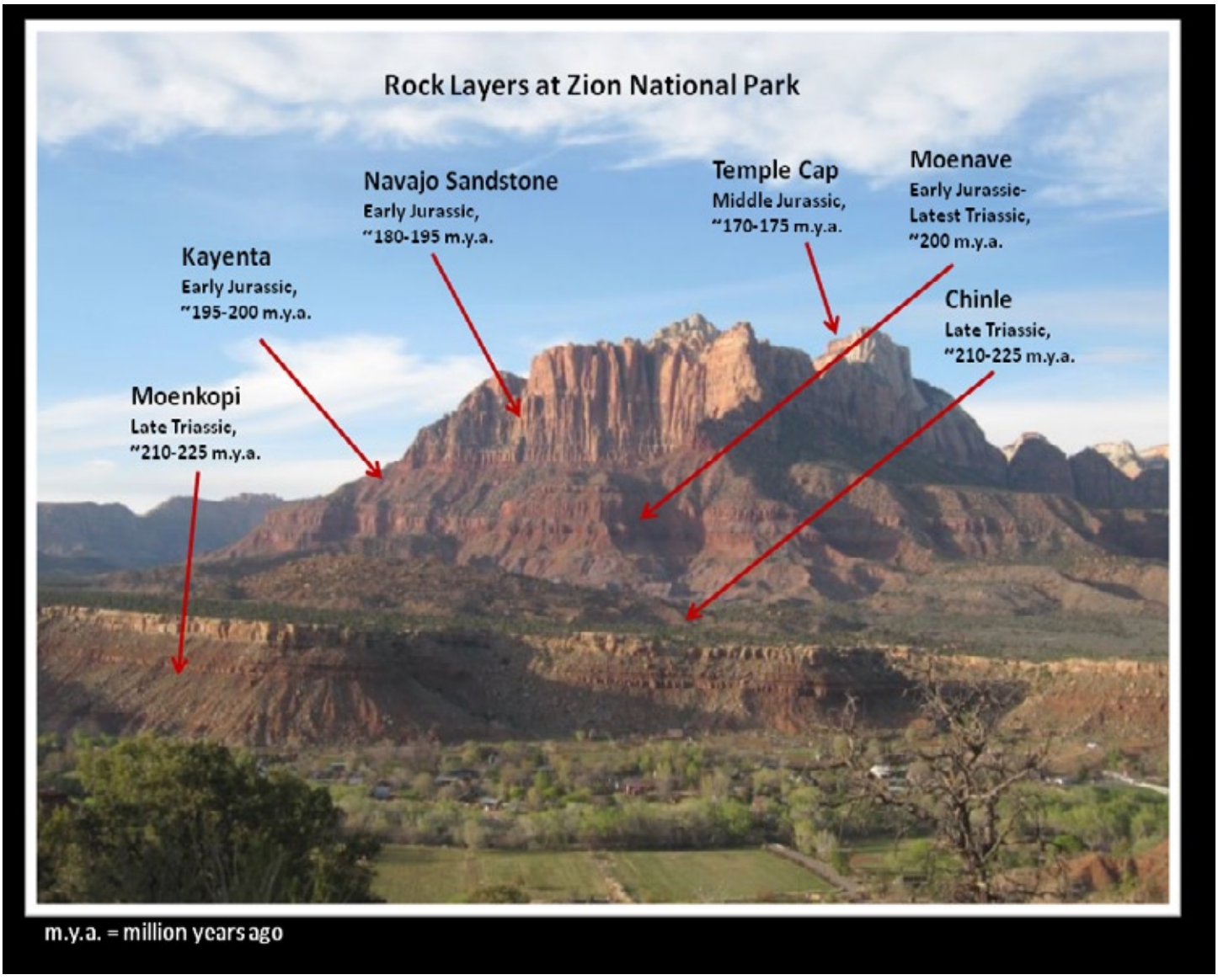
National Park Service
U.S. Department of the Interior

Zion National Park
Utah

Changing Landscapes - Images
Pre-Activity 3
Then and Now

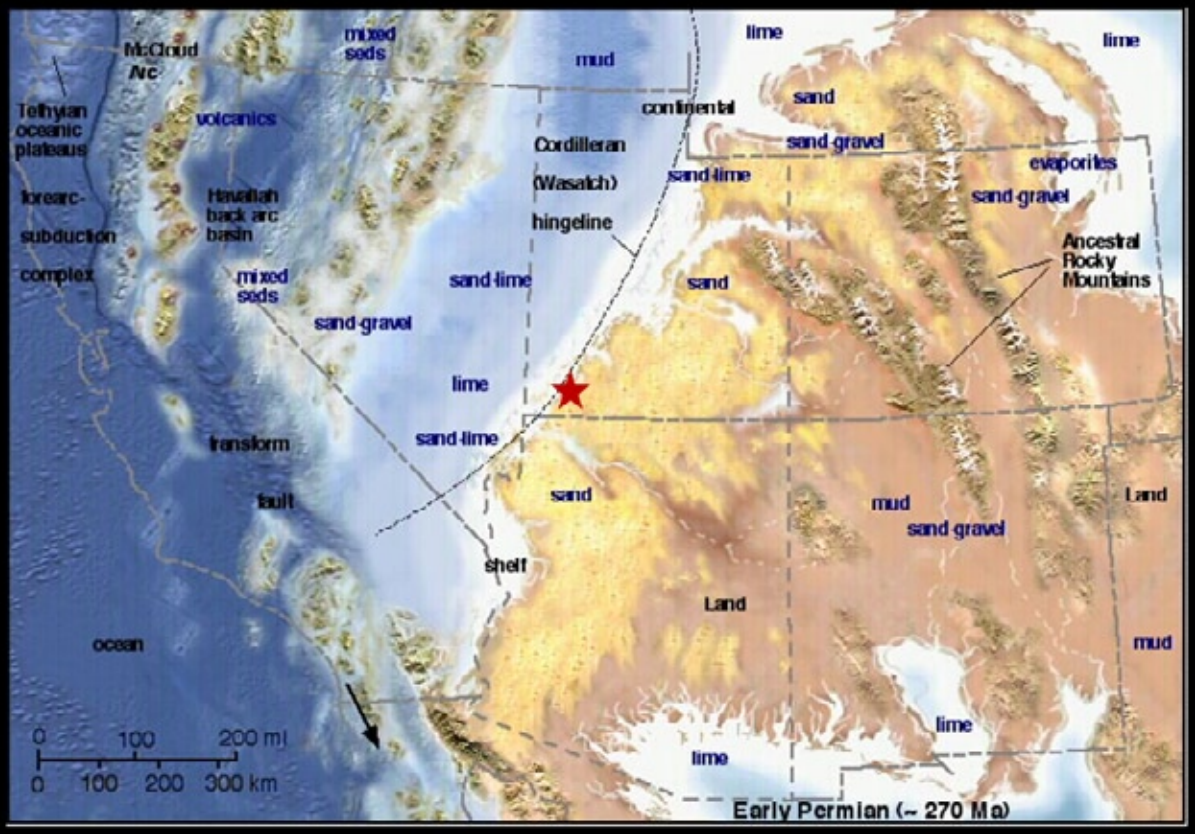

Rock Layers at Zion National Park
Navajo Sandstone
Early Jurassic,
~180-195 m.y.a.
Temple Cap
Middle Jurassic,
~170-175 m.y.a.
Moenave
Early Jurassic-
Latest Triassic,
~200 m.y.a.
Kayenta
Early Jurassic,
~195-200 m.y.a.
Chinle
Late Triassic,
~210-225 m.y.a.
Moenkopi
Late Triassic,
~210-225 m.y.a.
m.y.a. = million years ago

Geologic Layers at Zion National Park

Geologic Formations

Rock Layer	Appearance	Where To See	Deposition	Rock Type
Cinder cones and lava flows	black layers and cones	Kolob Terrace and west of Rockville	lava flows and cinder cones	basalt and cinders
Carmel	cliffs	Mt. Carmel Junction	shallow sea and coastal desert	limestone, gypsum, sandstone
Temple Cap	cliffs	top of West Temple	desert	sandstone
Navajo Sandstone	steep cliffs 1,600 to 2,200 feet thick red lower layers are colored by iron oxides	tall cliffs of Zion Canyon; highest exposures are West Temple, Checkerboard Mesa believed to be the tallest sandstone cliffs in the world	desert sand dunes covered 150,000 square miles shifting winds during deposition created cross-bedding	cross-bedded sandstone
Kayenta	rocky slopes	throughout canyon	streams	siltstone and sandstone
Moenave	slopes and ledges	lower red cliffs seen from Zion Canyon Visitor Center	streams and ponds	siltstone and sandstone
Chinle	purplish slopes	above Rockville	streams	shale, loose clay, conglomerate
Moenkopi	chocolate cliffs with white bands	rocky slopes from Virgin to Rockville	shallow sea	shale, siltstone, mudstone, others
Kaibab	cliffs	escarpment along I-15 near Kolob Canyons	shallow sea	limestone

Early Permian: ~270 million years ago



Kaibab Formation – limestone formed in warm, shallow, tropical sea

Paleogeographic reconstruction courtesy of Ron Blakey

Early Triassic: ~240 million years ago

Moenkopi Formation: shifting shoreline with broad tidal flats

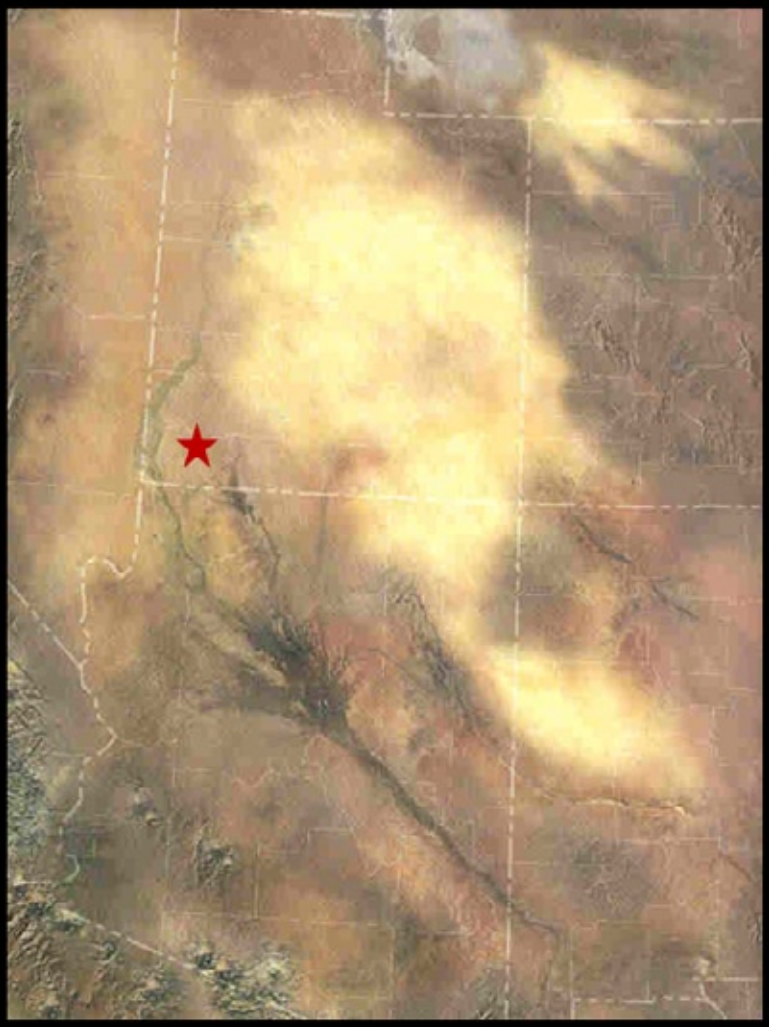
Paleogeographic reconstruction courtesy of Ron Blakey

Late Triassic: ~ 215 million years ago

Chinle Formation: far-reaching river systems, volcanoes in distance

Paleogeographic reconstruction courtesy of Ron Blakey

Earliest Jurassic: ~200 million years ago



- **Moenave Formation:** rivers, lakes, and flood plains

Paleogeographic reconstruction courtesy of Ron Blakey

Early Jurassic: 195-180 million years ago

Navajo Sandstone: desert conditions, wind-blown sand dunes cover the Colorado Plateau and beyond. Likely the largest sand-dune desert in earth history.

Paleogeographic reconstruction courtesy of Ron Blakey