



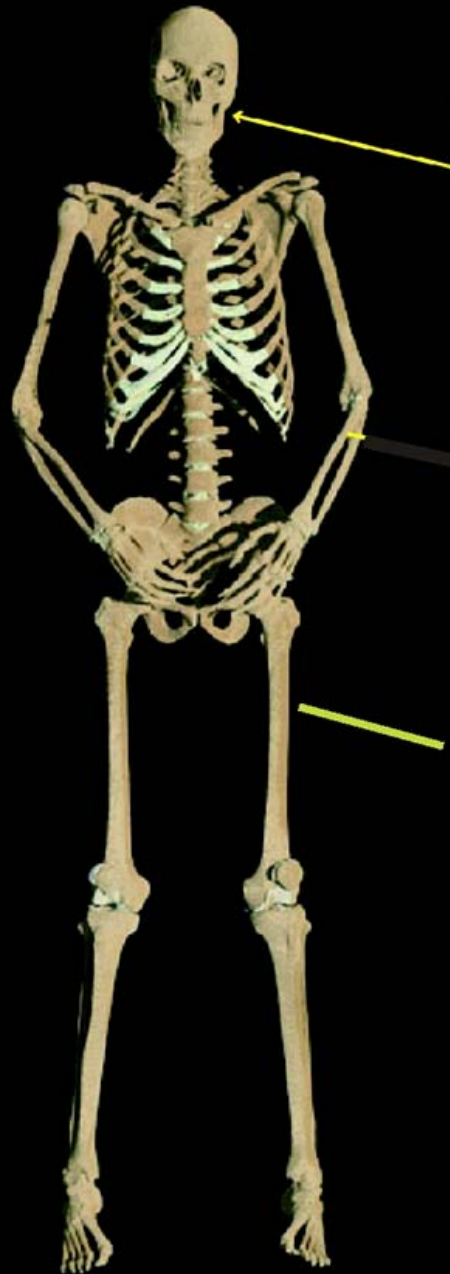
The Viking Settlement of the North Atlantic: An Isotopic Approach

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Isotopes and Human Tooth Enamel

- Isotopes vary geographically
- Isotopes are deposited at birth in tooth enamel and remain unchanged through life and after death
- Isotopes thus provide a signature of the place of birth
- Isotopes are a direct measure of human movement

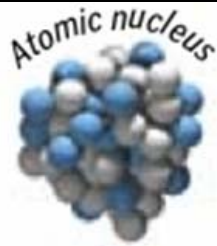
Strontium Isotopes and Skeletal Remodeling



- Tooth enamel forms between birth and 10 years of age.
- Chemically inert.
- Bone constantly remodels, due to growth, stress, and metabolic processes.
- Chemically dynamic.

Strontium 86

38 protons
48 neutrons

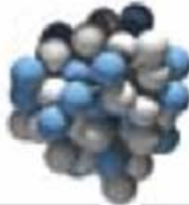


Younger rocks have a lower ratio of strontium 87 to strontium 86 than do older rocks.



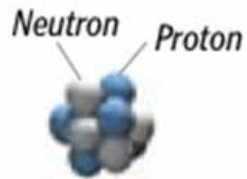
Strontium 87

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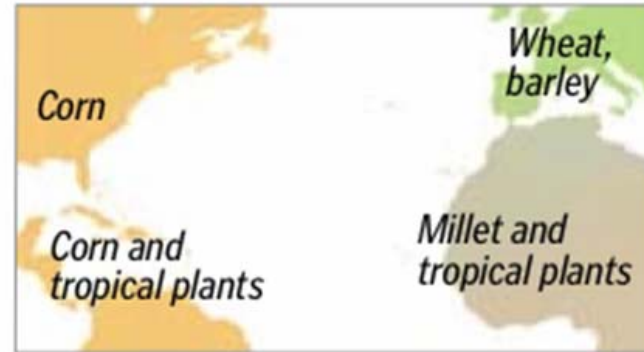


Carbon 12

6 protons
6 neutrons



Wheat, barley



Carbon 13

6 protons
7 neutrons



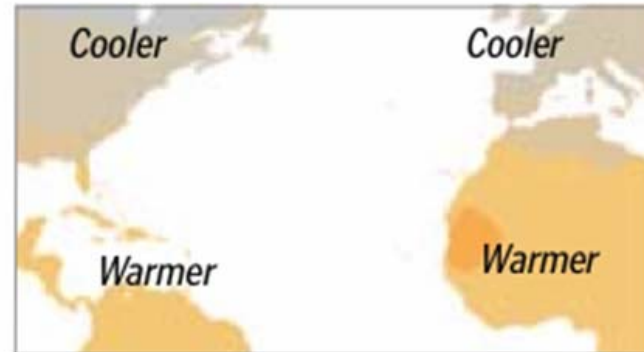
Corn, sorghum, tropical plants

Oxygen 16

8 protons
8 neutrons



Cooler climates

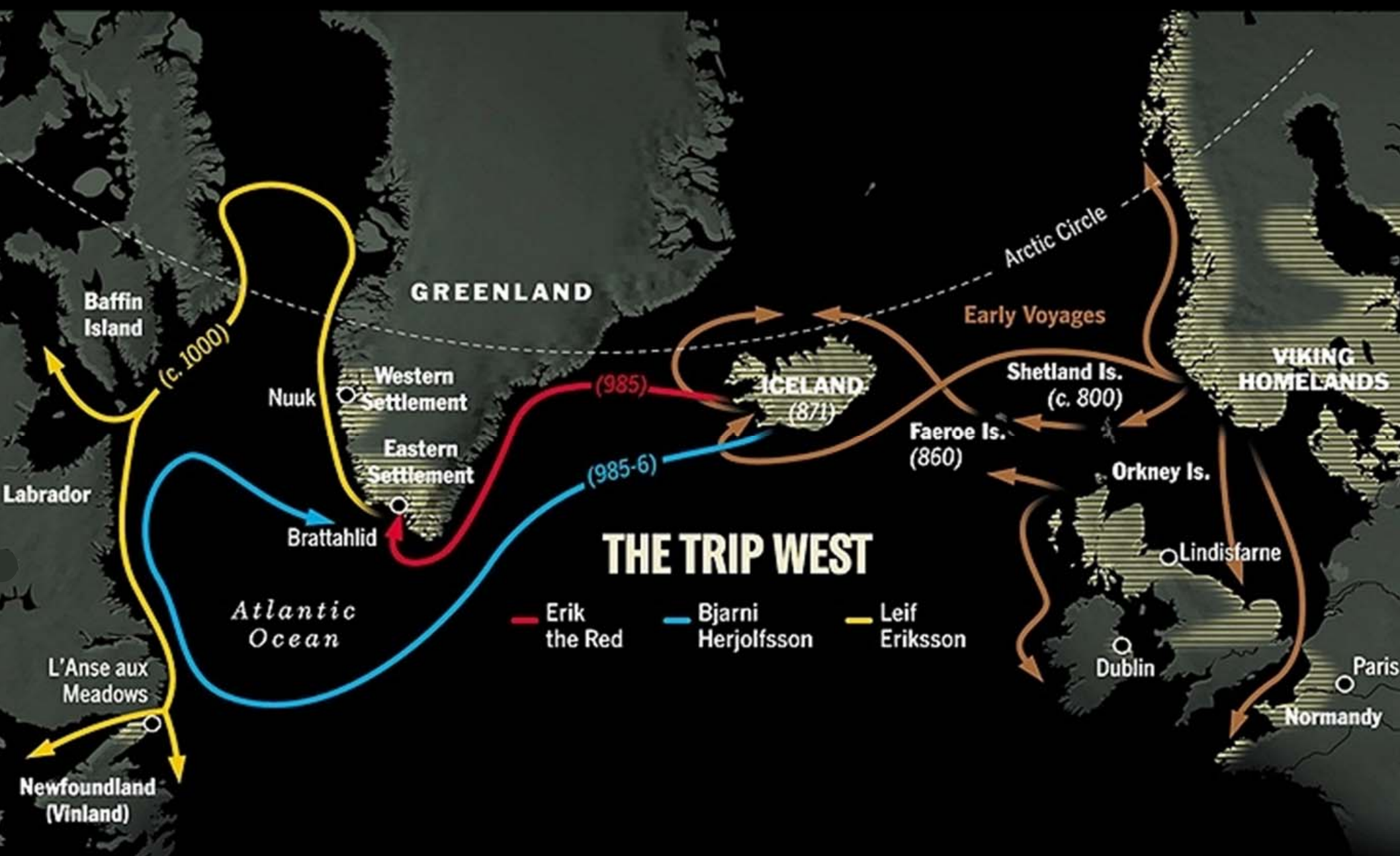


Oxygen 18






8 protons
10 neutrons

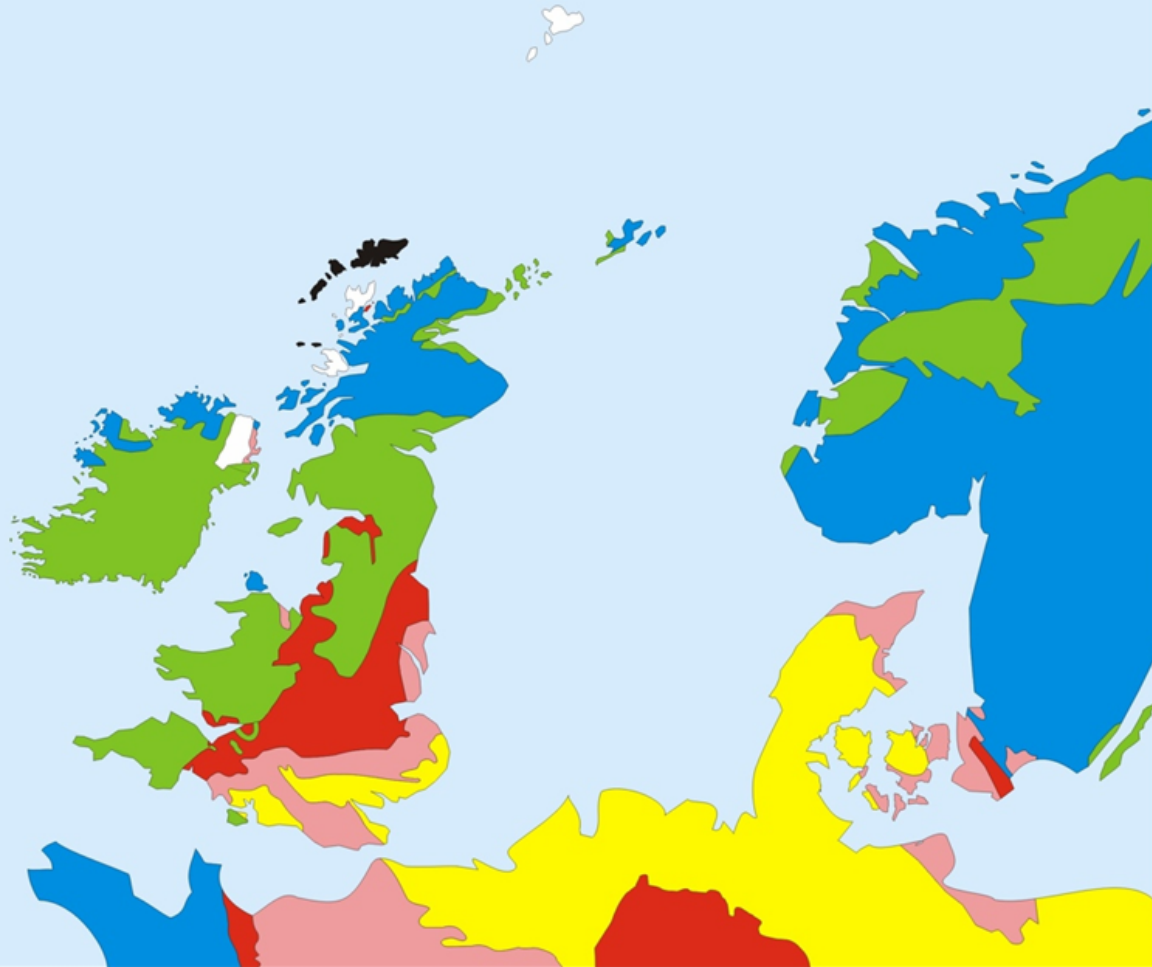


Warmer climates



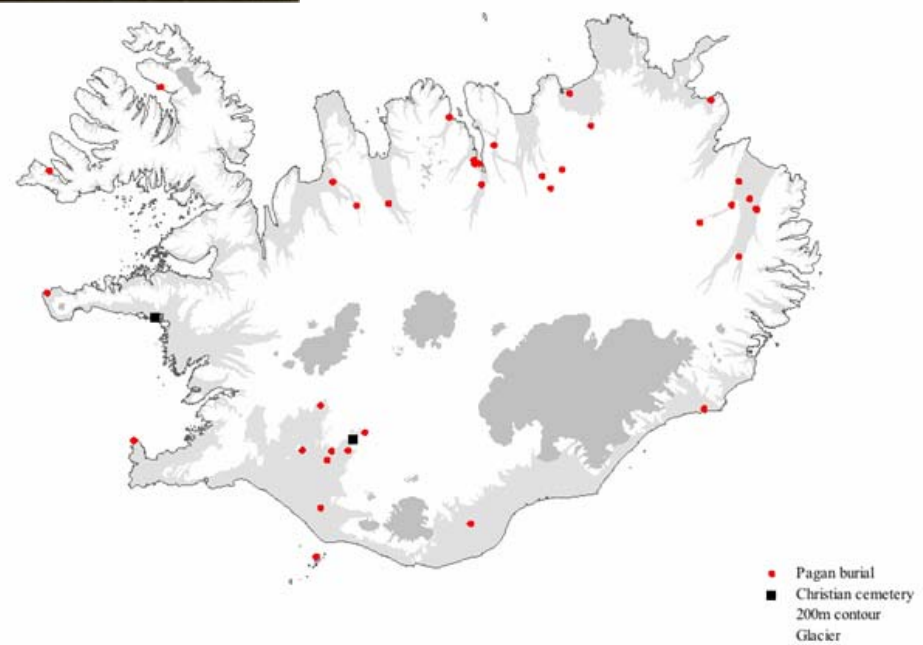


-  Lewisian Precambrian
c. 2700 Ma
-  Precambrian
2600 - 570 Ma
-  Palaeozoic
570 - 225 Ma
-  Triassic/Jurassic
225 - 136 Ma
-  Cretaceous Chalk
136 - 65 Ma
-  Tertiary/Quaternary
65 - 0 Ma
-  Tertiary/Quaternary Volcanics
65 - 0 Ma

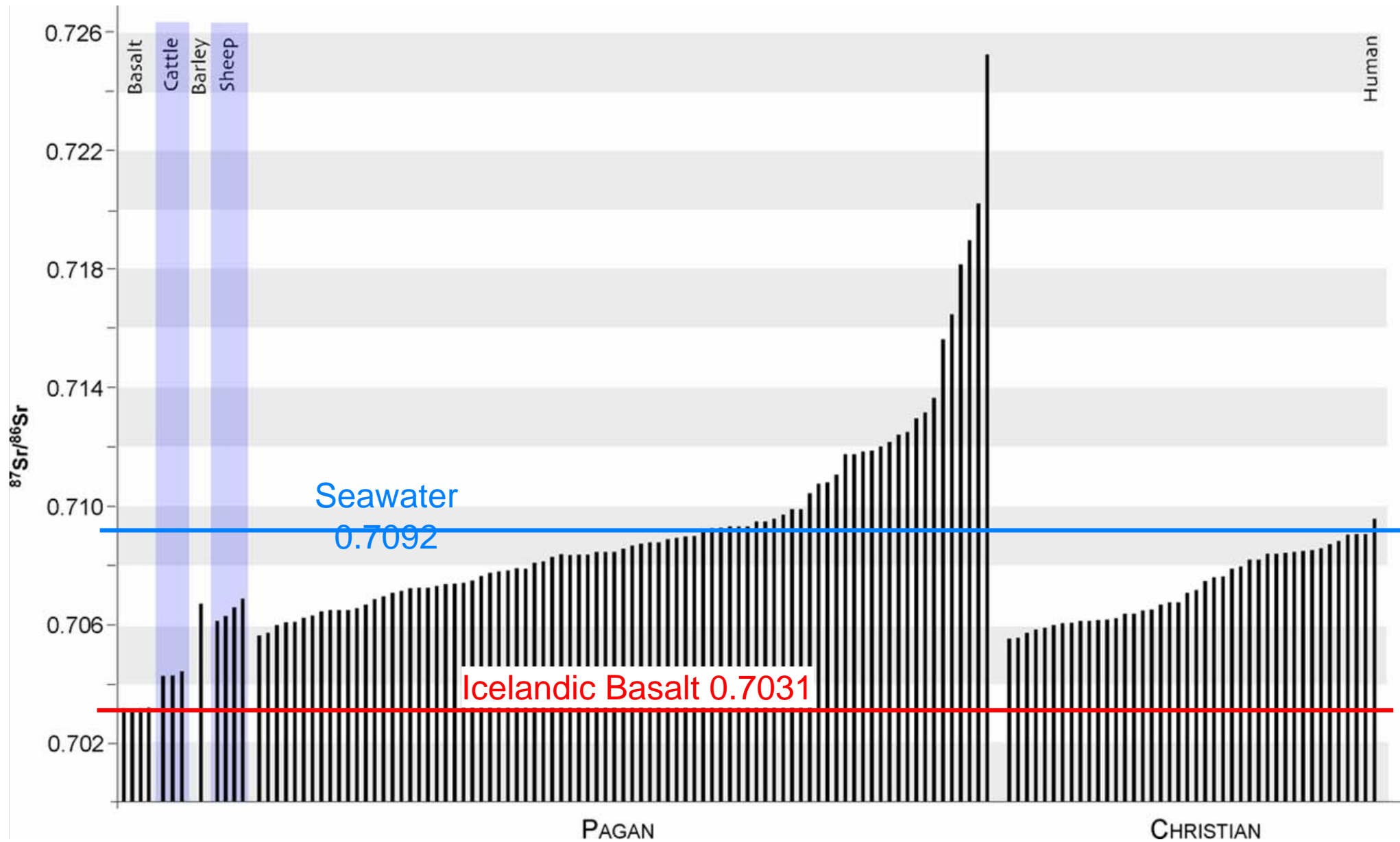




Iceland



Strontium Isotope Ratios in Icelandic Burials



Greenland Settlement and Geology

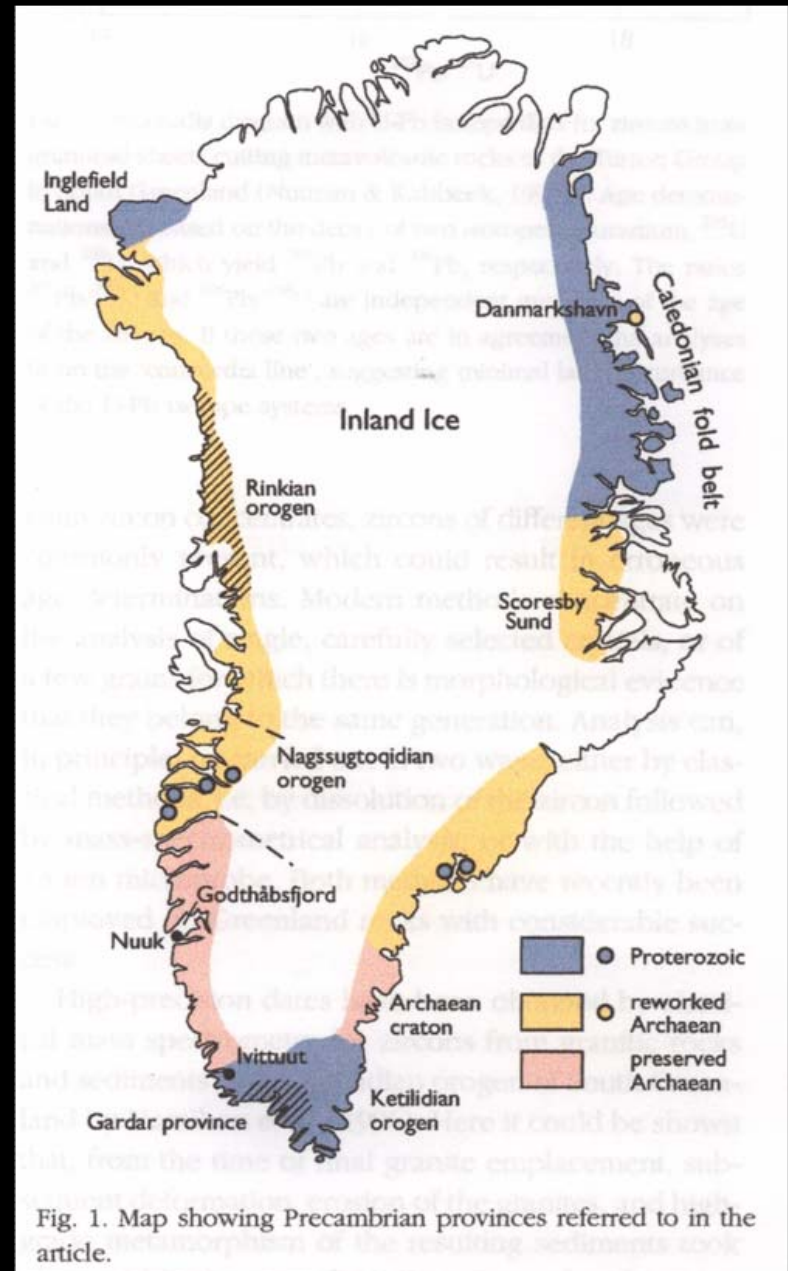
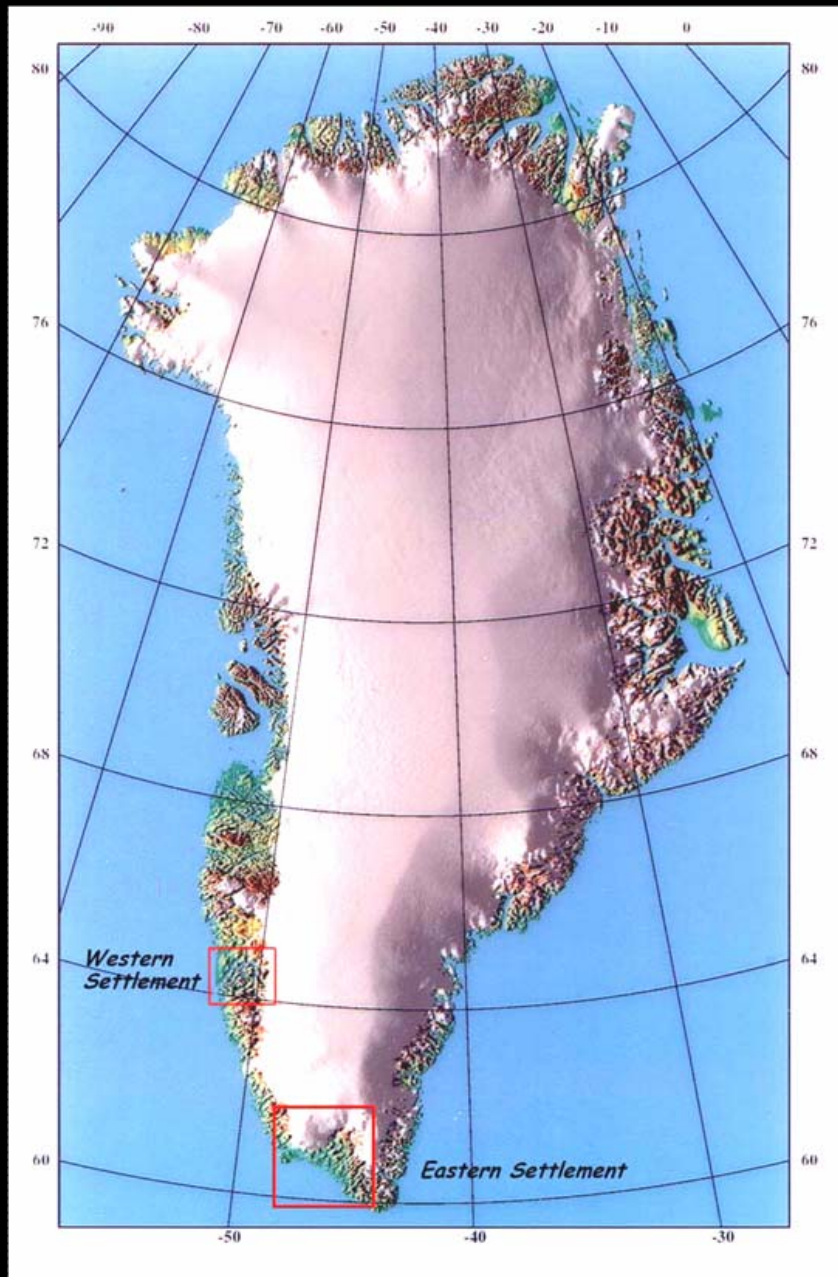
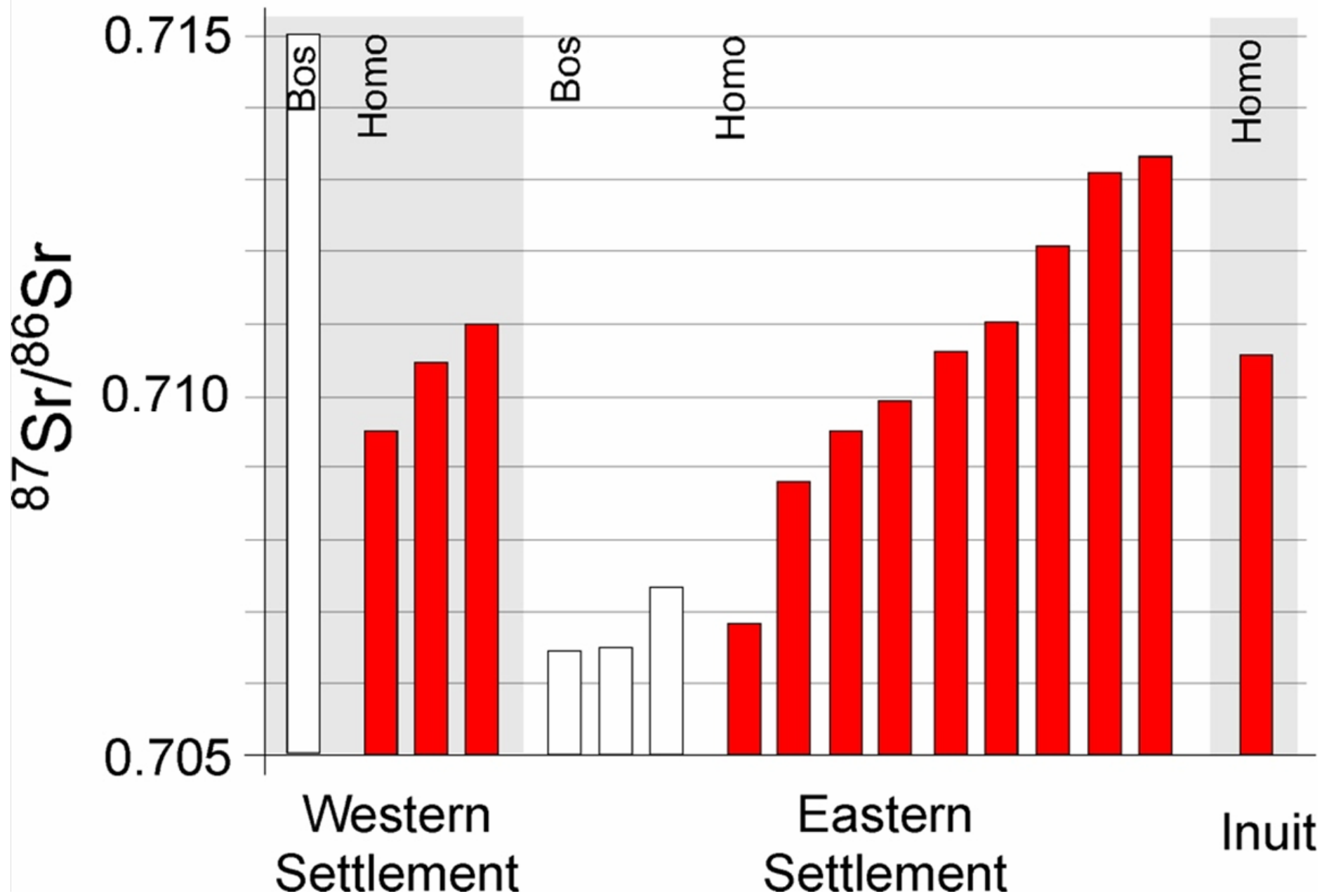


Fig. 1. Map showing Precambrian provinces referred to in the article.

Greenland Strontium Data



Some Conclusions

- Migrants are largely pagan, thus colonization primarily in the early years of settlement (AD 871-1000)
- Migrants are coming from several different places
- Diets reflect a mix of terrestrial and marine foods
- Greenland Cows from Iceland
- Oxygen isotopes do not appear to be useful
- Lead isotopes have some potential

Research Plans

- Radiocarbon dating of more burials
- Lead and oxygen isotopes on more burials
- More Greenland and northern UK burials
- More baseline data across North Atlantic
- More Publications