

# Source Apportionment of Mercury and Cadmium in Traditional Arctic Foods

(Peter Outridge, Keith Hobson, James Savelle, Patrick Roach)

Two problem sites/species (high Hg or Cd)

1. Hg in Ringed seals -- Victoria Island
2. Cd in Caribou -- Yukon Territory

# Source Apportionment of Metals in the North

**Aim:** Quantify Impact of Human-derived Sources on Hg & Cd in Important Northern Foods  
(in this case, caribou & seal)



**HOW:** Long-term trends through time,  
using historic & pre-industrial  
vs modern teeth

- Yukon caribou
- Beaufort Sea ringed seals

## **PARTNERS:**

- McGill U.
- DIAND (Yukon)
- Yukon Govt
- DFO (Arctic Region)

# Cadmium in Yukon caribou over 6,000 yrs



## Melting “ice patch” in Carcross area, Yukon







## Caribou remains encased in ice . . . .



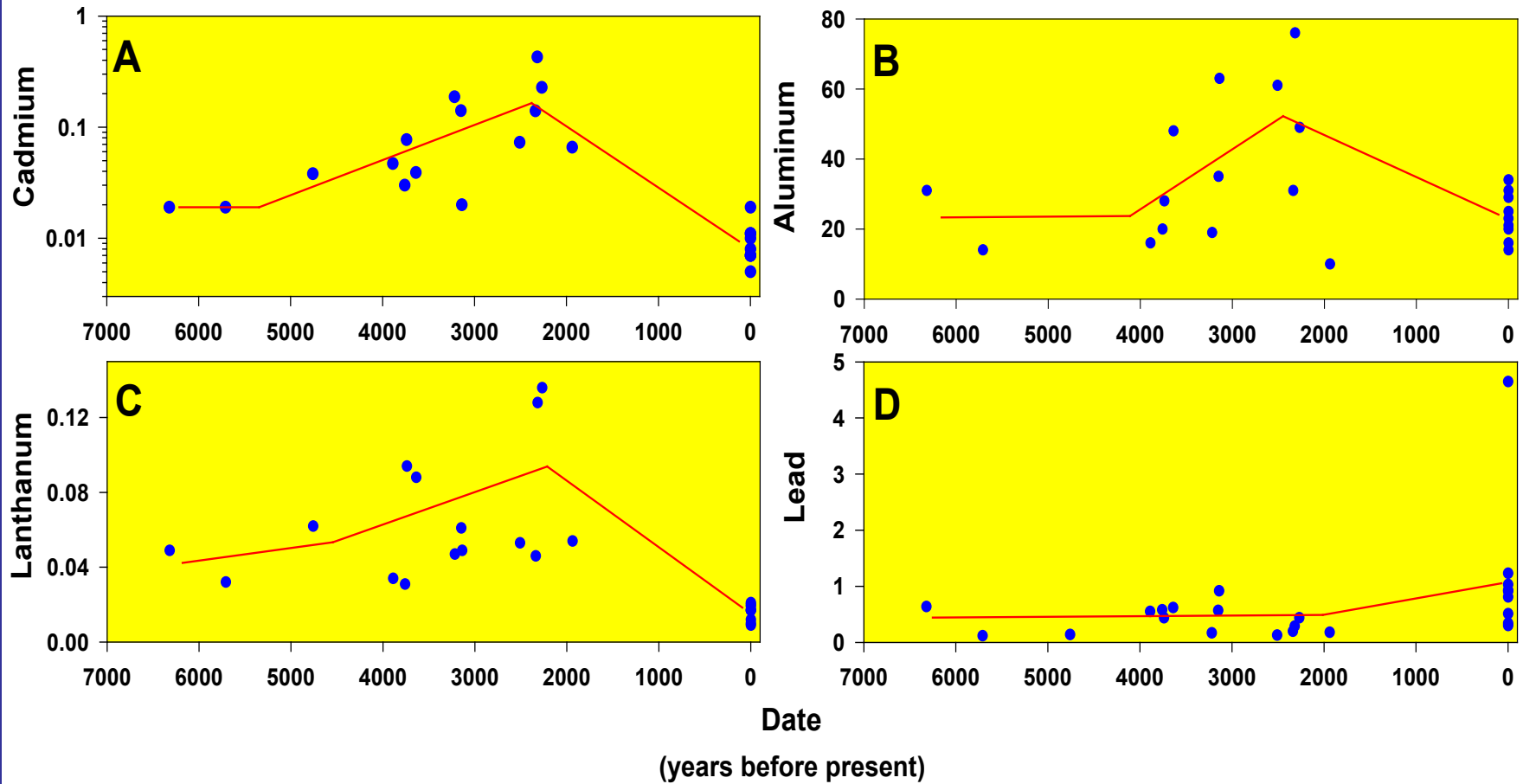


.....include teeth (molars)



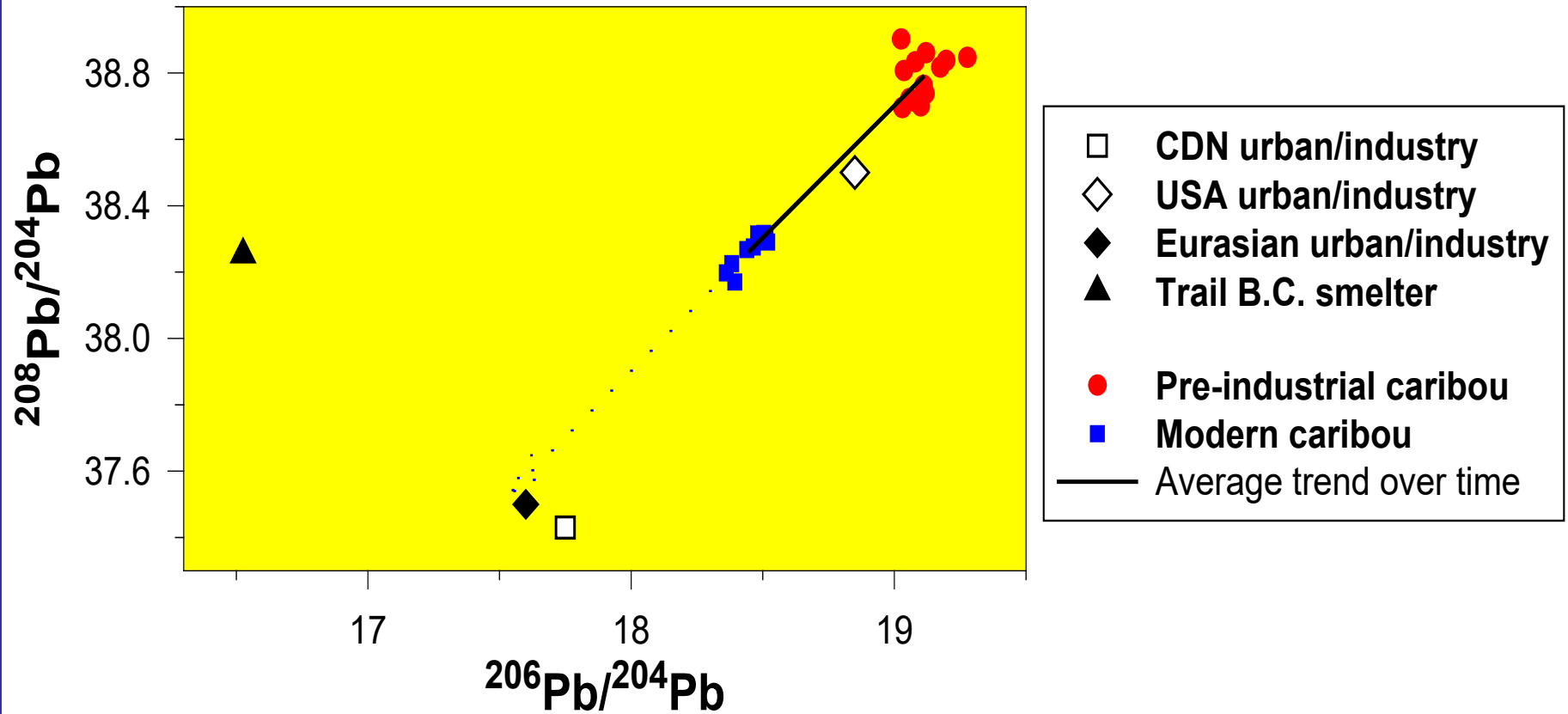
FRI-99-203A  
2,320 B.P.

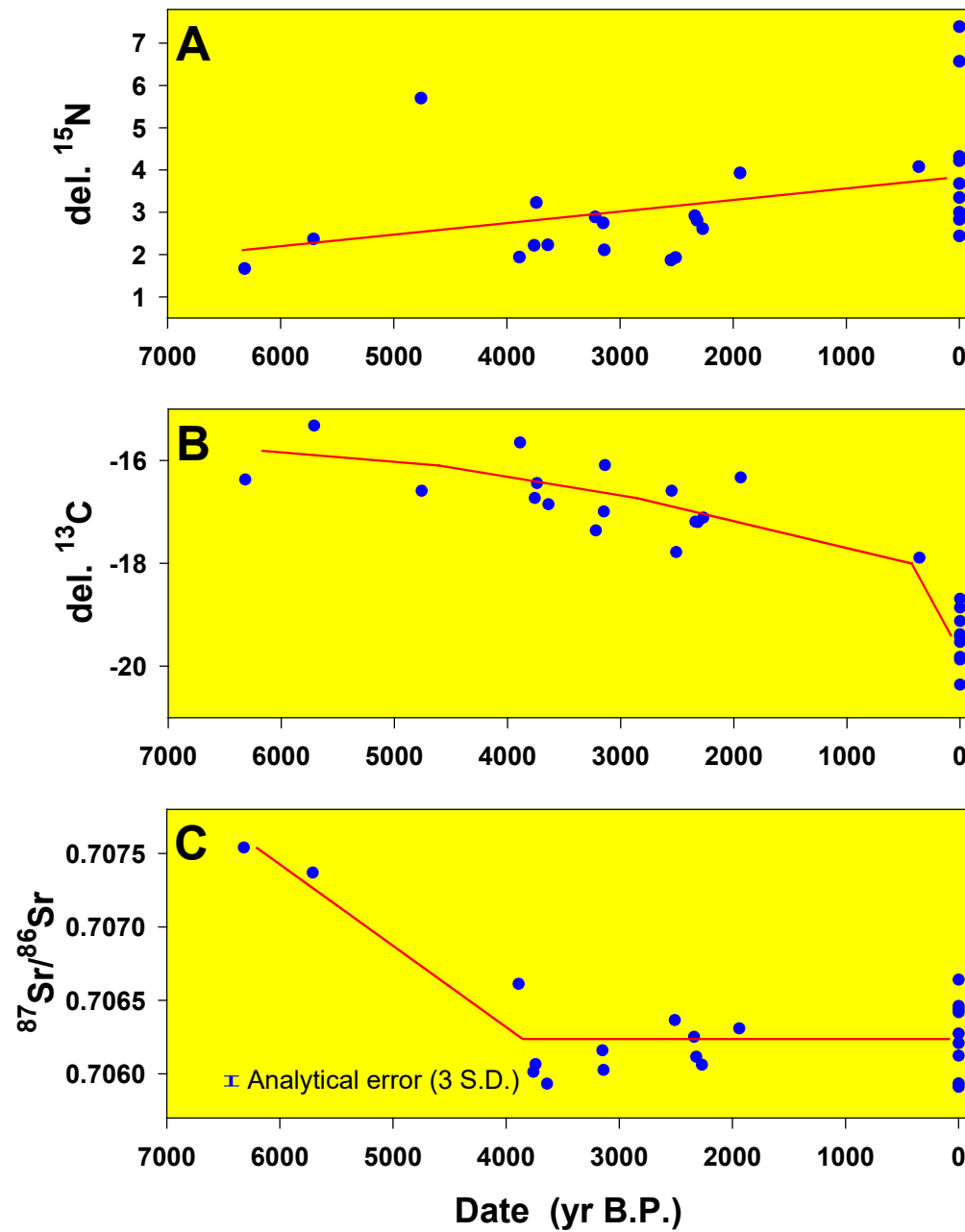
## Trace metals in caribou dentine (units ug/g DW)





## Lead isotope trend in caribou teeth





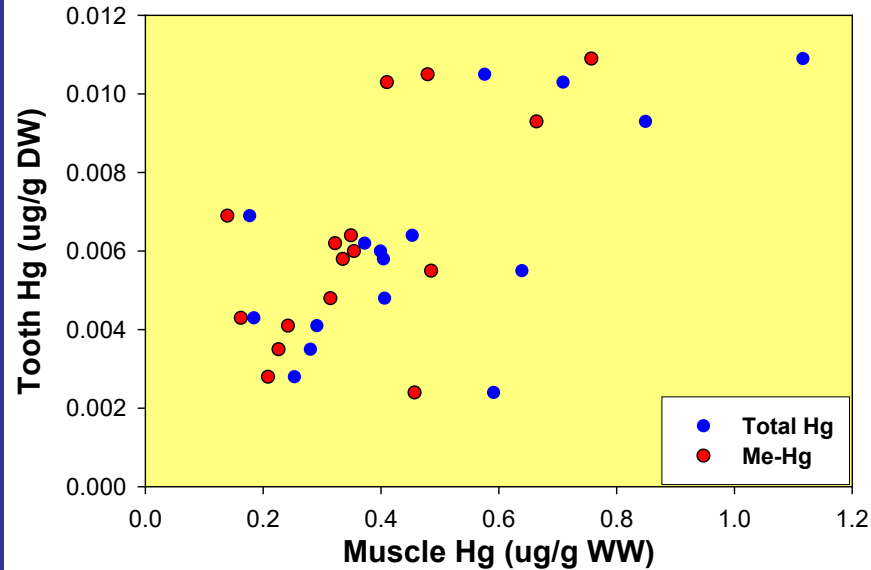
# **Mercury in Ringed Seals near Holman, Victoria Island, over 800 years**



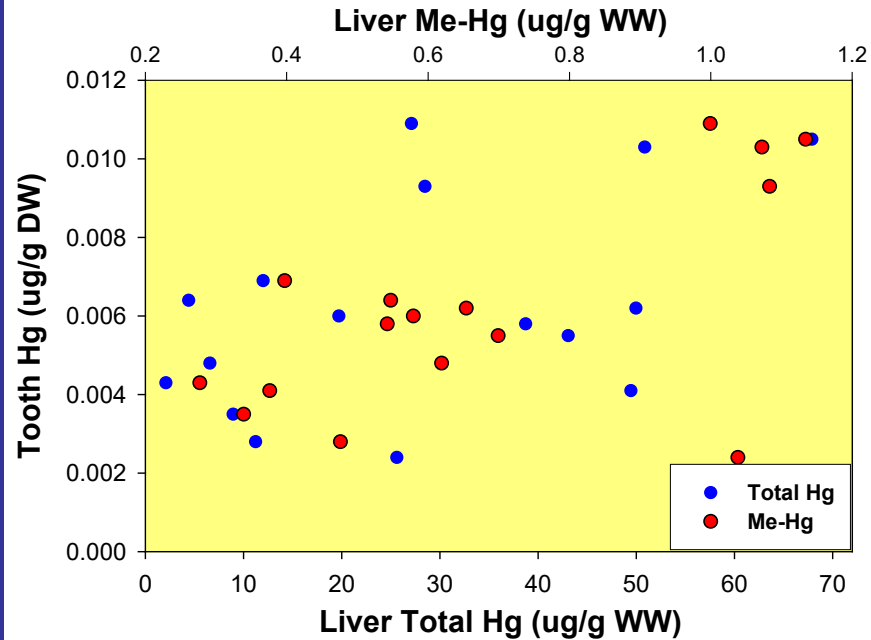


# Historical Samples of Ringed Seal Jaws

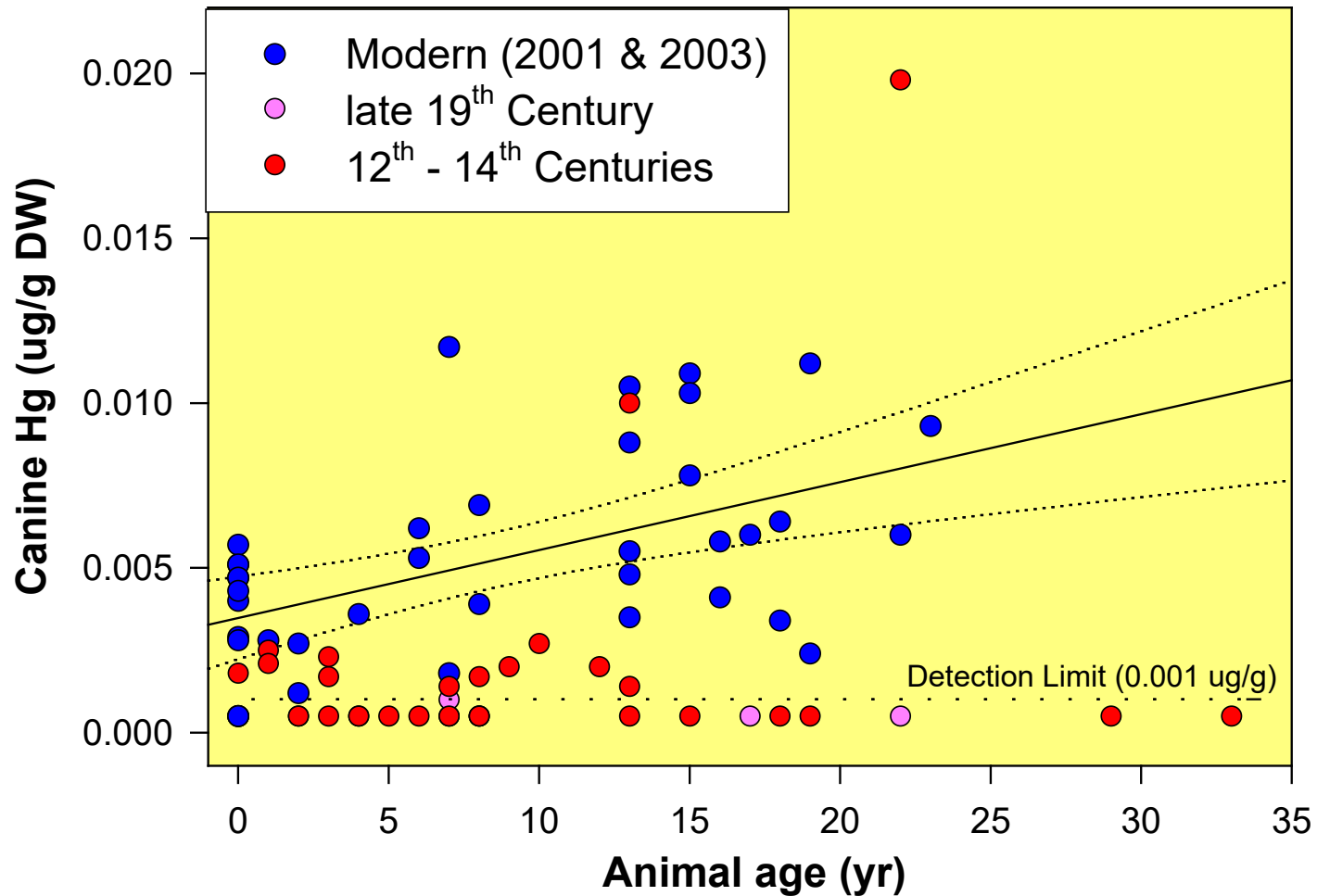
### Holman ringed seal Hg



Significant associations  
between tooth Hg and  
liver & muscle Hg in  
ringed seals



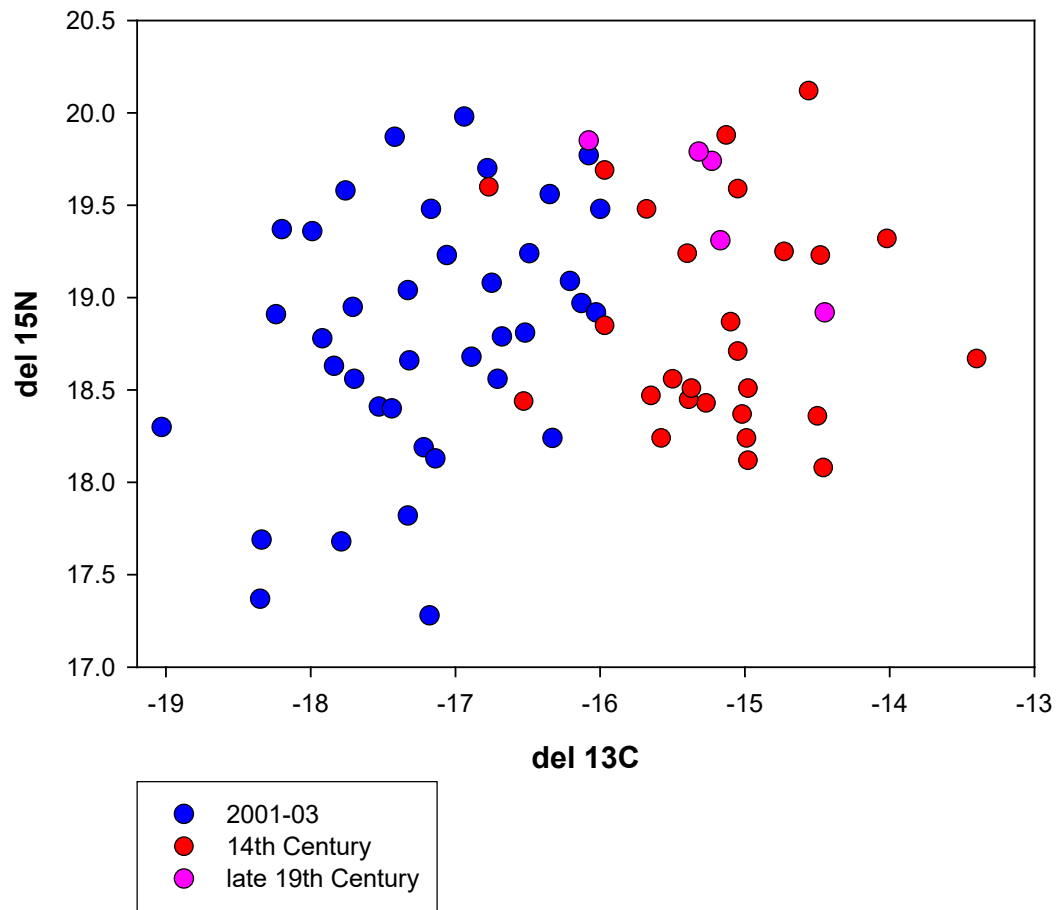
## Tooth Hg vs Age in Modern and Historical Ringed Seals Prince Albert Sound, N.W.T.



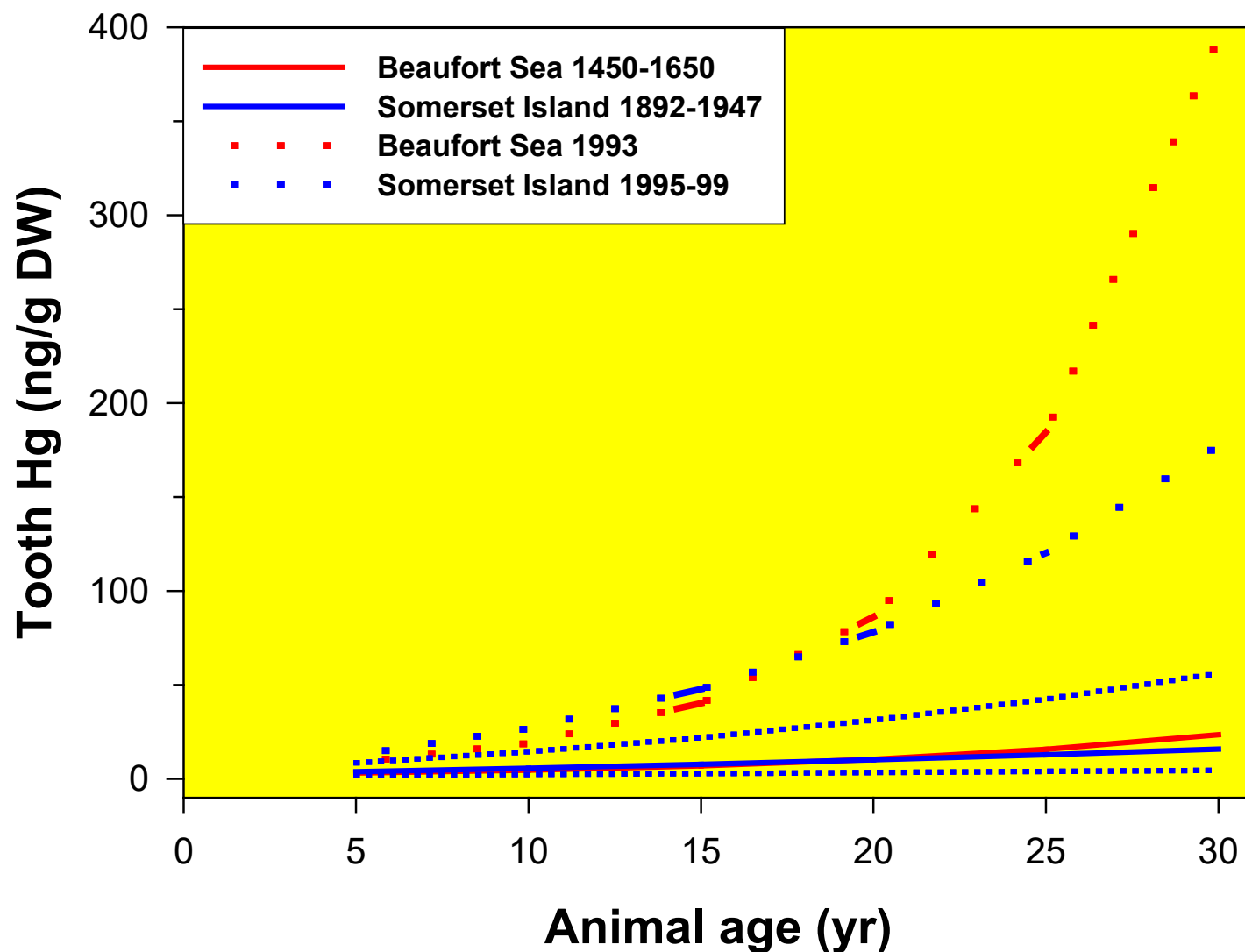


No significant shift in stable N isotope ratios (feeding level)  
but there is in stable C isotopes (feeding location OR “Suess effect”)

### Stable nitrogen as a function of stable carbon isotopes

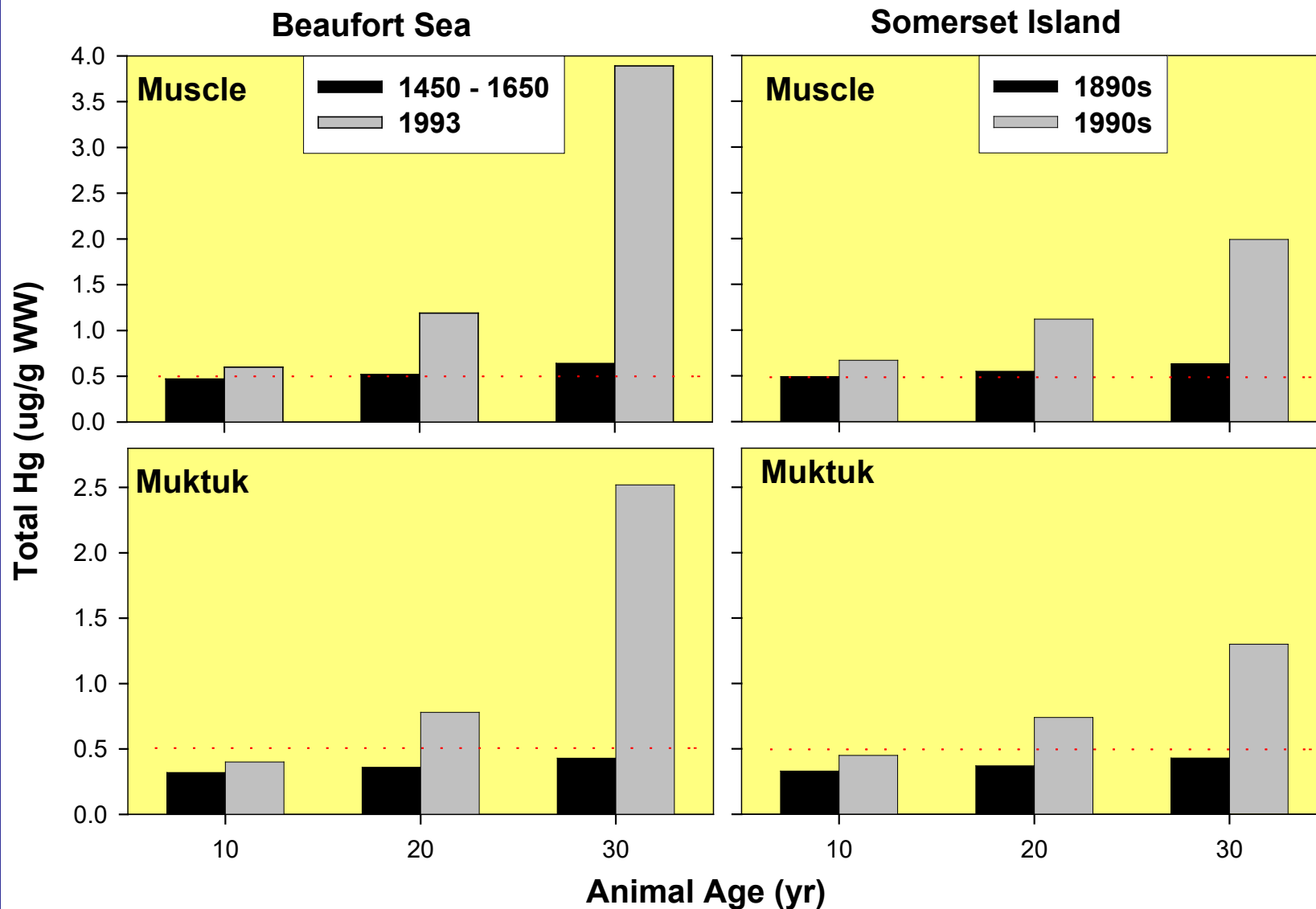


# Geometric mean tooth Hg estimates for Beaufort Sea and Somerset Is. beluga (+ 1 S.E. shown around historical Creswell Bay means)

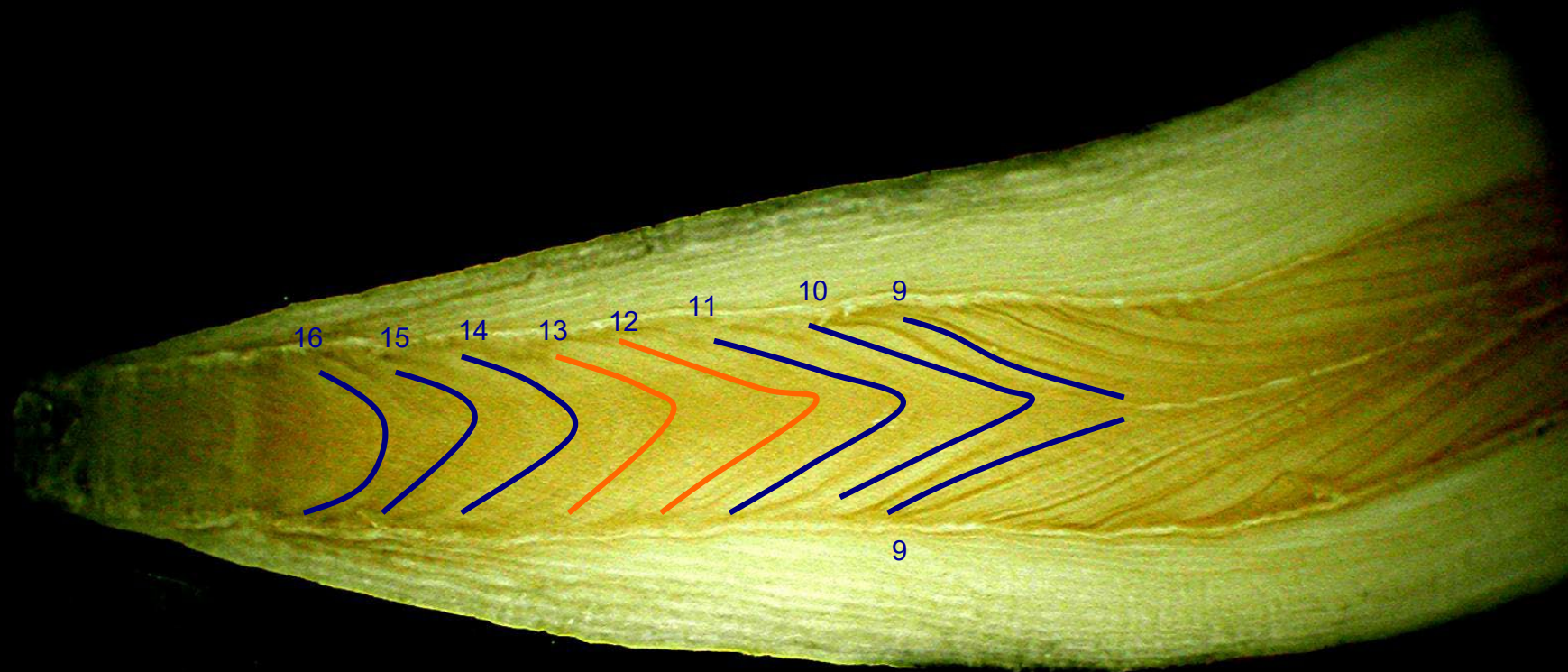


# Long-term changes in tissue Hg in beluga

(geometric mean concentrations, based on tooth data)







Sample 13 was added by error to vial with sample 12.  
Vial 98 contains both samples!!