

## Outline 11: The Cenozoic World

1. Mountain Building
2. When the Mediterranean Sea dried up

### Cenozoic Mountain Building

Two great orogenies:

1. Alpine-Himalayan Orogeny: extends from Europe to Asia, caused by the collisions of Africa and India with Europe and Asia. This closed off the Mesozoic Tethys Seaway. The Mediterranean and Black seas are remnants of the Tethys.

### Cenozoic Tectonics or Mountain Building

2. Laramide Orogeny of North America: caused by the collision between the Pacific plate and North America. Formed the Rocky Mountains and many other features of western North America.

### Laramide Orogeny

- The Rocky Mountains are not near the edge of the continent. How did they form from plate collisions? Very rapid subduction of the Pacific Plate caused deformation far to the east underneath North America.

### Creation of Tensional Features

- About 25 MY ago North America overrode the East Pacific Rise. This created tension underneath North America and stretched the crust. This formed the Great Basin and the San Andreas Fault System.

### When the Mediterranean Sea Dried Up

- The Mediterranean Sea is underlain by oceanic crust and is up to 10,000 ft deep.
- When it dried up it formed a desert 10,000 ft below sea level!

## Causes

- There was a narrow, shallow opening in southern Spain less than 150 ft deep.
- Sea level dropped by 150 ft at the end of the Miocene, 7 MY ago, as glaciers formed on Antarctica.
- It dried up in less than 1000 years.

## Causes

- Why only 1000 years?
- Evaporation rate of 1000 cubic miles/yr
- Rivers send only 100 cubic miles/yr
- Net loss = 900 cubic miles/yr

## Evidence

- Buried gorges in Rhone River of France and Nile River of Egypt. Gorges are up to 5000 ft deep (same as Grand Canyon!).
- Floor of Mediterranean has extensive evaporite deposits of salt and gypsum up to 6000 ft thick!
- Stromatolites on floor of Mediterranean.

## Climatic Effects

- Such a large desert changed the climate of Europe.
- Palm trees grew in Switzerland.
- Dry grasslands formed over much of Europe replacing forests.

## Refilling the Mediterranean Sea

- In the Pliocene, about 5 MY ago, tectonic movements opened the Straits of Gibraltar, a new link to the Atlantic Ocean formed.
- The Mediterranean refilled in about 100 years.