratigraphically











Aluminum Concentrations were Highest in the House Structure



P Value = 0.051

Al Concentrations displayed Stratigraphically











Ni Concentrations were Highest in the House Structure



P Value = 0.038

Ni Concentrations Displayed Stratigraphically











AI, Fe, and Ni Concentrations Could be Related to Lucayan Pottery

- Clays found in the Bahamas, tend to contain an average of 31.2 Wt% Al₂0₃, and 13.0 Wt% Fe₂O₃
- The highest levels of Al were located within the house structure
- Fe concentrations did not parallel Al
- The highest mean elemental concentration of Fe was in the midden
- Bahamian pottery contained less Ni than pottery from the Dominican Republic, Haiti, and Cuba
 - 30% of all found pottery traceable to east central Cuba, which may account for the presence of Ni at SS21

Major Conclusions

- Phosphorous concentrations were highest in the midden and food preparation areas; such trends are most likely indicative of usage patterns within the site
- Phosphorous concentrations were stratigraphically highest in the cultural unit
- The midden area was enriched in Strontium, possibly from the presence of shell material
- Nickel concentrations were highest within the cultural unit; this signature may be related to Lucayan Pottery
- Nickel concentrations were relatively constant across SS21
- Aluminum concentrations were lowest in Activity Area 2
- Iron concentrations were highest within the house structure

Significance

- This study further proves that chemical anomalies can be tied to anthropogenic signals within an archeological site.
- Given this site was excavated at such a hich resolution, these data may serve as a control for future chemical analysis
- To survey archeological sites prior to excavation.
 To better understand settlement patterns.



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Questions



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