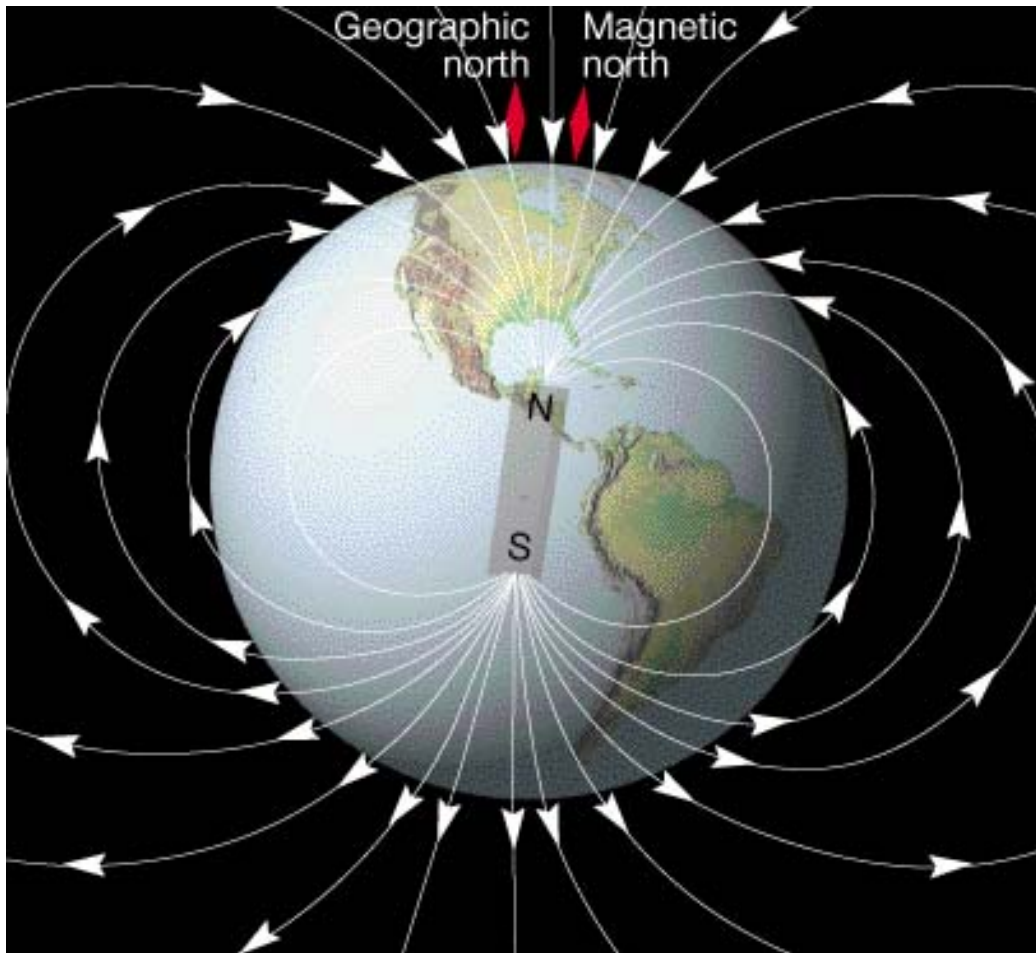


Telling time with magnets



Lines of magnetic force are parallel to surface at equator, vertical at the poles

Magnetic minerals align themselves to magnetic field

Earth's magnetic field

North pole of magnetic minerals points down in Northern Hemisphere, up in Southern Hemisphere

Slight Tangent

- So we can use magnetic minerals to tell what hemisphere a rock formed in (by whether north pole points up or down) and even what latitude it formed at (by how steep the angle with the Earth's surface is)
- BUT you have to first know how the rock was oriented at the time of deposition (mathematically unfold the rock)

Back to time...

- How do we tell time with magnetics?

Back to time...

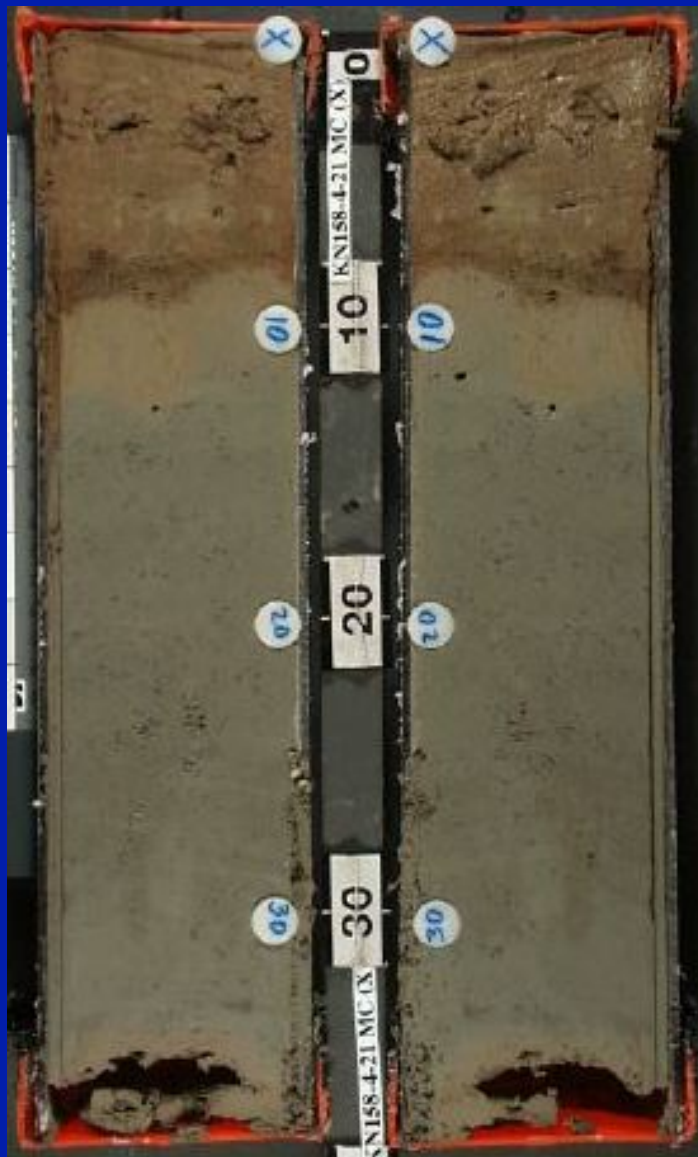
- How do we tell time with magnetics?
 - Earth's magnetic field reverses from time to time

Back to time...

- How do we tell time with magnetics?
 - Earth's magnetic field reverses from time to time
 - No regularity to it
 - No apparent biological consequences

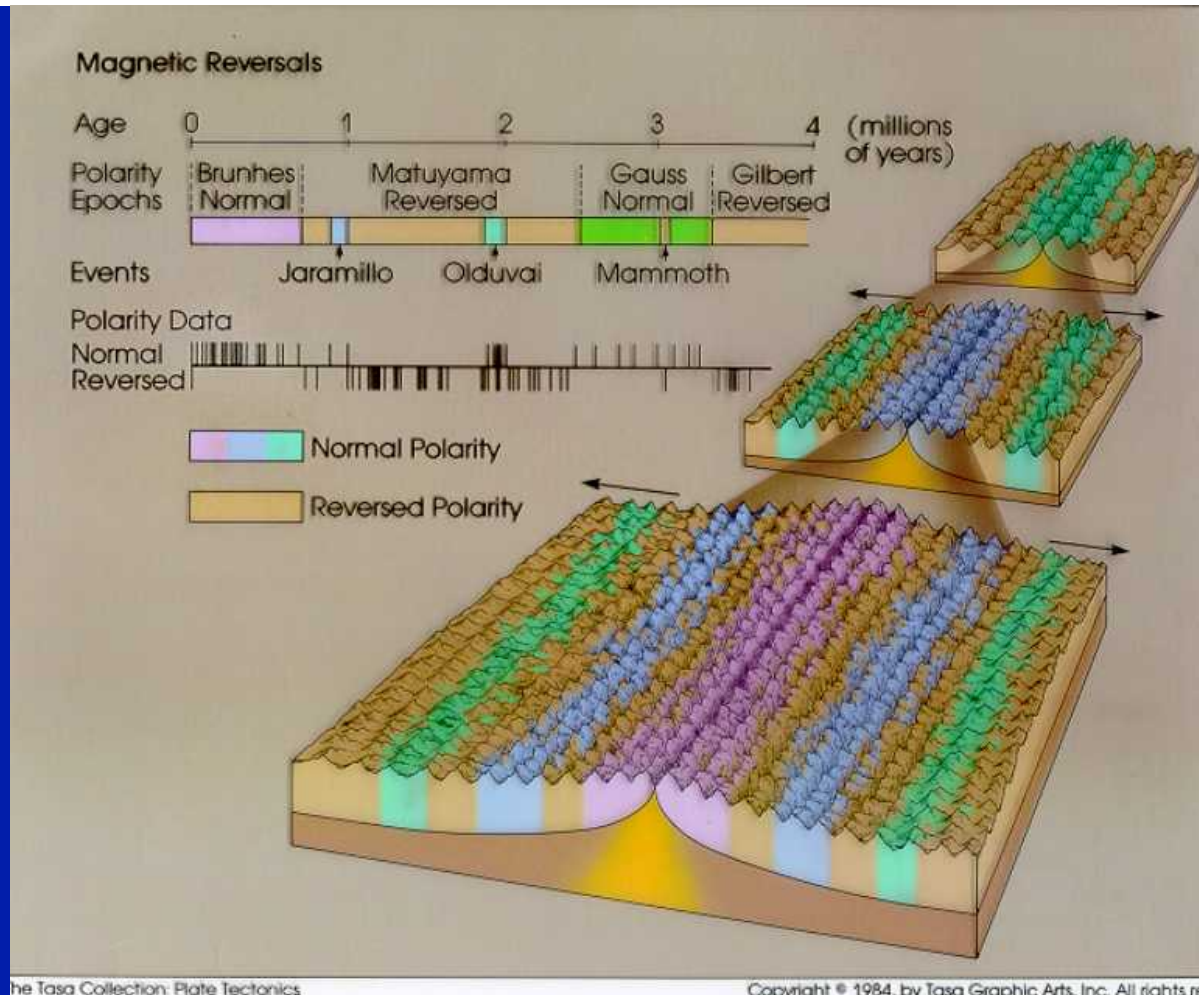
Back to time...

- How do we tell time with magnetics?
 - Earth's magnetic field reverses from time to time
 - No regularity to it
 - No apparent biological consequences
 - So if we can figure out when those reversals occurred, we just compare the pattern of reversals we find in our rocks to the known pattern, and where it matches, that's the age of our rocks



We get a very complete record of the reversals from the sediment that is deposited in the deep sea - it is a very continuous record through time.

BUT - how old is the sediment? We can't use radiometric dating to know.



On the ocean floor, we see magnetic “stripes” as basalt forms at the spreading centers and moves away. We can collect the basalt, use radiometric dating to find age, and we’ve got the age of that stripe.



We can use Iceland lavas - a pretty complete record - to add dates to the timescale. Do the magnetics and find the pattern of reversals. Check that against the deep sea record to make sure you've got all the reversals. Then date the lavas to add ages.