



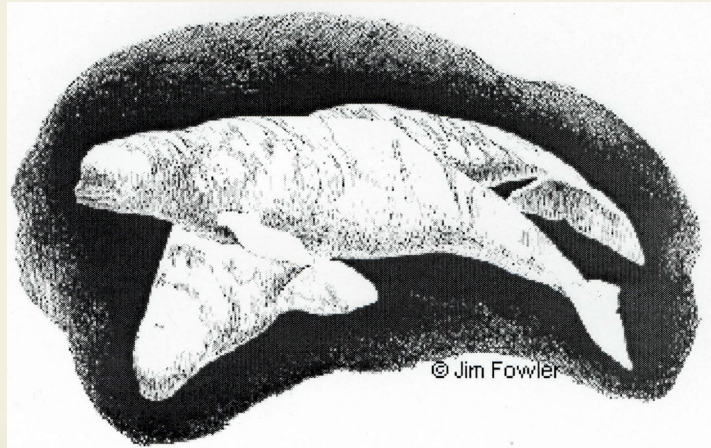
Chronological Records of Food Web & Habitat in Arctic Mammals

Method Development in Stable Isotope Geochemistry

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LSI Lab
IG³ - GSC - Ottawa

MITE - End-of-Program Meeting February 27-28, 2006 Ottawa





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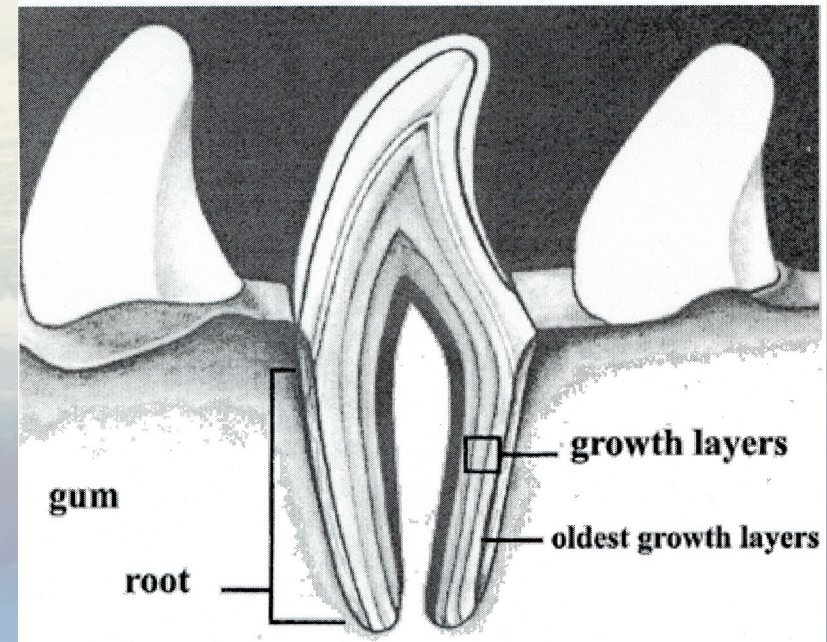
Beluga Whale

Delphinapterus leucas

Source: www.adfdg.state.ak.us/pubs/notebook/marine/beluga

Beluga whales may deposit up to two growth layer groups annually (Goren et al, 1987)

Goren AD, Brodie PF, Spotte S et al. "Growth Layer Groups (GLGs) in the Teeth of an Adult Belukha Whale (*Delphinapterus leucas*) of Known Age: Evidence for Two Annual Layers." *Marine Mammal Science* 3(1), 1987, pp. 14-21.

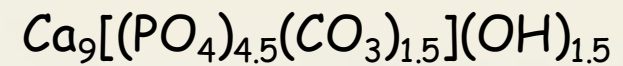


Source: www.seaworld.org/infobooks/Beluga





Beluga Tooth Trials



"Biogenic Apatite"

$\delta^{13}\text{C}$ → diet

$\delta^{18}\text{O}$ → water & temperature



Dentine
or Cementum



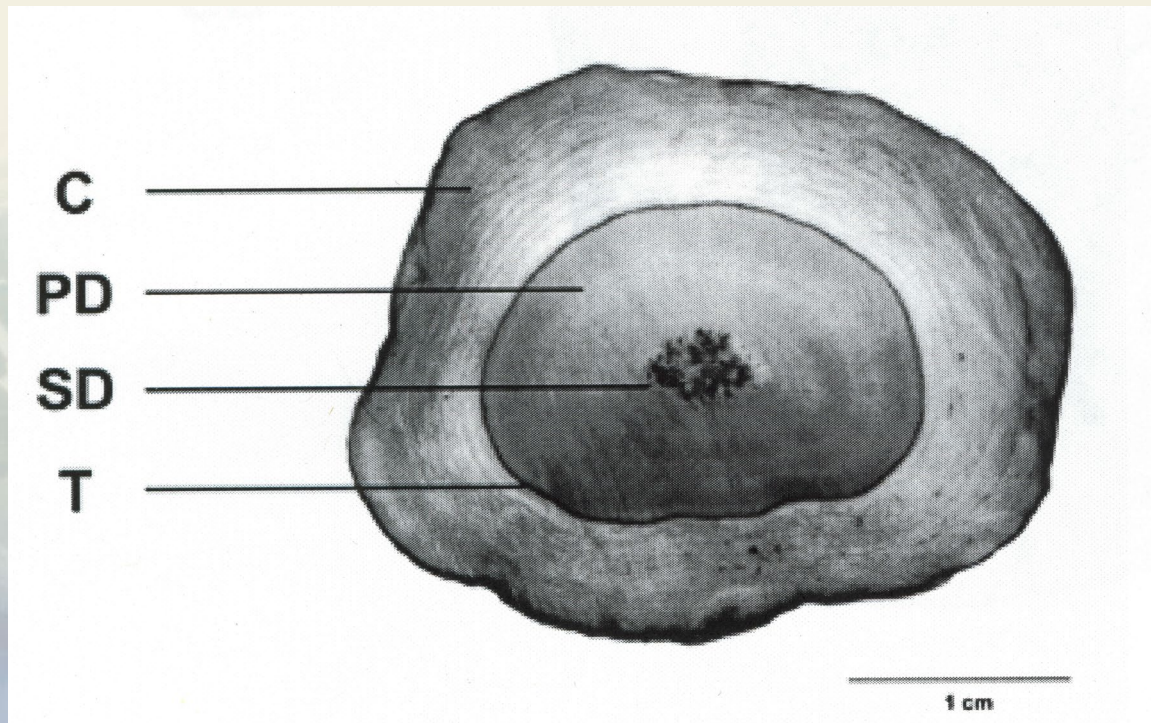
Pre-Dentine (pulp)

Beluga Whale Tooth Section
(pre-treated at 400 °C @ 1 atm)





WALRUS TOOTH (cross-section)



Source: Espinoza, E. O., and Mann, M-J., 1991, Identification Guide for Ivory and Ivory Substitutes: World Wildlife Fund and The Conservation Foundation: www.cities.org/eng/resources/pb/E-ivory-guide





Beluga Tooth Trial

Phosphoric Acid
Extractions



"Biogenic Apatite"

Beluga Tooth Section B₄





The picture can't be displayed.

Earth Sciences Sector



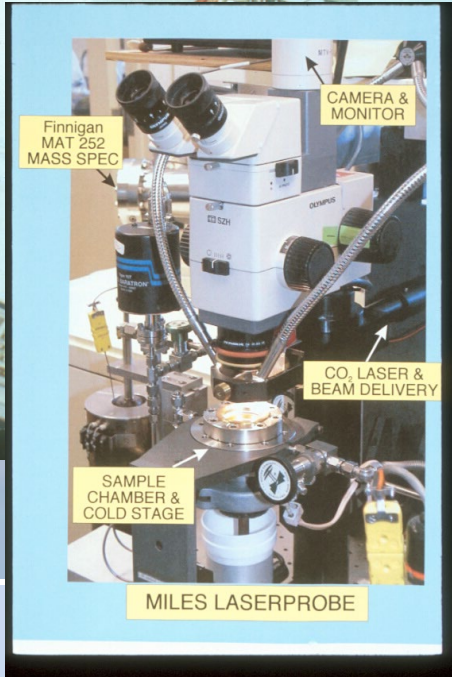
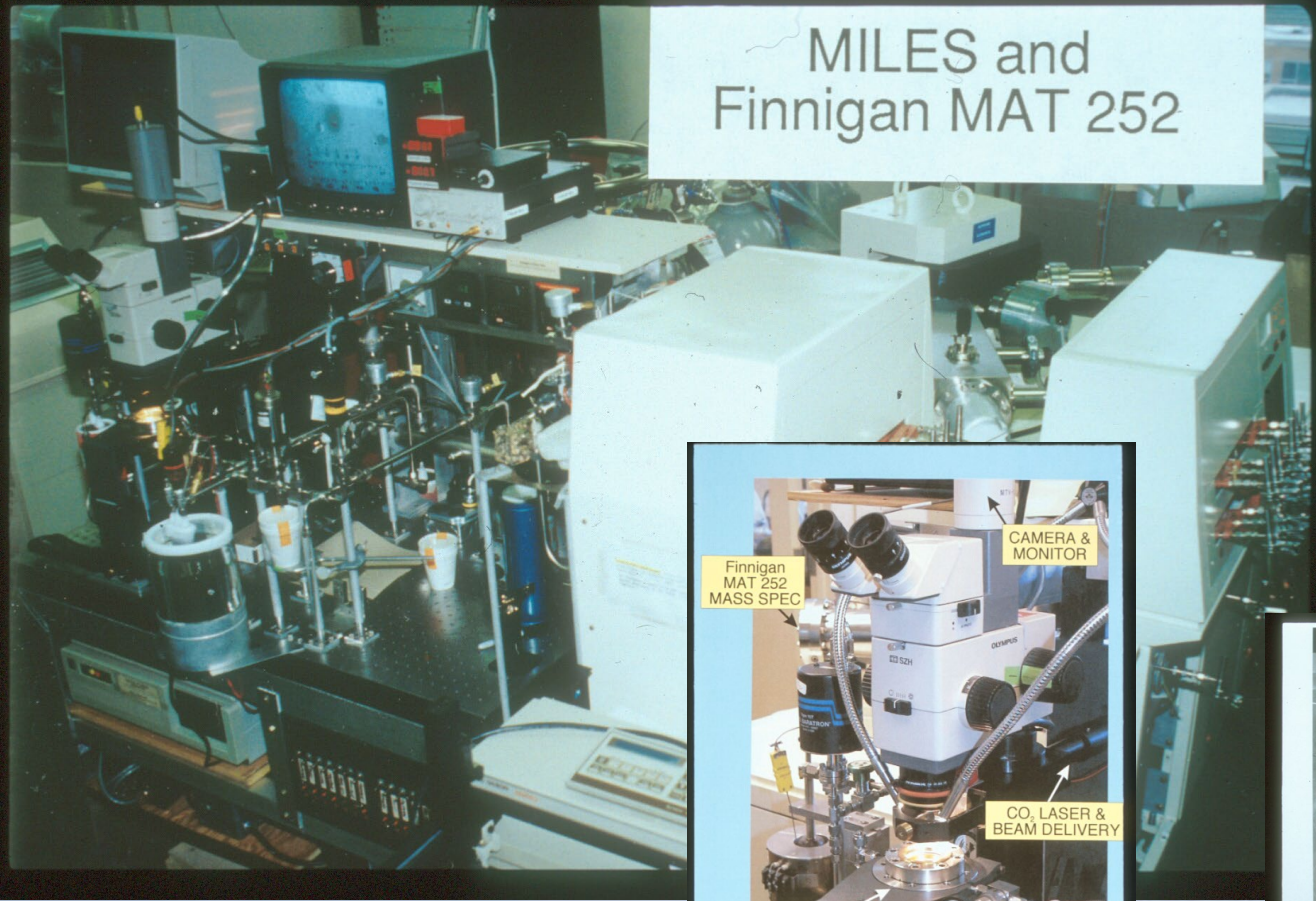
Natural Resources
Canada

Ressources naturelles
Canada

Canada



MILES and Finnigan MAT 252



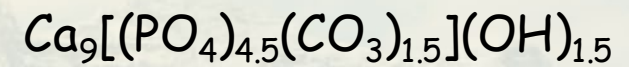
Cross-section of reaction crater in FeS₂





Beluga Tooth Trial

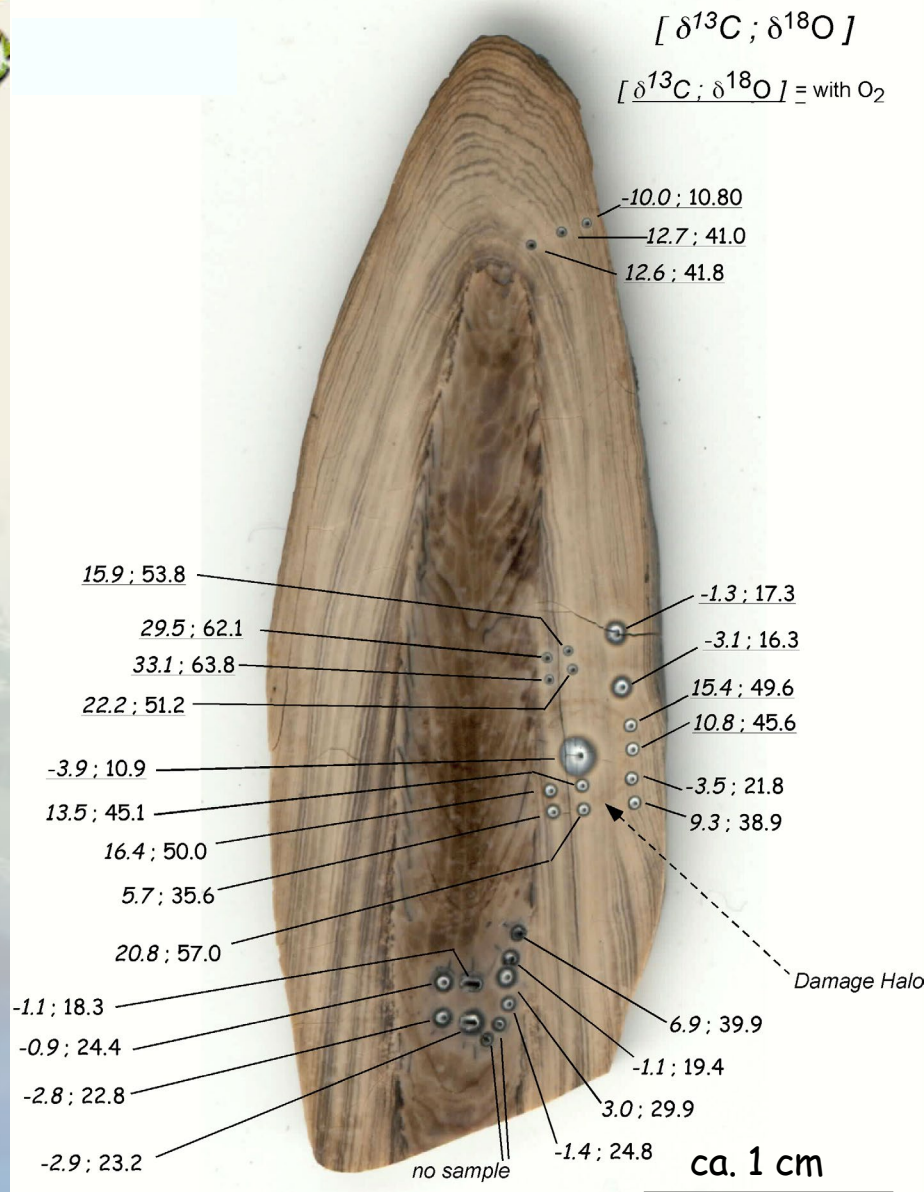
In-situ Analyses
(MILES CO₂ Laser-
extracted CO₂)



"Biogenic Apatite"

Nominal Sample Size

≈ 125 μm diam. x 150 depth

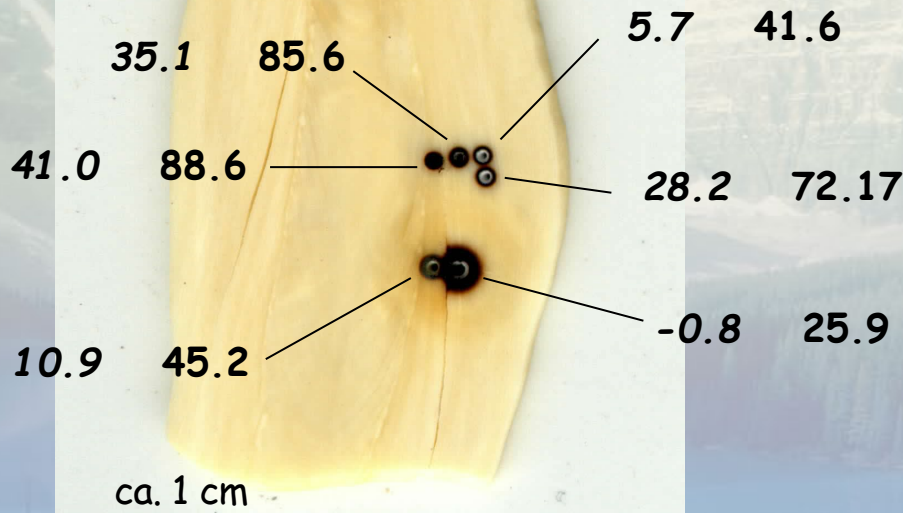




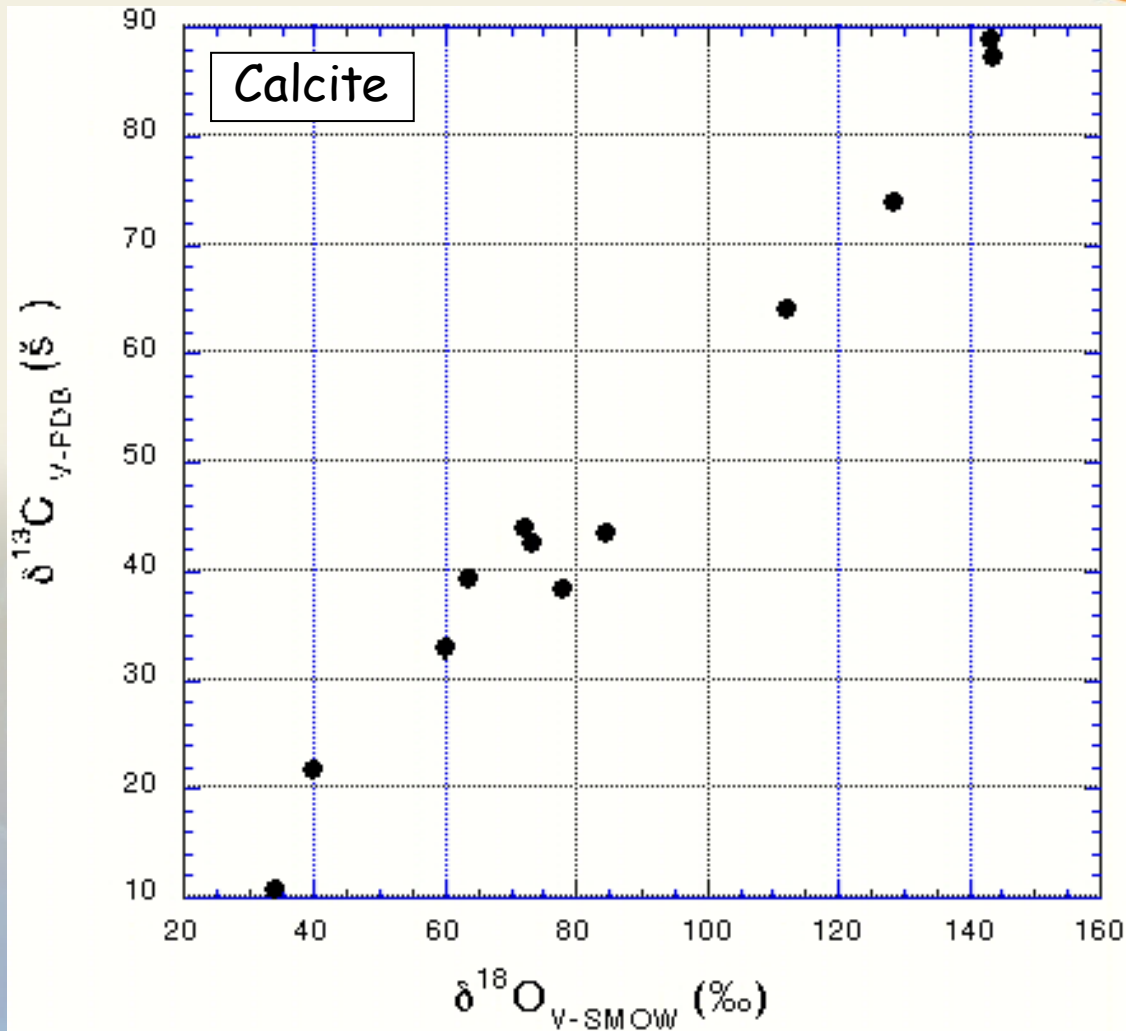
Beluga Tooth Section A₆

$\delta^{13}\text{C} (\text{‰})$

$\delta^{18}\text{O} (\text{‰})$

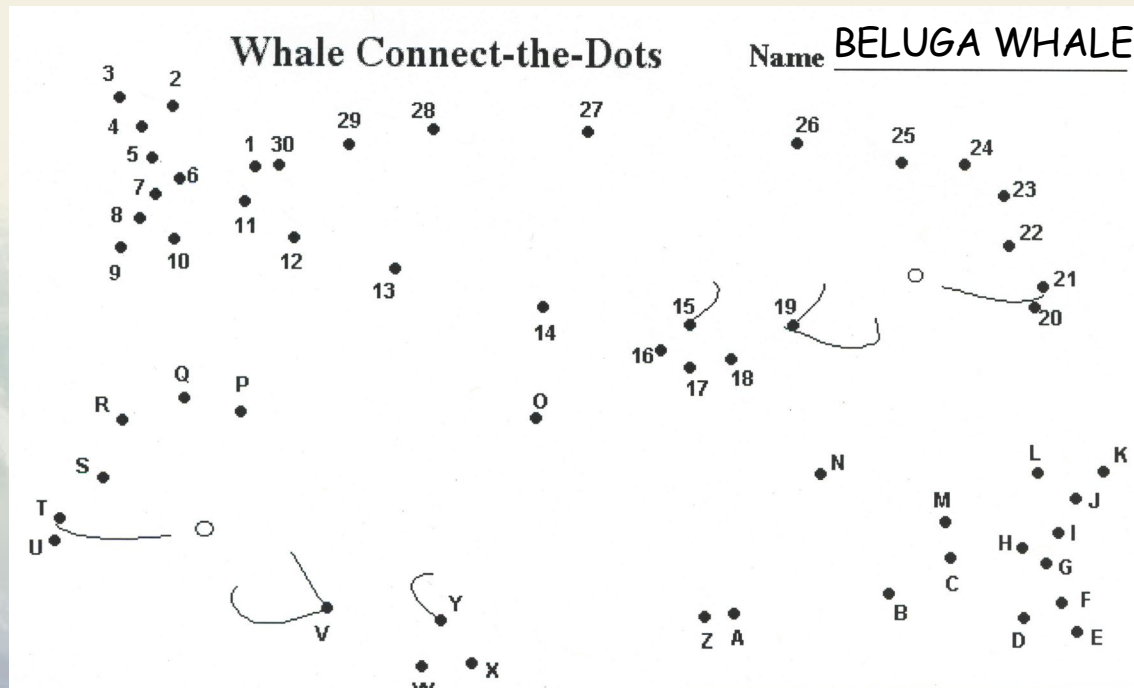


Pre-treated with ClO_4^-



Laser-assisted analyses of natural two Calcite specimens illustrate isotopic fractionation during gas-handling.

Sample size ca. 0.1-0.2 μmole



Source: www.enchantedlearning.com

Like a connect-the-dot picture, a systematic approach to analytical refinements will clarify the picture !!



