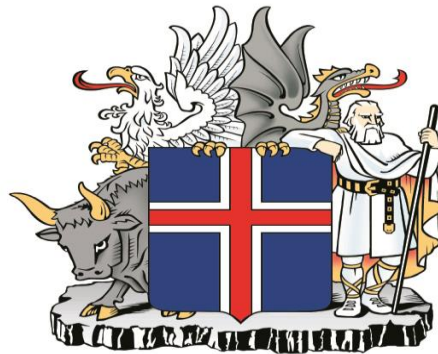


Regular Monitoring

And other occurrences at the IRSA laboratories.



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Equipment & Software

- Two stationary Ortec HPGe detectors
- ~50% relative efficiencies
- One mobile Ortec HPGe detector
- 18% relative efficiency
- GammaVision
- Greina
- SMath



Samples

■ Regular samples

- Lamb
- Milk & milk powder
- Sea water
- Rain water
- Fish
- Sea weed
- Other meats

■ Other samples

- Whale
- Salt
- Polar bear
- Soil

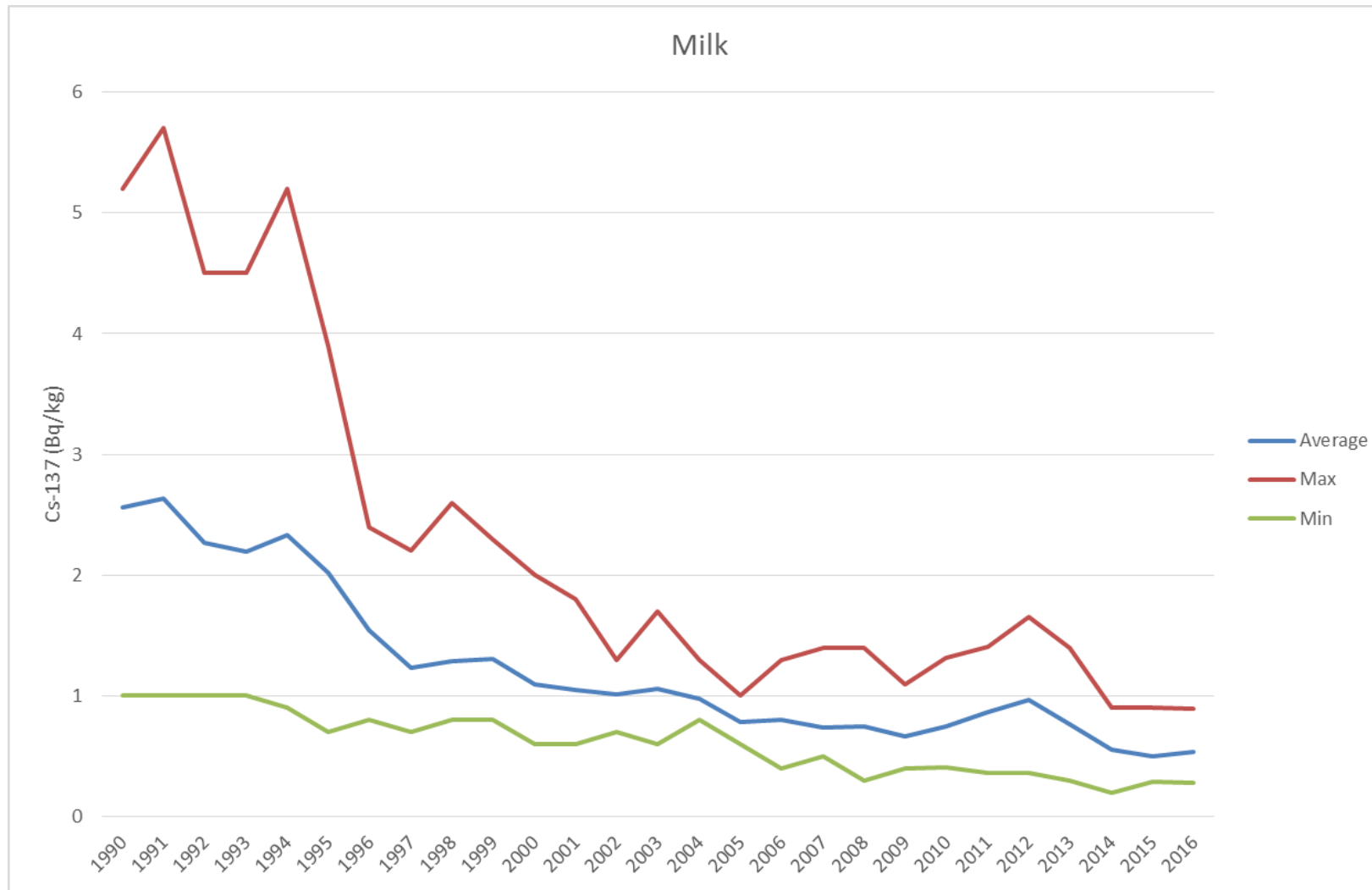


Sample Series

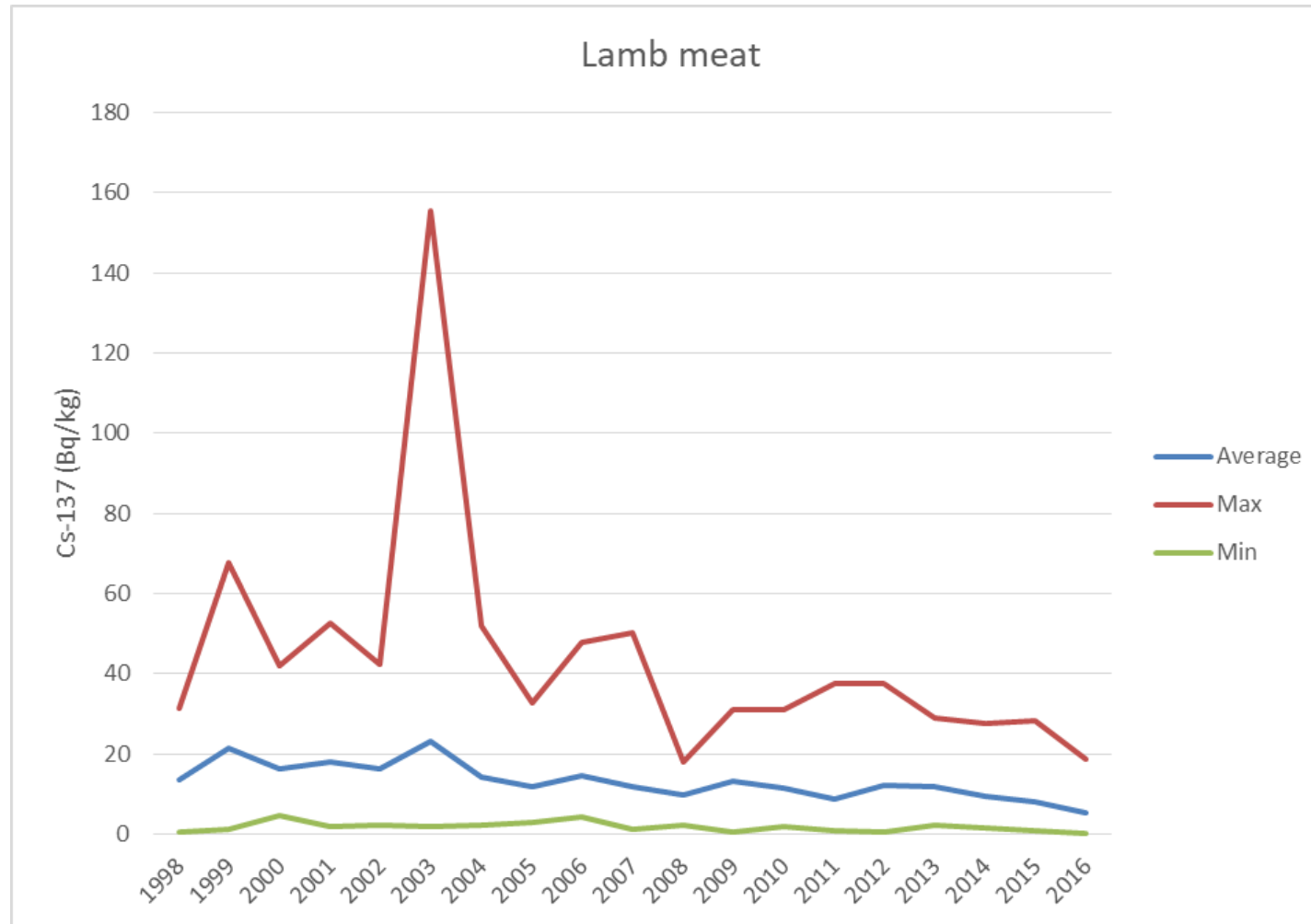
- IRSA founded in 1981
- Regular sampling has been going on since early in IRSA's life
- Some series go back to the 1980's
- Yearly monitoring reports



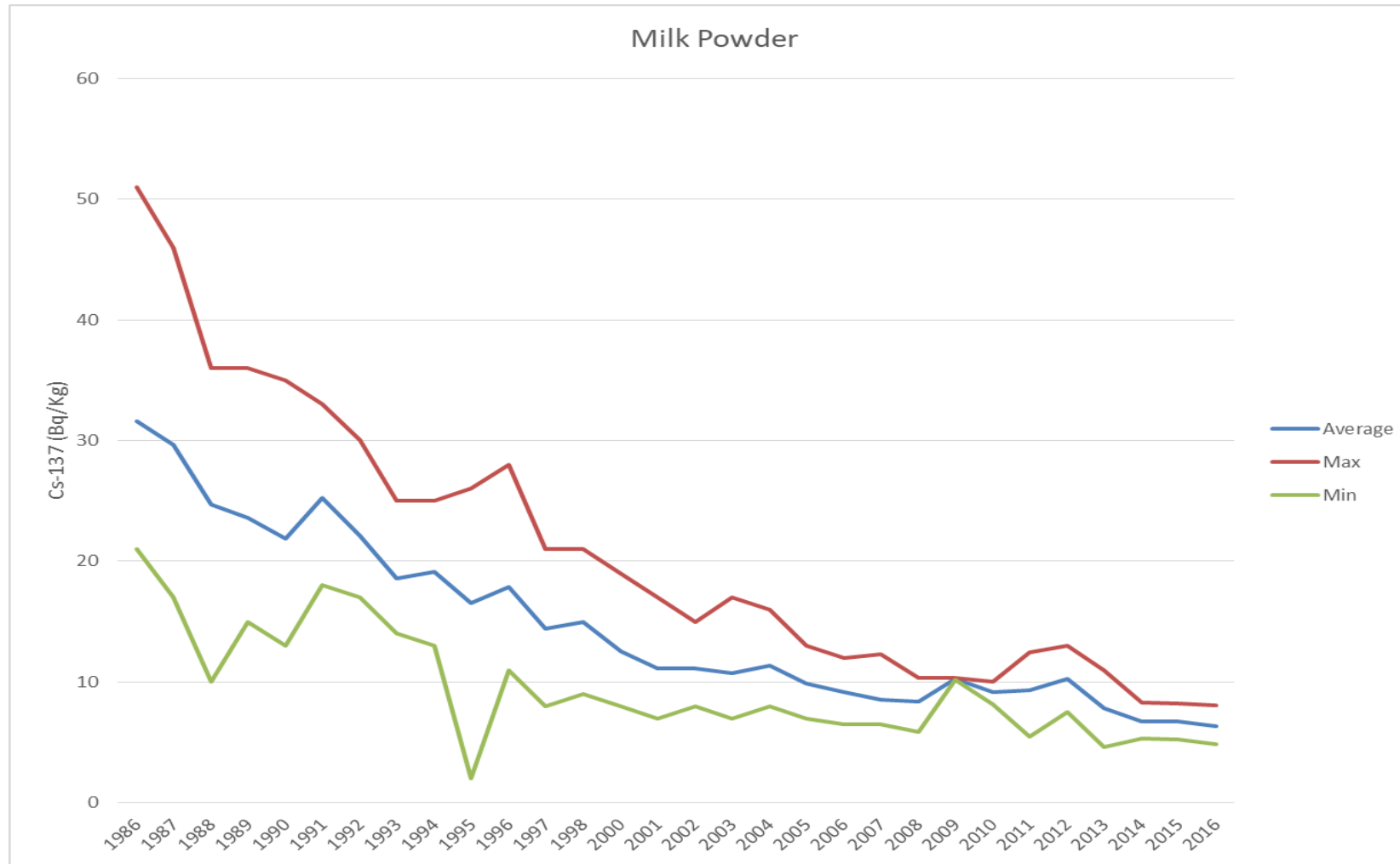
Milk



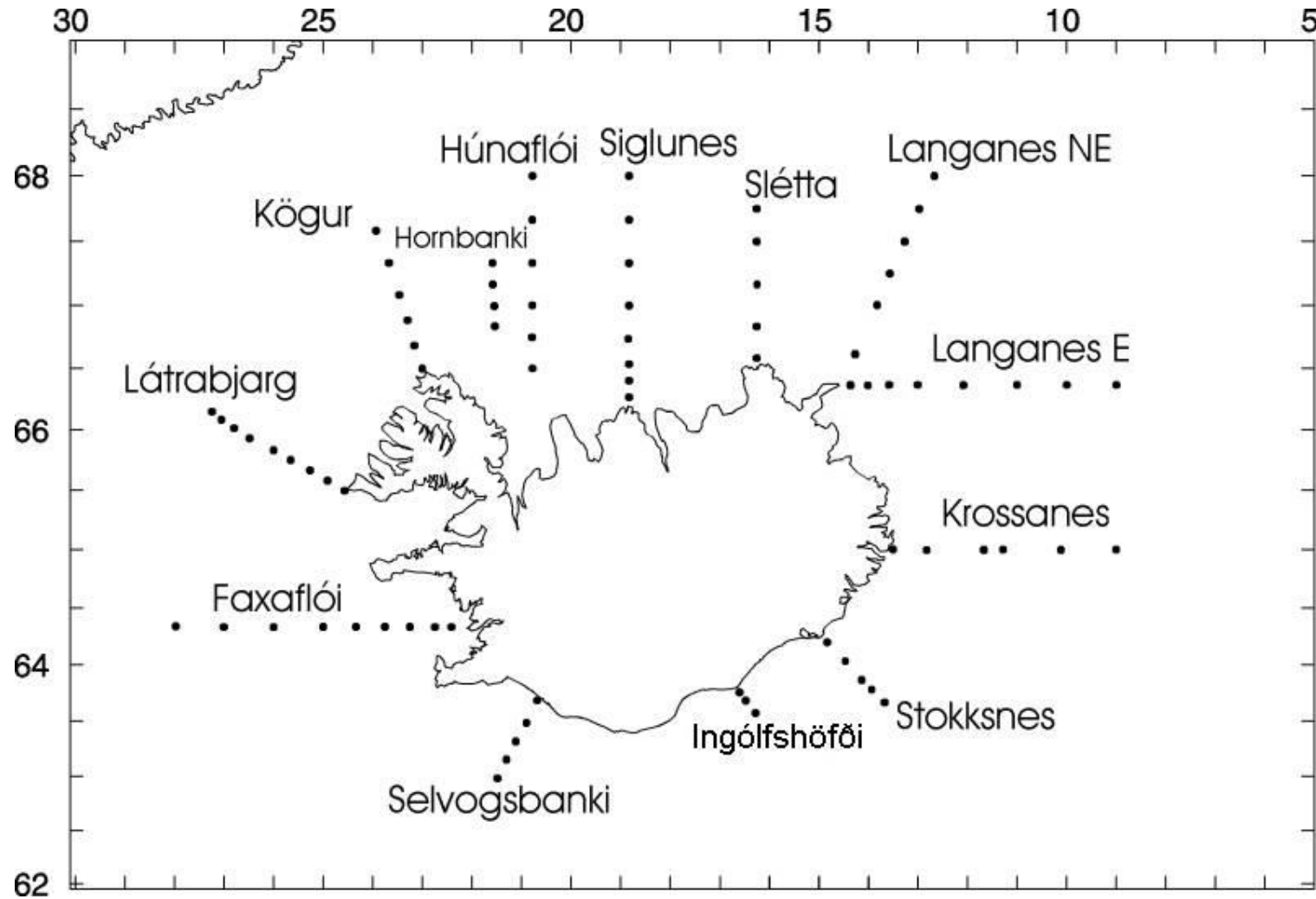
Lamb



Milk Powder



Sea Water Sampling



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Sea Water Samples

- 180 liters per sample
- CuFC (Copper ferrocyanide)
- Cs-134 spike for loss tracking
- Ends up with less than 200 ml of sediment
- Common sample volume: ~70 ml
- Measured and analyzed



Útreikningur sjávar- og úrkomusýna

Inntak

SJFX916E

Massi sjávarsýnis sem mælt var

$$m_{\text{sjor_kg}} = 172,42$$

Fjöldi daga frá viðmiðunardegi til mældidags

$$\Delta_d = 4072$$

Magn CuFe blöndu mælt (rúmmál)

$$vol = 136 \text{ ml}$$

Virgni íbótar í Bq á viðmiðunardegi

$$A_{\text{spike}} = 9,8989 \cdot 126,5905 \quad (\text{sjá neðar})$$

$n = 132302$ Nettófjöldi slaga í viðmiðunartoppi Cs-134 (um 605 keV)

$t = 227916,72$ nettó-talningartími (LT) í sek.

$$c_{\text{cps_Bq}} = c_3$$

Kvörðunarstuðull m.v. G-2 eða G-3 (velja þarf viðkomandi stuðul að ofan)
(Velja þarf punkt f. lágskrift)

$$A_{\text{sjor}} = 0,156$$

Mæld virgni (í Bq, ekki Bq/kg) í útfellingu sjávarsýnis

Reiknaðar stærðir

$A_{\text{spike_cps}} = A_{\text{spike}} \cdot c_{\text{cps_Bq}}$ Virgni íbótar í cps, m.v. lögun/stærð sýnis

$$A_{\text{spike_cps_m}} = A_{\text{spike_cps}} \cdot 2^{\frac{-\Delta_d}{752,4}}$$

Virgni íbótar í cps á mælidegi

$$\epsilon = \frac{n}{t \cdot A_{\text{spike_cps_m}}}$$

Reiknaðar efnafræðiheimtur útfellingar $\epsilon = 0,9942$

$$A_{\text{sjor_tonn_leidrett}} = \frac{A_{\text{sjor}}}{m_{\text{sjor_kg}} \cdot \epsilon} \cdot 1000$$

Reiknuð virgni í sjó (úrkomu) Bq/tonn = Bq/m³

$$A_{\text{sjor_tonn_leidrett}} = 0,91$$

Bq/tonn

$$\begin{matrix} \text{cal}_{\text{vol3}} = & \begin{bmatrix} 32,7 \\ 87,1 \\ 142 \\ 199 \end{bmatrix} & \text{cal}_{\text{eff3}} = & \begin{bmatrix} 0,030481 \\ 0,02395 \\ 0,019411 \\ 0,016107 \end{bmatrix} \end{matrix}$$

$$\begin{matrix} \text{cal}_{\text{vol2}} = & \begin{bmatrix} 35,6 \\ 92 \\ 147 \\ 202 \end{bmatrix} & \text{cal}_{\text{eff2}} = & \begin{bmatrix} 0,032253 \\ 0,025241 \\ 0,020375 \\ 0,017082 \end{bmatrix} \end{matrix}$$

Kvörðun á Cs-134 heimtum

$$c_3 = \text{ainterp}(\text{cal}_{\text{vol3}}; \text{cal}_{\text{eff3}}; \text{vol})$$

$$c_2 = \text{ainterp}(\text{cal}_{\text{vol2}}; \text{cal}_{\text{eff2}}; \text{vol})$$



Norm in Iceland

- Norm (Naturally Occurring Radioactive Material)
- Low natural background
- Almost no natural radioactive materials
- Only been found in geothermal power stations
- Pb-210
 - 10-80 Bq/g
- Po-210
 - 40-420 Bq/g
- No radium

