BUCK, DAVID, Land Use and Environmental Change Institute and College of Natural Resources and Environment, University of Florida, Gainesville, FL

**Modern Water Chemistry and Benthic Foraminiferal Abundance in Lago Enriquillo, Dominican Republic**

Lago Enriquillo, Dominican Republic (N 18°30' latitude, W 71°40' longitude), is the largest lake in the Antilles with a surface area of 200km$^2$ (Fig. 1). The north basin has a maximum depth of 22.5m and the south basin has a maximum depth of 9.0m. The lake is part of the Neiba/Cul-de-Sac Valley, which stretches from the Bahia de Neiba in the Dominican Republic to Port-au-Prince, Haiti.

During the early to mid-Holocene, a portion of the Neiba Valley, including Lago Enriquillo, was connected with the Caribbean Sea. Marine conditions persisted long enough and maintained adequate circulation for fringing coral reefs to develop. A shift from marine to brackish conditions occurred in the late Holocene and is thought to have occurred when Lago Enriquillo became separated hydrologically from the Caribbean as a result of fluvial damming and possible tectonic uplift (Mann *et al*., 1984; Taylor *et al*., 1985). Currently, Lago Enriquillo is 41.5m below sea level (BSL) and is hypersaline with historic salinities ranging from 50-100ppt. Salinity in Lago Enriquillo is determined largely by variations in watershed hydrology and the evaporation/precipitation ratio (E/P) in the basin.

Recent research in the Enriquillo basin has focused on ionic and isotopic relationships in the water column (Araguás Araguás *et al*., 1993), changes in basin hydrology and associated plankton, algal, and diatom communities (Margalef, 1986), composition of the flora and fauna in and around the basin and water chemistry (Inchaustegui *et al*., 1978), and population dynamics of the American crocodile (*Crocodylus acutus*) (Schubert, 2000). In this study, I examined the benthic faunal community of Lago Enriquillo. I assessed the relative abundances of benthic foraminifera and other associated benthic microfauna in surface sediments from 25 sites in the basin. Relative abundances were compared with local water column variables.

In November 2002 and March 2003, I collected surface sediment and water samples from the lake and numerous fresh water springs that discharge into the lake.
Surface sediments and associated waters were collected along transects from fresh water springs to hypersaline lake water to sample a variety of microenvironments within the basin. Sediments were also collected in deep areas of each basin. Surface sediments were retrieved with an Ekman dredge and sieved through 355μm mesh in the field to remove the coarse fraction. Samples were washed with fresh water and fixed with isopropyl alcohol (70%). Samples were transported to shore, washed again with fresh water, and stained with Rose Bengal (1g/L $H_20$) to distinguish living from dead foraminifera (empty shells). After five hours of staining, samples were again washed to remove excess stain and stored in plastic cups for transport to the Florida Institute of Paleoenvironmental Research (FLIPER) at the University of Florida. In the lab, a subsample (approximately 10g wet weight) from each of the 25 sample locations was washed through a 63μm sieve and dried. Benthic foraminifers, ostracods and pelecypod mollusks were identified in the 63μm fraction. Relative abundances in each sample were calculated by counting and identifying 300 individuals. Individuals with fractured or damaged apertures or otherwise degraded shells were not included in the tally. The oxygen isotope ratio ($\delta^{18}O$) was measured in the carbonate shells of stained foraminifera (*Quinqueloculina* sp.) to investigate the fractionation behavior of the species and how the fractionation relates to water column variables.

Preliminary findings reveal a high relative abundance of milliolid foraminifera, dominated by *Quinqueloculina* species along with the presence of *Elphidium* and *Ammonia* species.

Q*uinqueloculina* species are associated with high relative abundances of two ostracod genera, *Cyprideis* and *Perissocytheridea*. Water chemistry analyses show correlation between salinity and $\delta^{18}O$ of spring and lake water. The presence of these species and their modern abundances in relation to water column variables will be used to interpret stratigraphic changes in Holocene-age sediment cores retrieved from Lago Enriquillo in June 2001. Quantitative relations between abundant foraminifera species and water column variables will be used as proxies for inferring past changes in lake hydrology and E/P.