

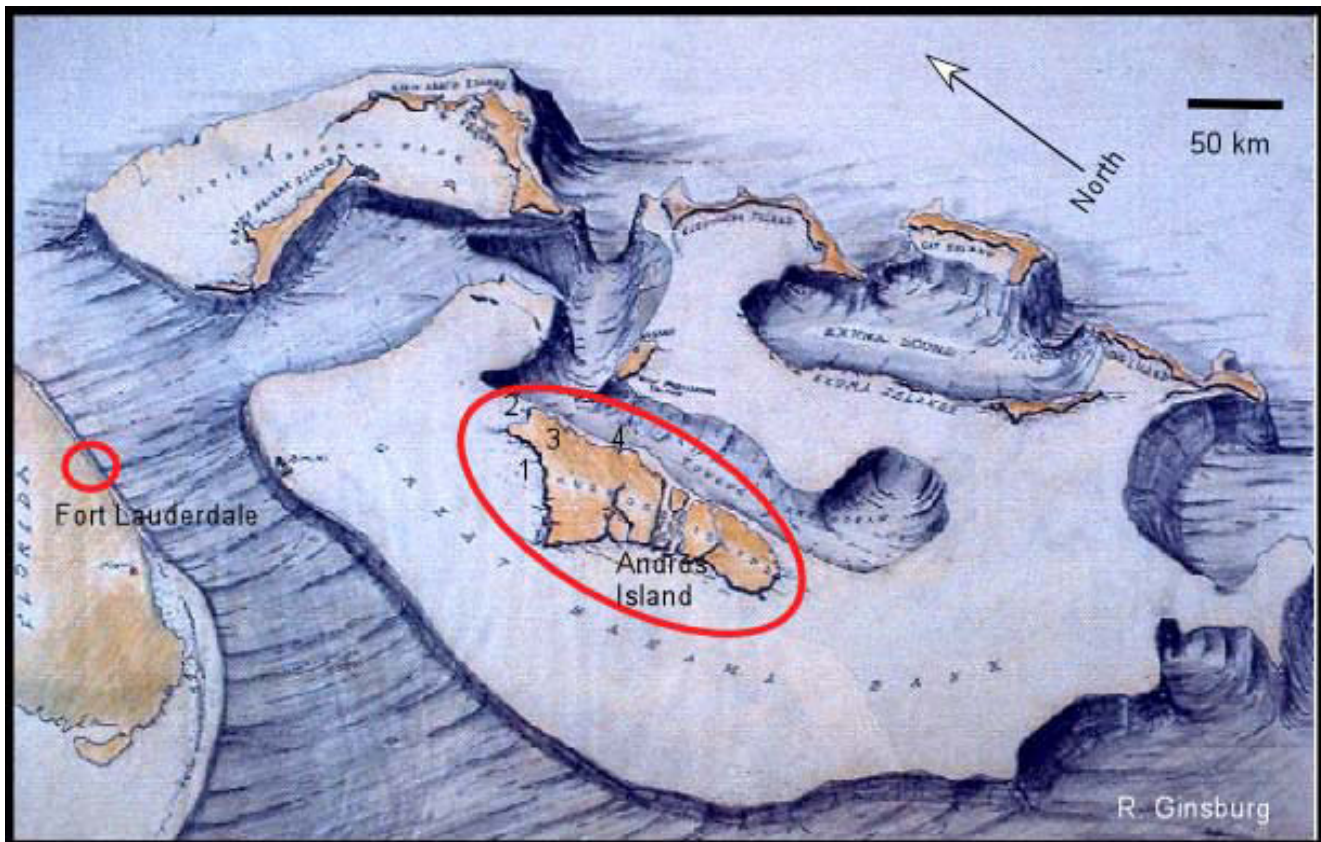


Andros Island, Bahamas Field Trip

Geology and ecology of Bahamian carbonate environments - coral reefs (patch reefs, barrier reef crest, wall), tidal flats, beaches, ooid shoals, tidal creeks, blue holes, Pleistocene eolianite, cemented crusts, beach rock

Date: 12-17 July 2008

Trip Leaders: Robert Ginsburg and Philip Kramer



Map 1. Generalized sketch of the Bahamas showing the bathymetry of the shallow carbonate banks and locations of Andros Island relative to the ICRS meeting location in Fort Lauderdale, Florida. The field trip will focus on central and northern Andros which has some of the most spectacular examples of Bahamian reefs and other carbonate environments

Field Trip Overview:

This field trip is designed for the scientist, professionals, and advanced students who are interested in seeing a variety of the Bahamas unique carbonate environments and understanding the geological and ecological processes that continue to shape them. The trip will begin after the Symposium and will include 4 full days in the field, discussions of specific case examples, and evening presentations about the ecosystems and human dimensions. The field trip includes round trip air flight from Fort Lauderdale, Florida, all accommodation, meals, transportation, and 1 day of diving (2 full tank dives and numerous snorkel opportunities).

Located off the southeastern tip of Florida, Andros Island is the largest island in the Bahamas at 160 km long by 65 km at its widest point. The eastern margin of Andros is bordered by the Tongue of the Ocean, a 1,800 m deep abyss that separates Andros from the capitol city of New Providence. The western side of the island is surrounded by shallow waters overlying the Great Bahama Bank. Andros supports some of the last remaining tracks of undeveloped dry broad leaf evergreen formations (i.e. coppice) found in the Bahamas including dwarf shrublands, shrublands, woodlands. Much of the central of the island contains extensive freshwater pineland forests which are dependent on the underlying freshwater lens that has formed within the bedrock. There are currently about 9,000 people living in settlements along the east coast who remain closely connected to the land and sea. Predominant industries in Andros include sponging, fishing, crabbing, fly-fishing, tourism, basket weaving, and woodcarving. Due to the island's small population and vast uninhabitable areas, impacts on the island's biodiversity are still relatively low. Many rare and endangered species occur here including sea turtles, Flamingos, the Andros rock iguana, the only iguana in the Bahamas not confined to small cays, can be found in the interior pine and evergreen broadleaf areas. Andros also has the highest concentration of blue holes in the Western Hemisphere, and the largest reservoir of freshwater in the Bahamas.

The Andros bank barrier reef runs for more than 230 km along the Tongue of the Ocean, making it one of the longest in the western Atlantic. The main reef lies 1-5 km from the Andros shoreline separated from shore by a shallow (2-4 m) and narrow (often less than a kilometer) lagoon. The lagoon has cays, submerged shoals and algal reefs. The reef is discontinuous in many places, particularly around the central portion of Andros where several large channels (bights) traverse across the entire island dividing it into three distinct land masses. The coral reefs support a large population of *Acropora* and *ontastraea* coral as well as several well known Nassau grouper spawning aggregation sites. These reefs have developed under relatively low energy conditions because of the protection afforded by the surrounding banks. It is not uncommon to get more than 4 meters of vertical reef growth often in the form of small pinnacles that rise up off the bottom. A dramatic coral wall occurs along the entire length of the island at a depth of between 25 and 35 meters. The exceptional clear water (known as the clearest in the world) allows coral growth down to depths in excess of 80 meters.

Andros Island currently has five national parks, which were declared in 2002. These parks fall under the authority of the Bahamas National Trust who is in the process of developing management plans for the parks.

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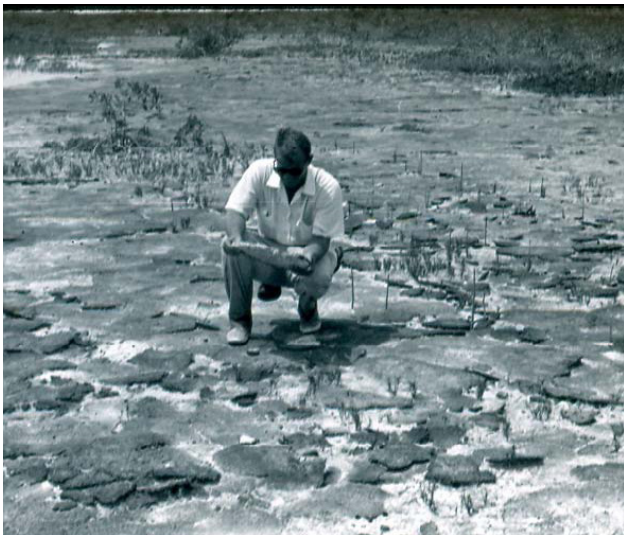
Cost: \$1500 USD including airfare, lodging (double occupancy; if you prefer to have your own room, there will be an additional cost of \$55/night), food, and transportation, and boats, tanks and weights for diving. Cost does not include other dive gear that may need to be rented.

Trip Itinerary:

Detailed descriptions: July 12 (day 1) to July 17 (day 6)

12 July (Day 1): Bahamas by Air. Depart Fort Lauderdale, aerial view of Bahamas and Andros Island. Arrive, check into hotel, afternoon snorkel off hotel beach- nearshore seagrass and coral reef communities. Evening introduction to the Bahamas and opportunities to meet islanders and experience living on an Out Island

13 July (Day 2): West Andros - tidal creeks, mud flats, mangrove communities, cemented crusts, microbially laminated sediment. Depart by bus at 8:00 am to Red Bays where we will board small boats run by native guides for a trip down the northwest coast of Andros. We will explore the Peritidal flats of Three Creeks, Andros offer a thoroughly documented example of a spectrum of sedimentary features; algal-laminated sediments, cemented dolomite crusts and extensive marsh deposits of alternating algal and storm-deposited sediments. Pack lunch provided.



Peritidal mud flats with cemented dolomite crusts and dwarf mangrove communities (R. Ginsburg and P. Kramer).

14 July (Day 3): Joulter Cays - contemporary ooids, submarine and vadose cementation, beach rock, hurricane layers. Depart by bus at 8:00 am to a North Andros marina where we will board small boats for a 1 hour trip north to the Joulter Cays. Joulter Cay ooid sand shoals provide an unparalleled experience to see and sample contemporary ooids forming on shallow banks and accumulating on beaches and peritidal flats. Examples of submarine and vadose cementation and the remarkable preservation of subtidal hurricane layers. Lunch provided. Snorkel gear and wading shoes.

15 July (Day 4): Central Andros Bank Barrier Reef - reefs crests, fore reef, lagoonal patch reefs. We will spend a full day on the water exploring the Andros Bank Barrier Reef along the central coast of Andros Island alternating between diving and snorkeling (2 tank dives, 2 snorkels) Sites will include:
A) Reef crests: Emerging reef crests with discontinuous patches of the magnificent Elkhorn coral *Acropora palmata* and staghorn coral (*Acropora cervicornis*). Andros contains one of the larger

populations of *Acropora* coral left in the Caribbean, although disease and predation continues to take a toll. Fish populations in these shallow reef crests areas are very high. B) Fore reefs: We will dive on the shallow fore reef where head corals form a nearly continuous carpet dominated by *Montastraea annularis*. The low wave energy setting in central south Andros allows the development of coral pinnacles up to 5 m high in places. Extensive coral bleaching and disease have caused major losses to these reefs during the past decade and algal overgrowth is high. The endangered Nassau grouper occurs in high abundance on Andros fore reefs.



Section of the Andros barrier with large *Acropora* colony (K. Marks)

16 July (Day 5): Pleistocene eolianite, reef limestone and blue holes (afternoon) - Morning will be optional diving or snorkeling or free time to explore the island. At 1:00 pm we will depart by bus to see examples of Pleistocene eolianite. Almost all the islands of the extensive Bahamian Archipelago are composed of Quaternary eolianites, marine sand deposited on beaches and swept up into stationary dunes up to 50 m high. We will visit an example showing foreset bedding and soil horizons with land snails, which develop when rate of deposition is reduced. We will also visit exposed Pleistocene coral reef at Nichols town, Andros shows how different a preserved reef can be from its living counterpart offshore of the Island. Andros Island also has the highest density of blue holes in the world. Blue holes are collapsed karstic sink holes that are the surface expression of a vast labyrinth of caves and passages formed by dissolution during low stands of sea level. We will visit several examples and cool off with a swim in one of them. Snorkel gear and wading shoes.

17 July (Day 6): Pack and depart for airport. Return flight to Fort Lauderdale Airport (by 3:00 pm).

Field Trip Leaders: Robert Ginsburg, Ph. D. Professor of Marine Geology, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami. Professor Ginsburg is a pioneer in the areas of

carbonate geology and coral reefs of south Florida and the Bahamas. He has published extensively on aspects of carbonate sedimentology and has led dozens of field trips to the Bahamas.

Philip Kramer, Ph. D., Caribbean Marine Program, The Nature Conservancy, Florida Keys. Dr. Kramer has studied Caribbean marine ecosystems for more than 10 years and publishing one of the first large-scale benthic and fish characterizations of the Andros reef tract. He is currently involved with numerous scientific and conservation efforts in the Bahamas and Caribbean.

Meeting Point: Fort Lauderdale Airport, 12 July 2008 (exact time to be determined, but plan on 11 am)

Number of participants: 12 – 20

Additional Information:

For those not interested in diving, there will be a parallel opportunity for snorkeling. A detailed list will be sent out for what equipment you will need to bring. If you do not plan to bring snorkel or dive equipment, you must make arrangements to rent from dive shop on Andros at your own expense. For divers, Dive certification proof is required and we recommend participants acquire DAN or other diving insurance.

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