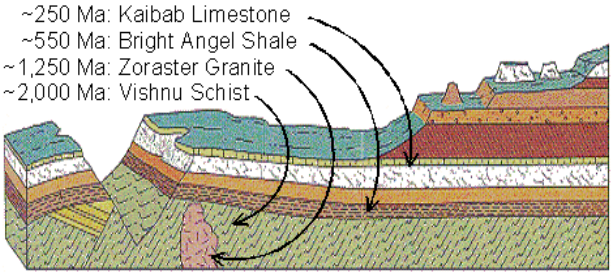
Sediments are the ocean's memory

- Geological materials comprising the sediments come from weathering and decomposition of pre-existing rocks or materials that are subsequently eroded, transported and deposited in the basins. These materials themselves are either integral to the "rock cycle", and may then have been either primary (or igneous, i.e., either plutonic or volcanic) or secondary (i.e., sedimentary or metamorphic) or of organic origin.
- Sediments (a) provide information about the past depositional environments and climatic conditions; (b) corroborate inferences from such other data as marine magnetic anomalies; and (c) are important in terms of resources.

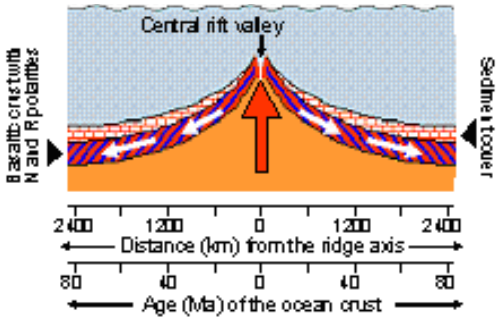
  For instance, based on the evidence of ~200 Ma old lime-stones that form Mt. Annapoorna, one of the Himalayan peaks, we know that an ocean once existed where the Himalayas are now located.

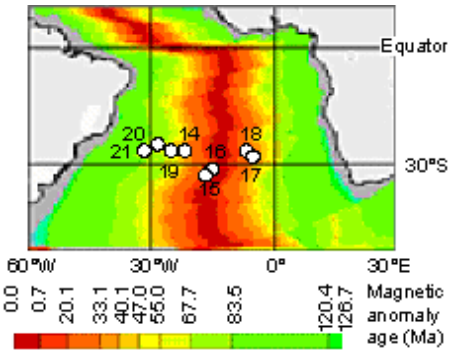


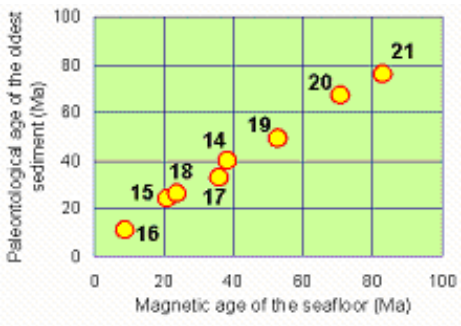
Likewise, the Grand Canyon's ~250 Ma old Kaibab Limestones that form the floor of the Kaibab National Forest suggest that todays' arid southwest was once covered by an ocean. Shown alongside is the geological section of the Grand Canyon region.

- **<u>DSDP data and seafloor spread</u>**

  Corroboration of marine magnetic interpretation has been a very interesting application of the sediment data. Sketched alongside, for instance, is the profile model across a mid-ocean ridge from which it can be seen that the age of the oldest sediment overlying the basaltic seafloor should be younger than, or at the most the same as, the age of the basaltic seafloor.







Site	Distance from ridge axis (km)	Magnetic of basaltic floor (Ma)	Fossil age of the bottom sediment (Ma)
14	727+10	36-39	40+1.5
15	380+10	21	24+1.0
16	191+6	9	11+1.0
17	643+20	34-38	33+2.0
18	506+20	?	26+1.0
19	990+10	53	49+1.0
20	1270+20	70-72	67+1.0
21	1617+20	?	>76

This is exactly what the DSDP (deep sea drilling project) results show. This map on the left shows the drill sites in South Atlantic under Leg 3 of this project. The ages obtained from interpretation of marine magnetic anomalies here are tabulated above and compared with the bottom sediment ages. Notice in the above Table as also in the graph shown on the left, which too compares the ages obtained from these two completely independent datasets, how closely the two inferences match. This supports the expectation that the oldest sediments overlying the basaltic floor should be at the most as old as the underlying basalts.