Trace Metal Concentrations in Lake Corpus Christi, Texas, Water Profiles Subsequent to an Overturn Event

Jill Brandenberger[1-2], Patrick Louchouarn[1-2], Ronald Parker[1-3], Philippe Tissot[1], Patrick Michaud[1-2,4], Bruce Herbert[3], Jim Bonner[1], Mark Beaman[1-2], Martha Williams[1-2]

[1] *Conrad Blucher Institute – Texas A&M University- Corpus Christi, TX 78412*
[2] Departments *of Environmental Sciences - Texas A&M University- Corpus Christi, TX 78412*
[3] Department *of Geology and Geophysics - Texas A&M University, College Station, TX 77843*
[4] Department *of Computer Sciences - Texas A&M University- Corpus Christi, TX 78412*

In the semi-arid climate of the South Texas Gulf Coast, fresh water is a vital, but limited resource. Population increases over the last several decades have intensified pressures on the natural resources and ecosystems of this area (USEPA, 1999). The quality of and access to water resources is a critical point in favoring or stressing the stability of our communities and the economic development of activities such as agriculture, fisheries, and tourism. New initiatives have been undertaken recently to monitor water quality in the Corpus Christi Bay Coastal system, but comprehensive information on the quality of our freshwater sources is presently lacking. A year ago, our group (Texas A&M Corpus Christi and Texas A&M) was awarded a Texas ARP grant to study the fate and impacts of contaminants (heavy metals and radionuclides) originating from South Texas Uranium Mines on the Nueces River Watershed. Our major focus of interest was the identification of geologic environments that sequester contaminants within this watershed, and thus may retard their transport, as well as reconstructing the temporal variability of contaminant inputs to the whole system. In order to do this we selected Lake Corpus Christi, TX as a study site that could provide information on both processes because: 1) a maze of upstream meandering wetlands should act as “filtering” environments for redox sensitive oxyanions (like arsenate) with strong affinities for organic-rich, reducing sediments; 2) the deep part of the lake, as a depocenter for fine sediments, should provide ideal conditions for preserving a chronological record of historic metal inputs; 3) the lake is subject to both temporal and episodic mixing events; and 4) the lake acts as both an important regional recreational area and the source of fresh drinking water for a number of communities. The focus of our project was directed towards temporal characterization of trace metal concentrations in the water column because dissolved toxicants exhibit order-of-magnitude increases in bioavailability relative to particle associated contaminants (Neff, 1984).

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