

5.3

EVIDENCE OF CHANGING SEA LEVELS

How are geologists able to determine historical sea level changes through the rock record?

BACKGROUND

A succession of rock strata, one on top of the other is called stratigraphic sequence. If we interpret each rock unit in sequence from oldest (bottom) to youngest (top) geologists can then infer depositional environments over a given portion of geologic time for the site where the rock sequence is located. As sediments cumulate, they cover up the sediments that were already deposited at an earlier (older) time. Depositional environments change through geologic time, as do the types of sedimentary layers that accumulate. Therefore, at any particular location bodies of sediment have accumulated in different times and environments.

MATERIALS

- Rock samples 14B, 15B, 18B, and 21B

DIRECTIONS

1. Place rock samples 14B, 15B, 18B, and 21B in the locations along the road cut from where they were collected.
2. Make observation of each rock type including things like grain size, sorting, rounding, fossils (plant/animal/marine/terrestrial) only if present.
3. Describe the possible depositional environment associated with the rock sample.
4. Shade in the box of the most closely related environment to each rock sample.

		Mark the box of the correct environment			
Grain size, sorting, rounding, rock type, fossils (plant/animal/marine/terrestrial)	Describe the depositional environment in which this sample formed	Deep ocean	Shallow marine	Beach front	Land

5.3 EVIDENCE OF CHANGING SEA LEVELS CONTINUED

REFLECTION

1. Place the samples in order by sample # from closest to the source area to furthest away.

Closest to source (mountains) _____ Furthest away from source (ocean)

2. What properties of the rocks did you use to place these samples in this order?
3. Do you believe this sequence of rocks represents a transgressive ocean or a regressive ocean sequence? Explain.
4. Refer to the "Generalized Geology and Profile of a Utica Shale Well Prototype in East Central Ohio": Find the Trenton Limestone at ~7,000 ft below the surface, track the changes in rock types to the Clinton Sandstone ~4,800-4,900 ft. Do you believe Ohio was experiencing transgressive or regressive oceans during this portion of Ohio's geologic past?