

SHORELINE PROCESSES

1. Coast - Central California

a. What feature and process causes the waves to bend into a curving line connecting points A, B, C, and D?

b. Jetties (long, narrow seawalls) are constructed perpendicular a shoreline. Locate the jetty on this photograph. Study the patterns of the beach sand and suspended sediment in the water around this jetty.

(1) Which way is the longshore current flowing?

Northward (upward on the photo)

(2) What evidence is there to support your answer to (1)?

The jetties cause wave refraction and concentrate wave energy at their points and deposition of sand where they intersect the beach. The flow of sand around the jetty is toward the top of the photo.

c. The airport in this photograph is built on a flat, uplifted marine terrace that extends from seacliffs inland to the foot of the mountains. What was this surface before it was uplifted from the ocean?

Wavecut terrace cut by wave erosion.

2. Newfoundland Coast -Canada

This aerial photograph was taken at low tide. Many shoreline features that are normally submerged are exposed from the ocean. Label the following features:

- a. Headlands
- b. Sea stacks
- c. Wave-cut platform
- d. Marine terrace
- e. Tidal flat
- f. Tidal channels
- g. Sea cliff

see figure

3. San Pedro, California

a. Color the three major uplifted marine terraces.

See figure.

b. What do these terraces indicate about the tectonic history of this area?

Uplift of the region

4. Spit - North Carolina

On this photograph, and the one below it, sand is white in color and shallow sand bars are light blue.

a. What is the direction of longshore drift?

From right to left in the photo.

b. What is the most likely cause for the numerous ocean inlets that cut through the beach?

Storms, such as hurricanes, breaching the sand bar.

c. What is the origin of the small lobe-shaped sand bar in the center of the photograph?

Tidal currents moving into the lagoon and redepositing the sand.

5. Coastal Features - North Carolina

a. Use arrows to show the direction of sediment transport in this area.

See figure.

b. Why is the tidal delta larger in the lagoon than in the open ocean?

The tidal delta is larger in the lagoon than in the open ocean because the greater wave energy in the open ocean tends to dominate over the tidal energy moving sediment out through the inlet. In the lagoon, the wave energy is at a minimum, and the tidal energy dominates, resulting in a large, lobate tidal delta.

6. Coastal Features - Quebec

a. Label the following features on the photograph:

(1) Barrier bar

(2) Tidal inlet

(3) Tidal channels

(4) Bayhead delta

see figure.

b. What is the source of sediment both seaward and landward of the inlet between the spits?

Sediment being deposited as tidal deltas comes from longshore drift up and down the coast. The ultimate source would be major streams that deliver sediments to the sea.

7. Cape Cod

a. Explain the origin of the curved landform at the end of Cape Cod.

Waves strike the northeastern part of the area from the east and northeast, thus creating longshore currents moving the sand toward the north. These longshore currents sweep the sand to the north and west, curving into a spit at the end of the sand bar.

b. What is the direction of longshore drift along the eastern shore of Cape Cod?

North and northwest in the upper right part of the photo

What is your evidence for this?

The sand bar is smooth on the east coast and is swept to the northwest around the curve.

8. Beach Erosion - Chatham, Massachusetts

a. What coastal features developed after the break in the barrier island in 1987?

A sand spit began to grow from the north and from the south at the break until it was connected to the mainland by a large sand bar by 1991.

b. What happened to the southern island between 1988 and 1991?

The beach enlarged and a large spit developed that connected the barrier island to the shore.

c. What happened to beach at Chatham (the arrow in A) between 1988 and 1991?

The inlet to the lagoon was enlarged and the coast behind the inlet to the north was eroded with less beach area north of the inlet. The beach area where the barrier island became connected was larger.