

A Revolution Revival: Ocean floor vs. Continent

In 1947, seismologists on the U.S. research ship *Atlantis* found that the sediment layer on the floor of the Atlantic was much thinner than originally thought. Scientists had previously believed that the oceans have existed for at least 4 billion years, so they had assumed the sediment layer should have been very thick. They were surprised to find so little accumulation of sedimentary rock and debris on the ocean floor and wondered how this could be possible.

Meanwhile, an international partnership of scientists and governments joined together to create the Ocean Drilling Program, allowing scientists a unique opportunity to get samples of ocean floor rock. They expected to find rock ages similar to what we find on continental rock, but when they determined the ages of the oceanic rocks many were surprised!

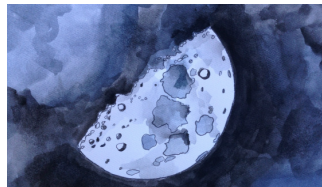
Here we provide you with some rock age data that will include continental basement rock (igneous and metamorphic rock found on continents that is the foundation of the continent below sediments) and ocean floor rock.

Key

MYA = Millions of years ago
 BYA = Billions of years ago
 Joides = Scientific drilling ship



Discuss what pattern(s) you notice and be ready to report back to your team.



Historic narrative adapted from <http://pubs.usgs.gov/gip/dynamic/developing.html> and http://www.odplegacy.org/PDF/Data/Documentation/ODP_Data.pdf
 Emoji from <http://emojipedia.org/smiling-face-with-sunglasses/>

Rock Age Data

Age of North American Continental basement rock along 34°N Latitude

Region	Location	Age of basement rock
California	34°N, 118°W	250 MYA
Arizona	34°N, 112°W	250 MYA
New Mexico	34°N, 106°W	>2.5 BYA
Oklahoma	34°N, 98°W	1.7-1.6 BYA
Arkansas	34°N, 93°W	1.5-1.3 BYA
Tennessee	34°N, 86°W	1.3-1.0 BYA
North Carolina	34°N, 79°W	250 MYA

Basement rock data determined from Stanley, Steven M. (2009) Earth System History 3rd edition (p 282). New York: W. H. Freeman and Company

Age of Oceanic basement rock at Joides Drill Holes between 32°N and 36°N Latitude

Ocean basin	Location	Age of basement rock
Pacific	33°N, 153°E	137 MYA
Pacific	33°N, 148°E	137 MYA
Pacific	32°N, 146°E	140 MYA
Atlantic	35°N, 67°W	150 MYA
Atlantic	32°N, 59°W	104 MYA
Atlantic	32°N, 52°W	77 MYA
Atlantic	34°N, 69°W	153 MYA
Atlantic	34°N, 16°W	140 MYA
Atlantic	36°N, 33°W	3.5 MYA

Source of data: Parsons, B., & Sclater, J.G. (1977). An Analysis of the Variation of Ocean Floor Bathymetry and Heat Flow with Age. Journal of Geophysical Research, 82 (5), 803-827.

If you have extra time after discussing the data and any pattern that explains it, feel free to plug the locations into Google Maps. For Oceanic data, be sure to keep zooming out until you can see land!