

Isotope Investigation

Table 1: Concentrations of ^{210}Pb , ^7Be and ^{137}Cs in sediments, muck and trap samples

Sample	^{210}Pb (dpm/g)	^7Be (dpm/g)	^{137}Cs (dpm/g)
Bottom Sediments and Muck			
Bottom sediments	2.15±0.27	0.53±0.17	.10±0.03
Muck-1 (July '09)	0.66±0.19	BD	BD
Muck-2 (July '09)	0.61±0.21	BD	BD
Linwood-Muck (Aug. '09)	0.41±0.20	0.97±0.15	0.03±0.02
Baycity-Clock-Muck (Aug '09)	10.22±0.98	12.25±0.89	0.31±0.10
Entrance-Muck-1 (Aug. '09)	14.64±1.06	4.89±0.82	0.23±0.08
Entrance-Muck-2 (Aug. '09)	6.90±0.52	2.89±0.41	0.23±0.05
Sediment Traps			
Trap-1 (4/29-?; F3)	29.6±0.8	19.4±0.6	1.97±0.07
Trap-2 (6/18-7/13)-WCA-2	24.5±4.0	31.1±4.0	BD
Trap-3 (4/29-?)	34.8±0.8	21.7±0.6	2.51±0.08
Trap-4 (6/28-7/13; 10-20)	2.75±1.03	3.22±0.94	BD

BD: below detection limit

What Radioisotopes Tell us?

- The muck samples collected in July 09 were fossil muck (no Be-7, Cs-137 or Pb_{ex}-210 present)
- Muck collected in August had very high concentrations of Be-7, Pb-210 and Cs-137
- We can delineate the old and recent muck based on these nuclides
- The trap studies suggest that the resuspension is very strong and the fluxes of radionuclides are governed by resuspension during June-July months- Linkage between resuspension and muck formation can be established

Uranium Isotopic Study

• Data:	U- conc. (ug/L)	U-234/U-238 AR
Saginaw River Upstream	1.31	1.14±0.01
Saginaw River	1.09	1.15±0.01
Saginaw Bay	0.53	1.17±0.01
River-mouth	0.63	1.19±0.01

Conclusion

- Distinctly different U concentration and Isotopic ratio in river and Bay waters – source of identification of U and P are possible (geochemically similar elements and hence P sources can be traced using U conc. & activity ratios)

Stable N and Carbon Isotopes

- Muck: $\delta^{13}\text{C}$: -22.5 to -25.5‰ (sources of carbon to the muck vary; n=4); sediments also vary
- Muck : $\delta^{15}\text{N}$: 0.3 to 9.4 ‰ (sources of nitrogen to the muck also varies; n=4); sediments show narrow range

Proposed Study for Coming Field Season

- **Source characterize N, OC, O (PO₄): about 30-40 muck and sediment samples**
- **Characterize age of muck formation; amount of resuspended sediments incorporated in the muck; importance of sediment resuspension for muck formation: 20 muck and 20 bottom sediment samples for Cs-137, Be-7, Pb-210, Ra-226, Ra-228**
- **Source of P using U activity ratios: U conc and activity ratios in about 20 water samples (rivers and Saginaw Bay)**
- **Quantify the fluxes of nuclides and mass using sediment traps: 10 sediment trap for radionuclide study**
- **20-30 particulate and dissolved for radionuclides (to quantify the mass flux and sediment resuspension flux)**