

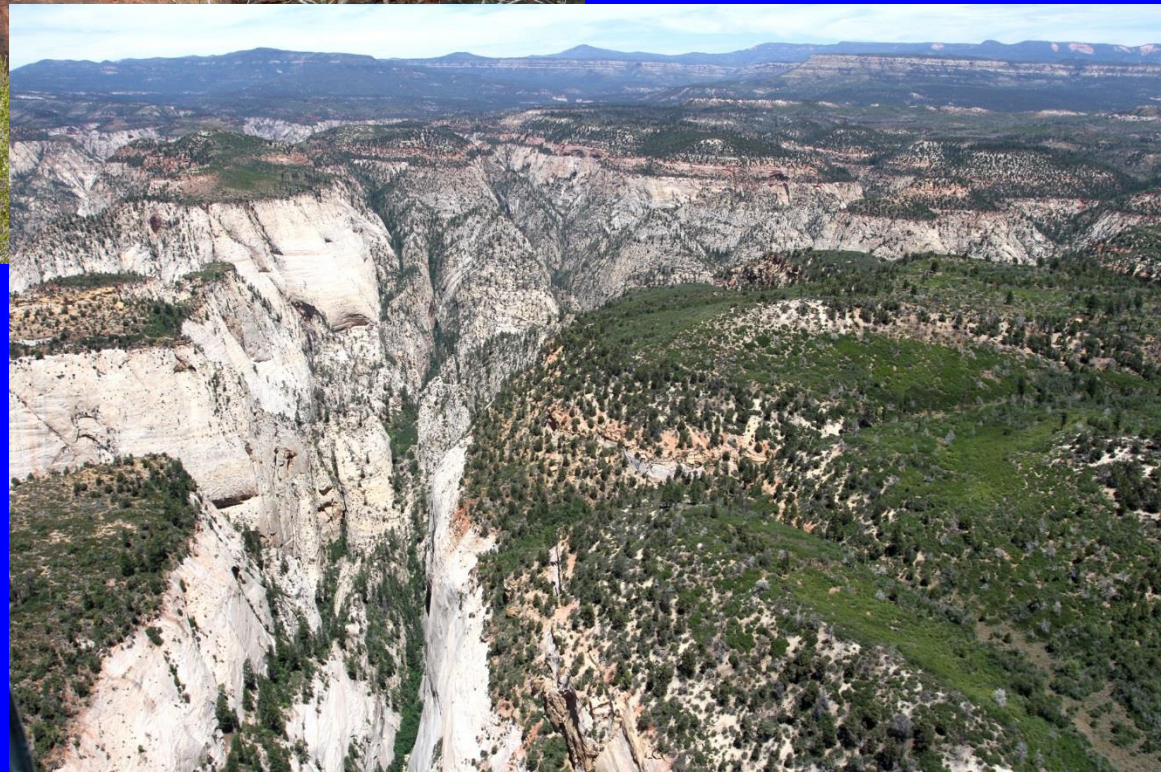
INTRODUCTION TO THE LOCAL GEOLOGY

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Goals

- Introduce the geological column in SW Utah
- Illustrate some basic geological concepts as seen in Utah

Awesome
geology!





Theories of earth history

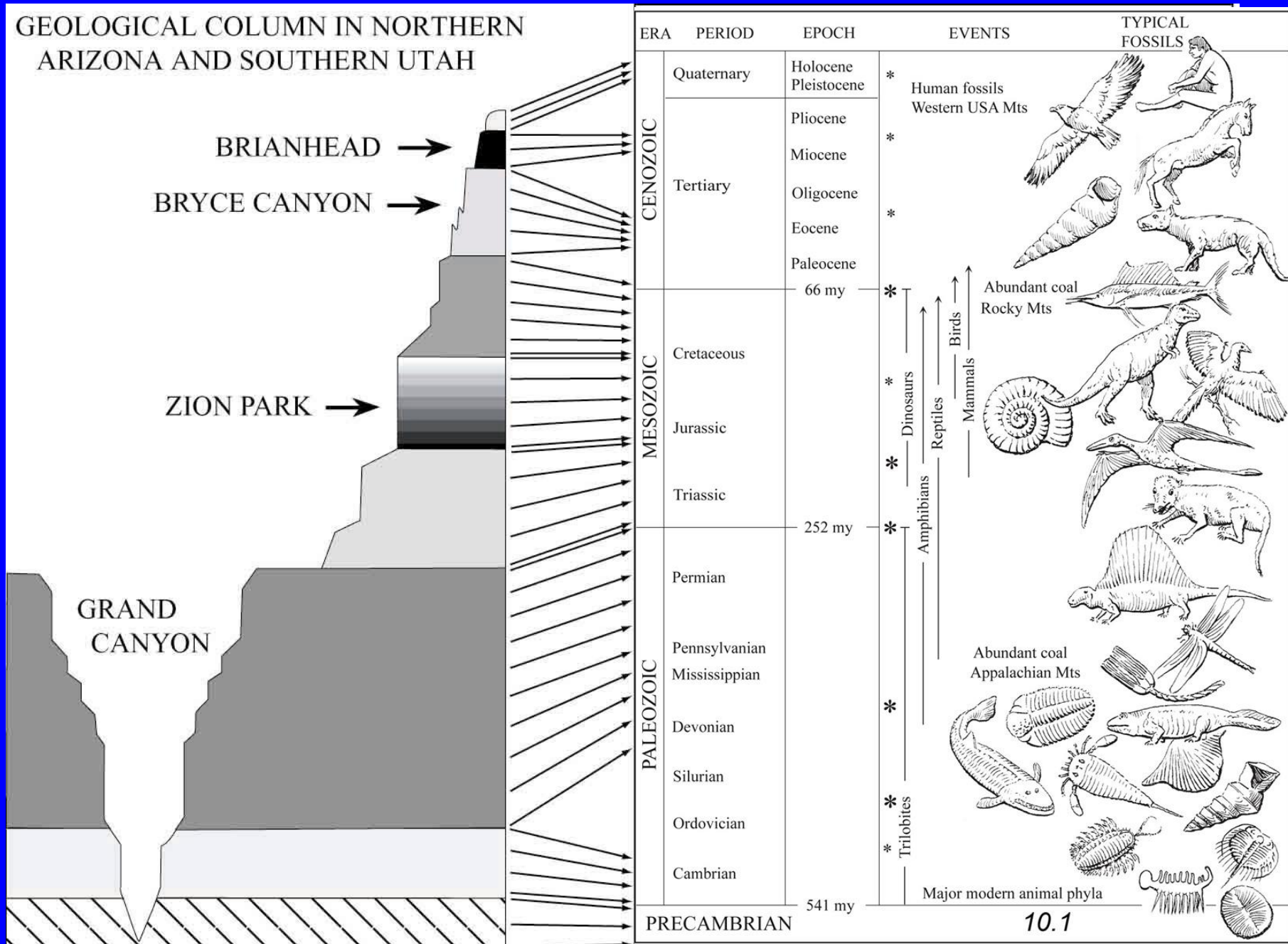
1. Conventional geology

Geological column (Cambrian-Recent) formed during 541 million years of evolution

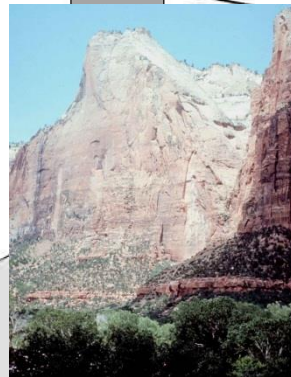
2. Creation and flood geology (short-age geology)

Geological column formed since creation week; thousands of years

GEOLOGICAL COLUMN IN NORTHERN ARIZONA AND SOUTHERN UTAH



GEOLOGICAL COLUMN IN NORTHERN ARIZONA AND SOUTHERN UTAH



ERA	PERIOD	EPOCH	EVENTS	TYPICAL FOSSILS
CENOZOIC	Quaternary	Holocene Pleistocene	* Human fossils Western USA Mts	Human, Horse, Bird
	Tertiary	Pliocene	*	Horse, Bird
		Miocene	*	Horse, Bird
		Oligocene	*	Horse, Bird
		Eocene	*	Horse, Bird
		Paleocene	*	Horse, Bird
MESOZOIC	Cretaceous	66 my	* Abundant coal Rocky Mts	Trilobite, Dinosaur, Bird, Mammal
	Jurassic			Dinosaur, Bird, Mammal
PALEOZOIC	Triassic			Dinosaur, Bird, Mammal
		252 my	*	Dinosaur, Bird, Mammal
	Permian			Dinosaur, Bird, Mammal
	Pennsylvanian Mississippian		Abundant coal Appalachian Mts	Dinosaur, Bird, Mammal
PALEOZOIC	Devonian		*	Dinosaur, Bird, Mammal
	Silurian		*	Dinosaur, Bird, Mammal
	Ordovician		*	Dinosaur, Bird, Mammal
	Cambrian		*	Dinosaur, Bird, Mammal
		541 my	Major modern animal phyla	Dinosaur, Bird, Mammal
PRECAMBRIAN				

Stratigraphy – the geological column

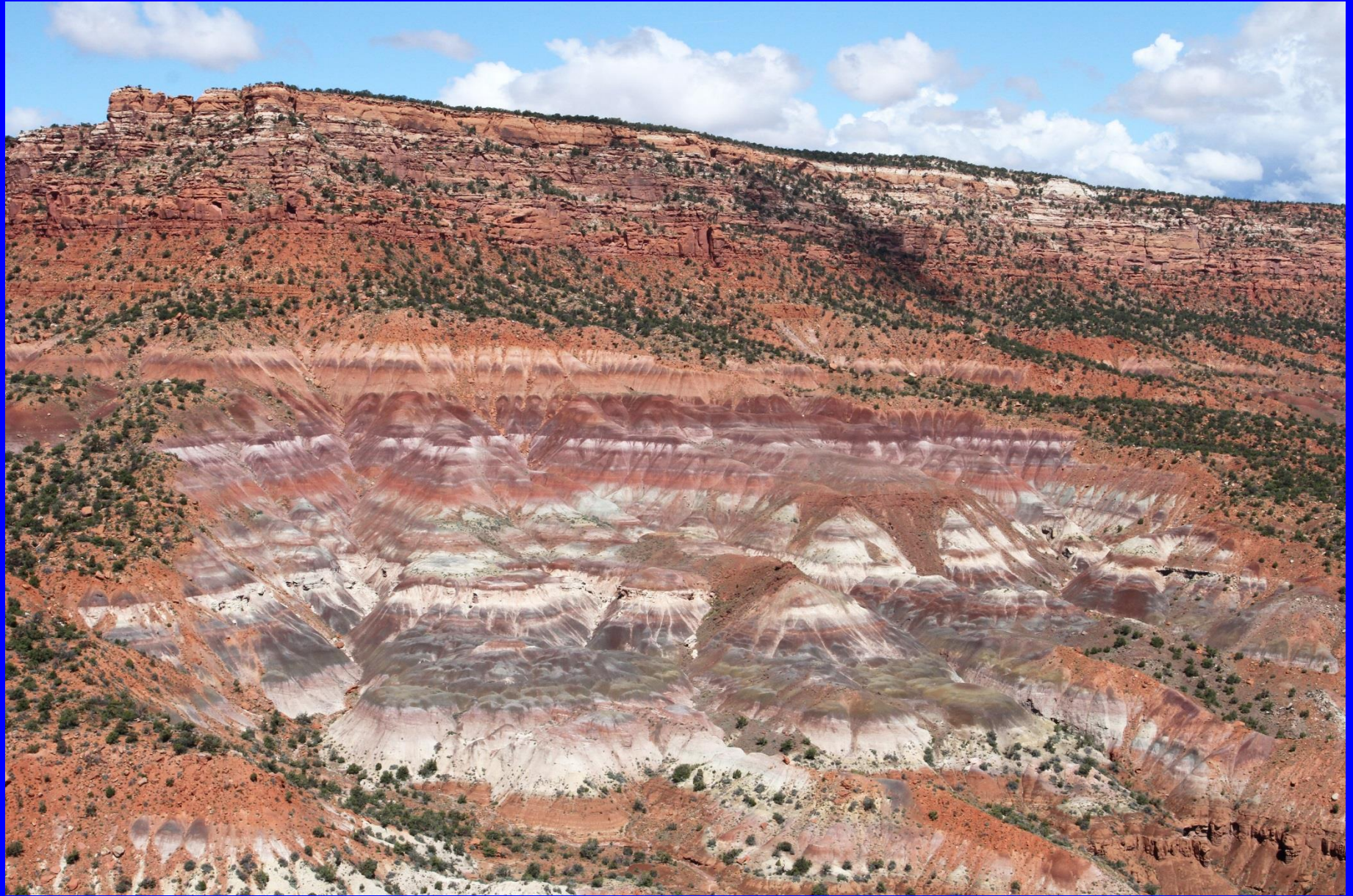
Paleozoic



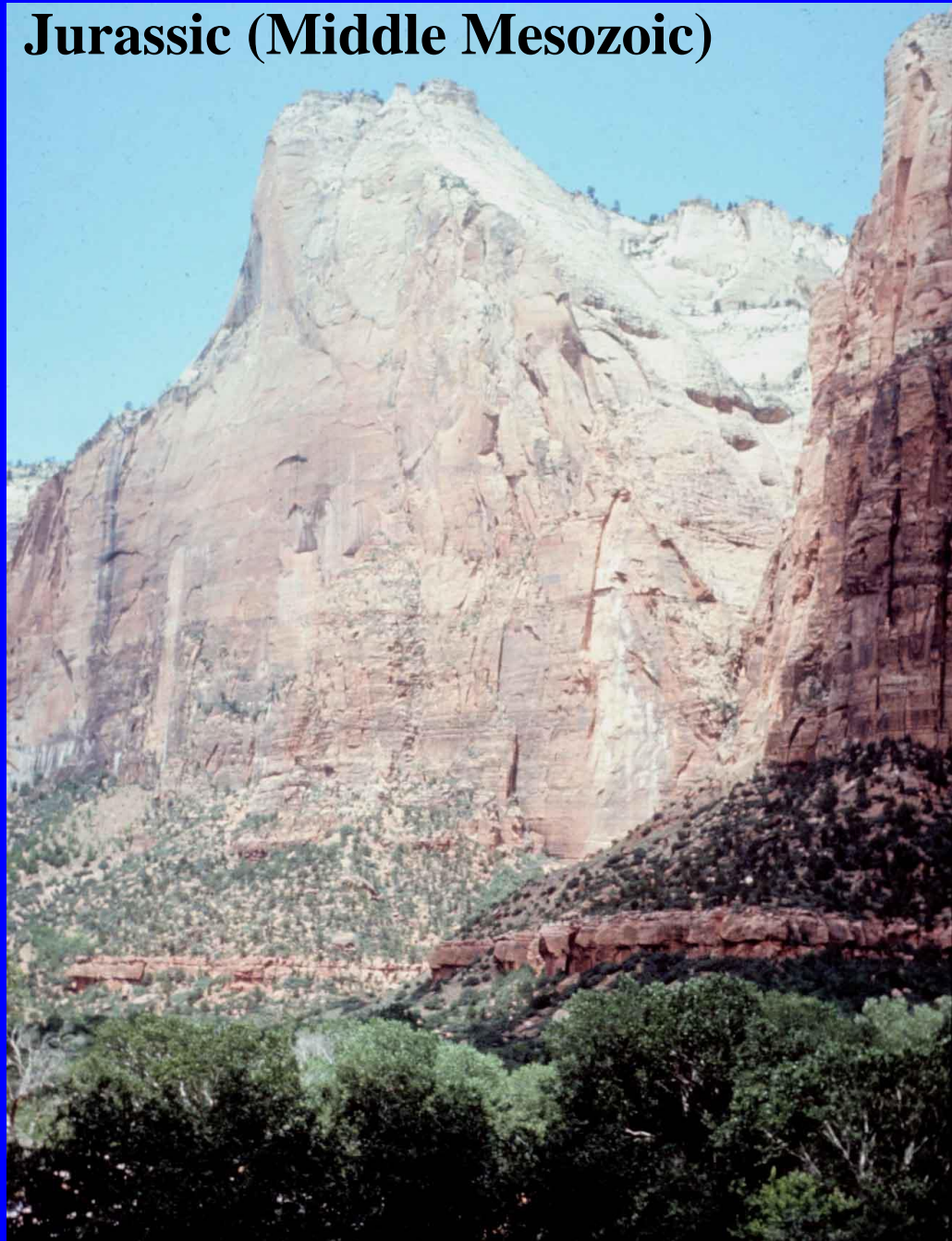


Triassic (Early Mesozoic)





Jurassic (Middle Mesozoic)



Cenozoic

Bryce Canyon

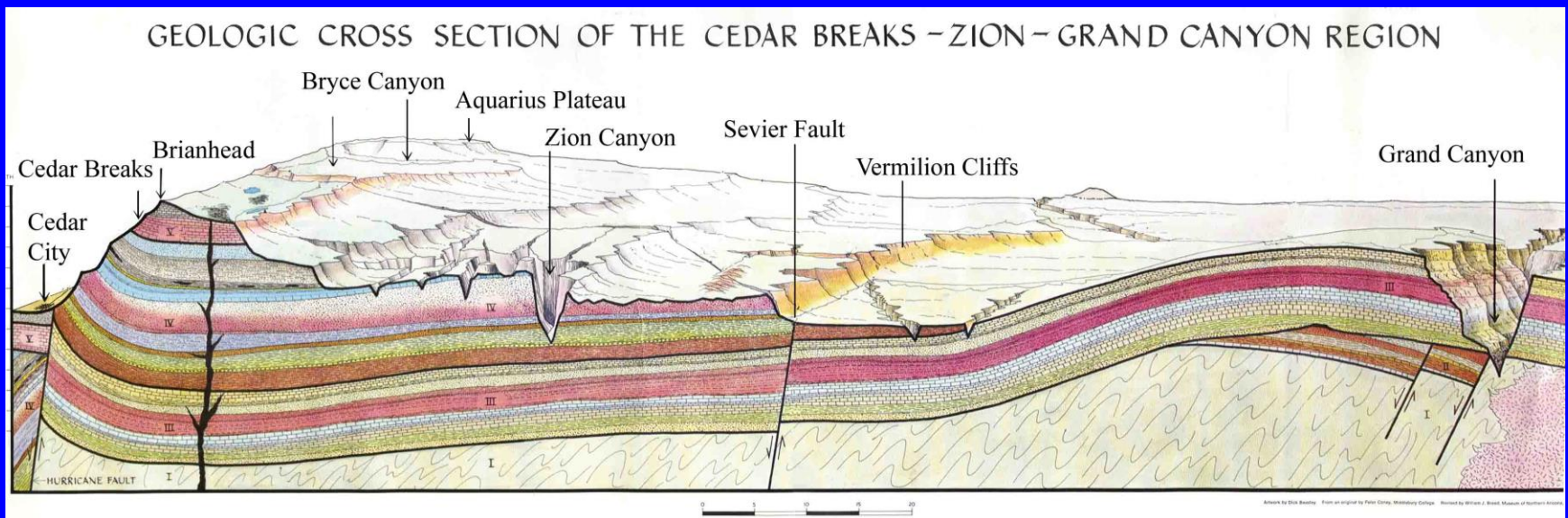




Cenozoic

Mesozoic

Paleozoic





PROCESS:

Sedimentary rock

From weathering and fracturing of other rock

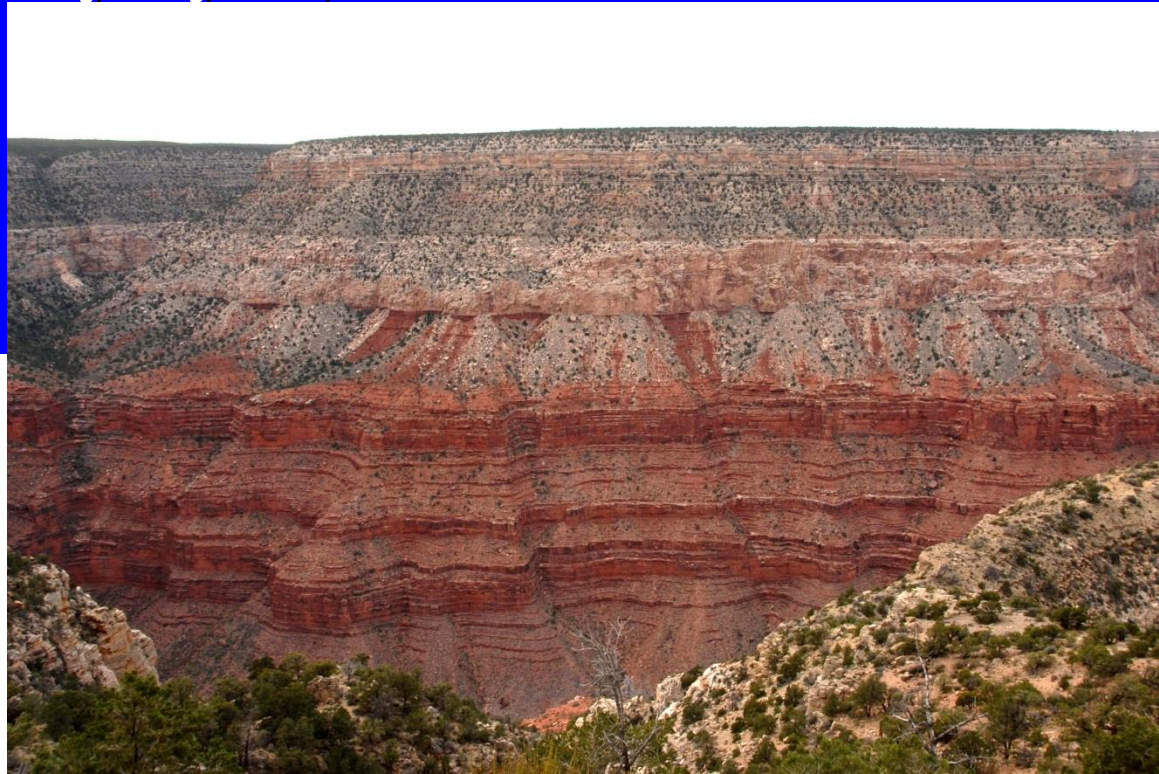
1. Erosion



2. Transport of
sediment to a basin;
Deposit in layers

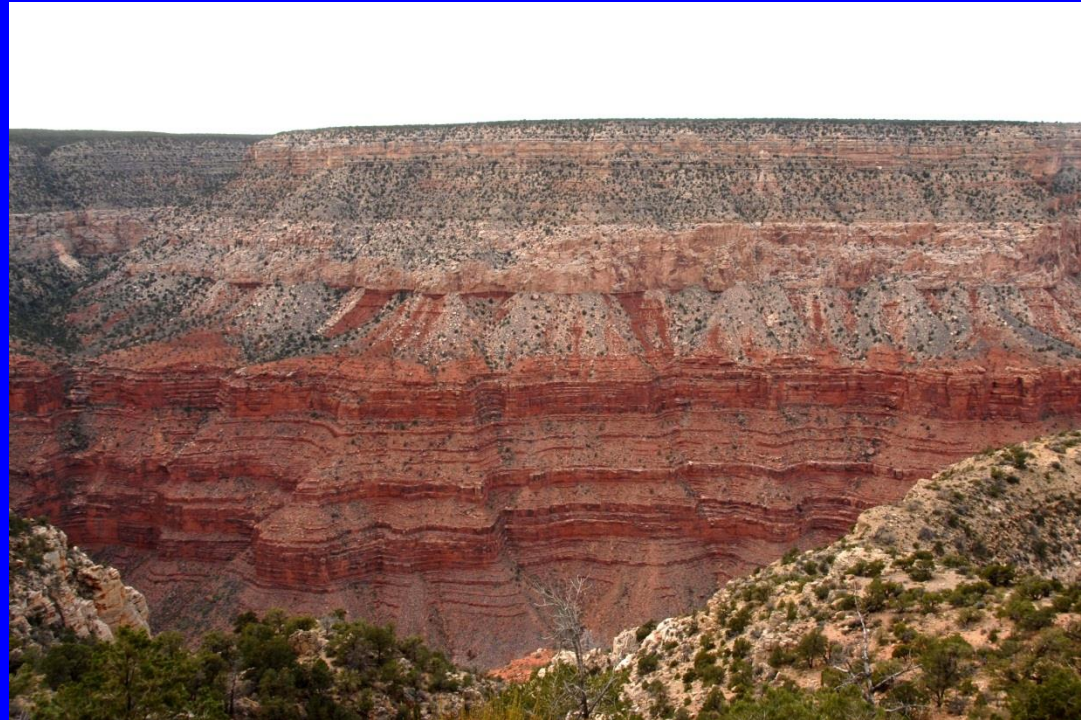


Sedimentary layers, or beds

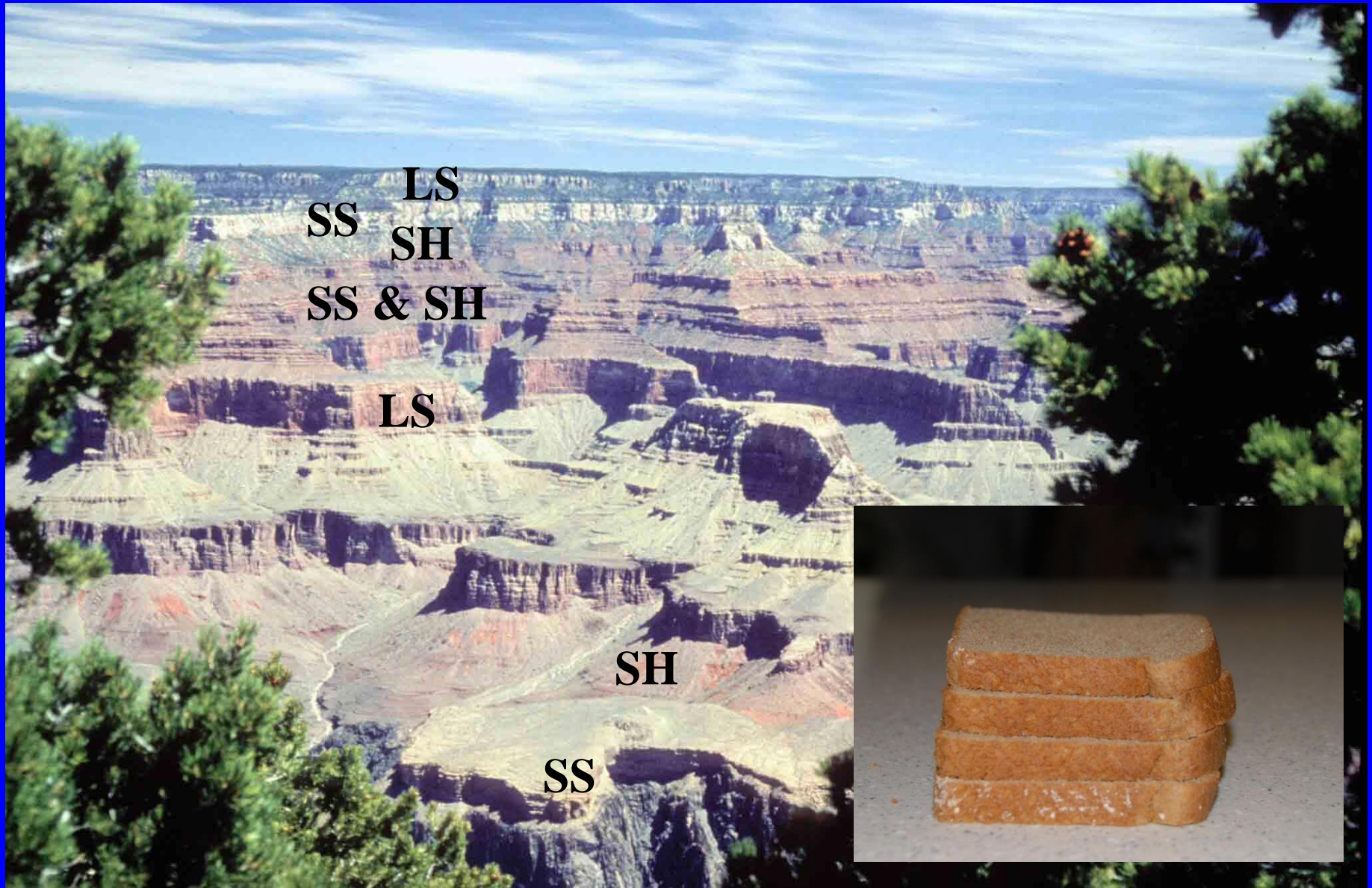




The layers seen on the surface continue into the rock, sometimes for hundreds of miles

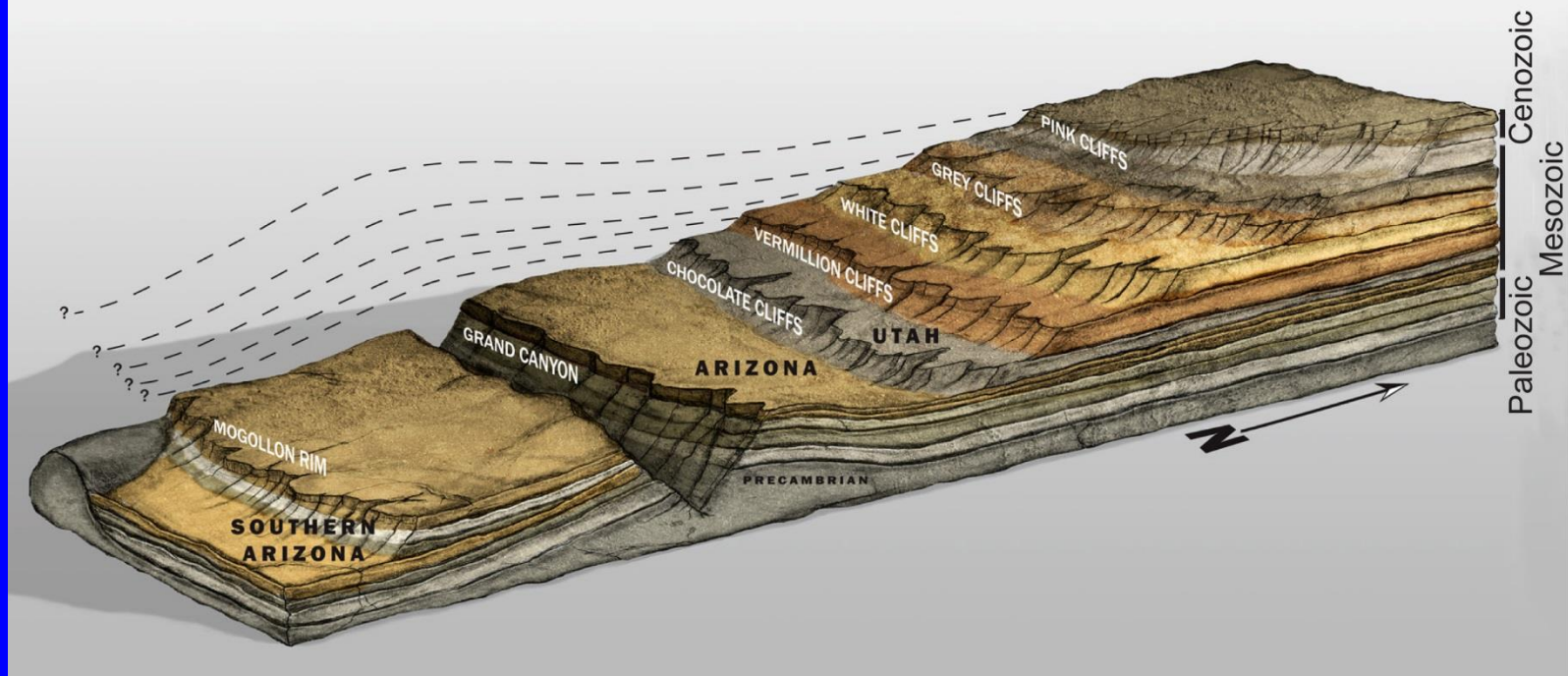


Sediments in the Grand Canyon

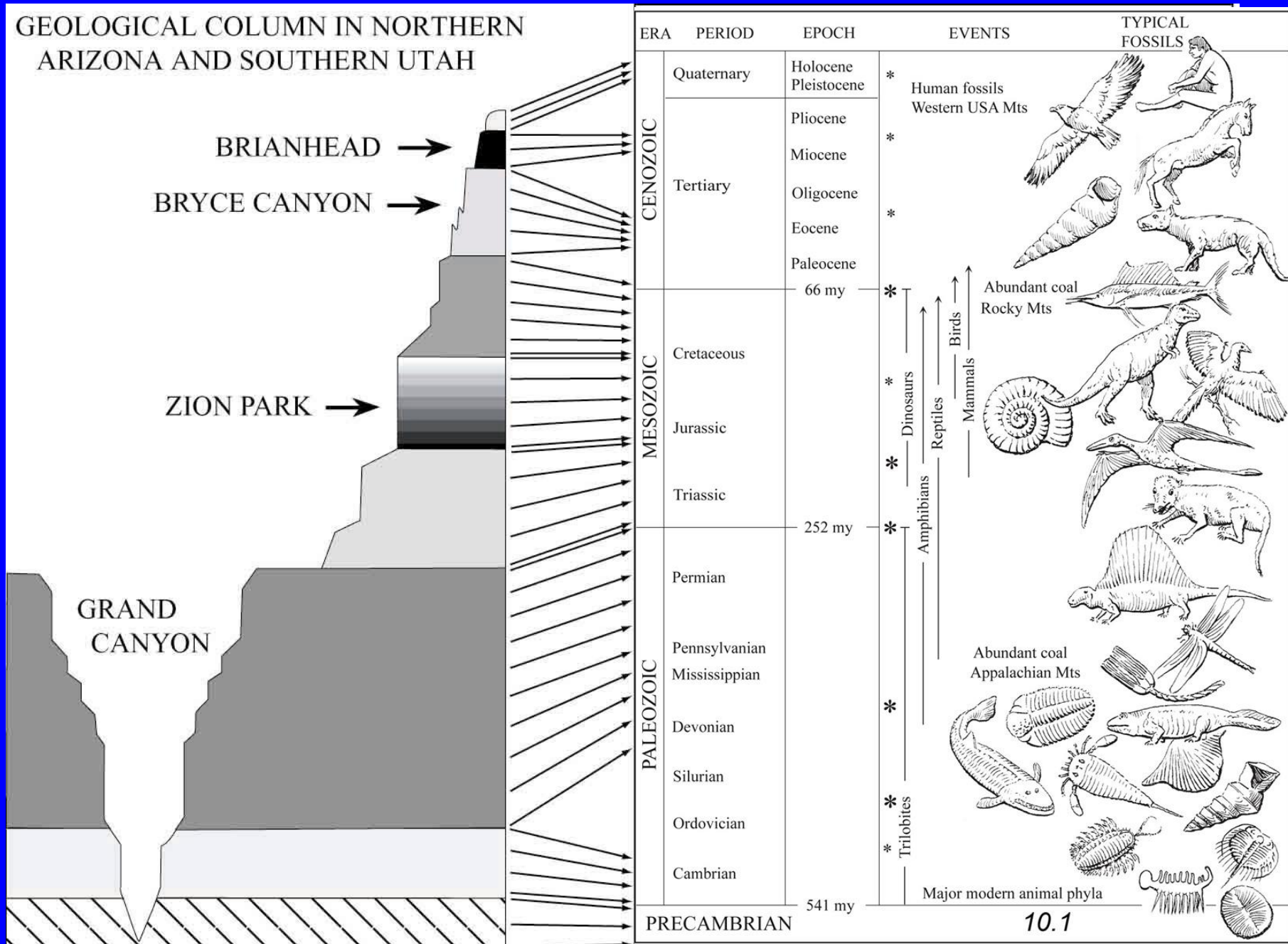


Is the local geological column complete?

The Grand Staircase of Utah and Arizona

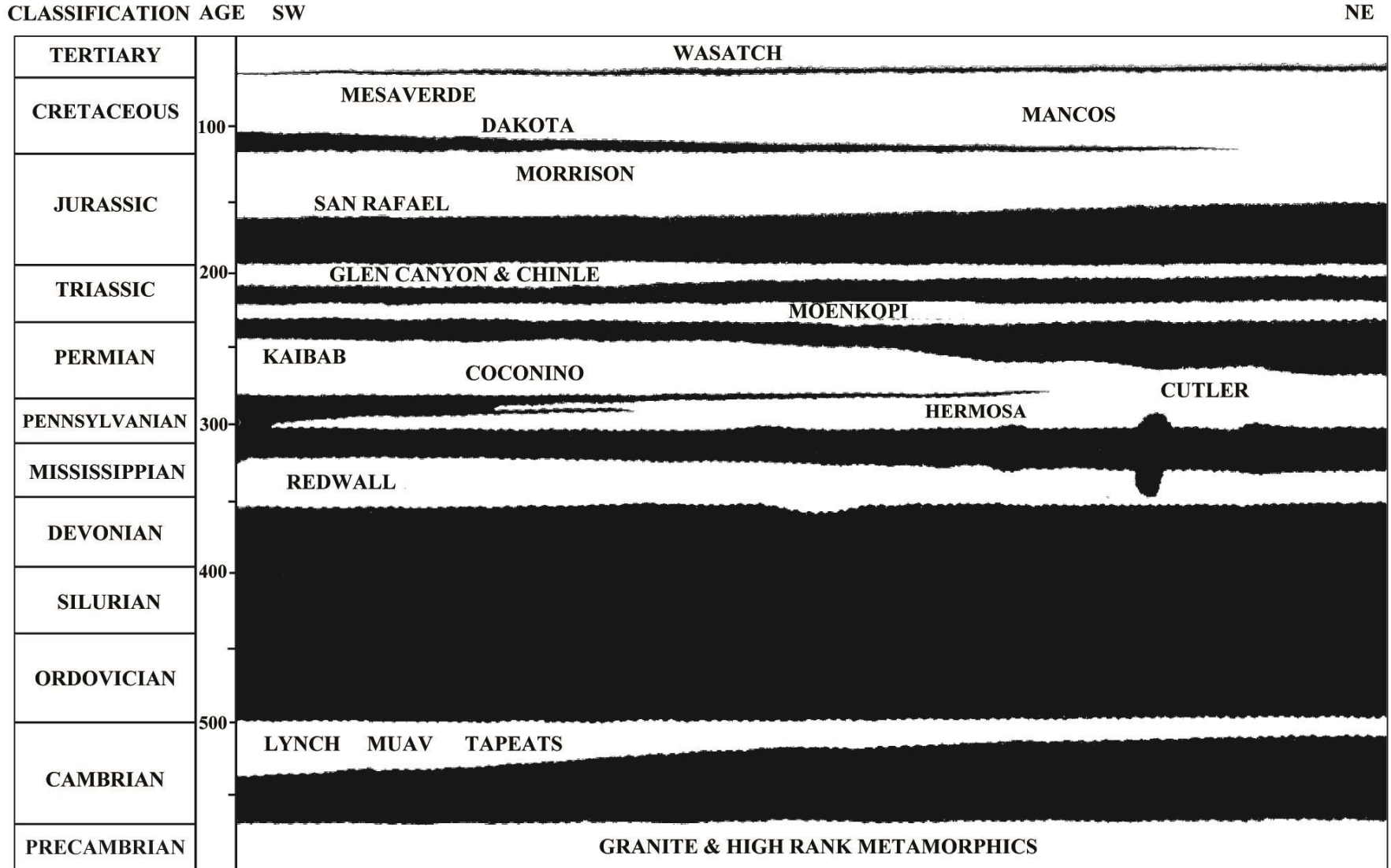


GEOLOGICAL COLUMN IN NORTHERN ARIZONA AND SOUTHERN UTAH



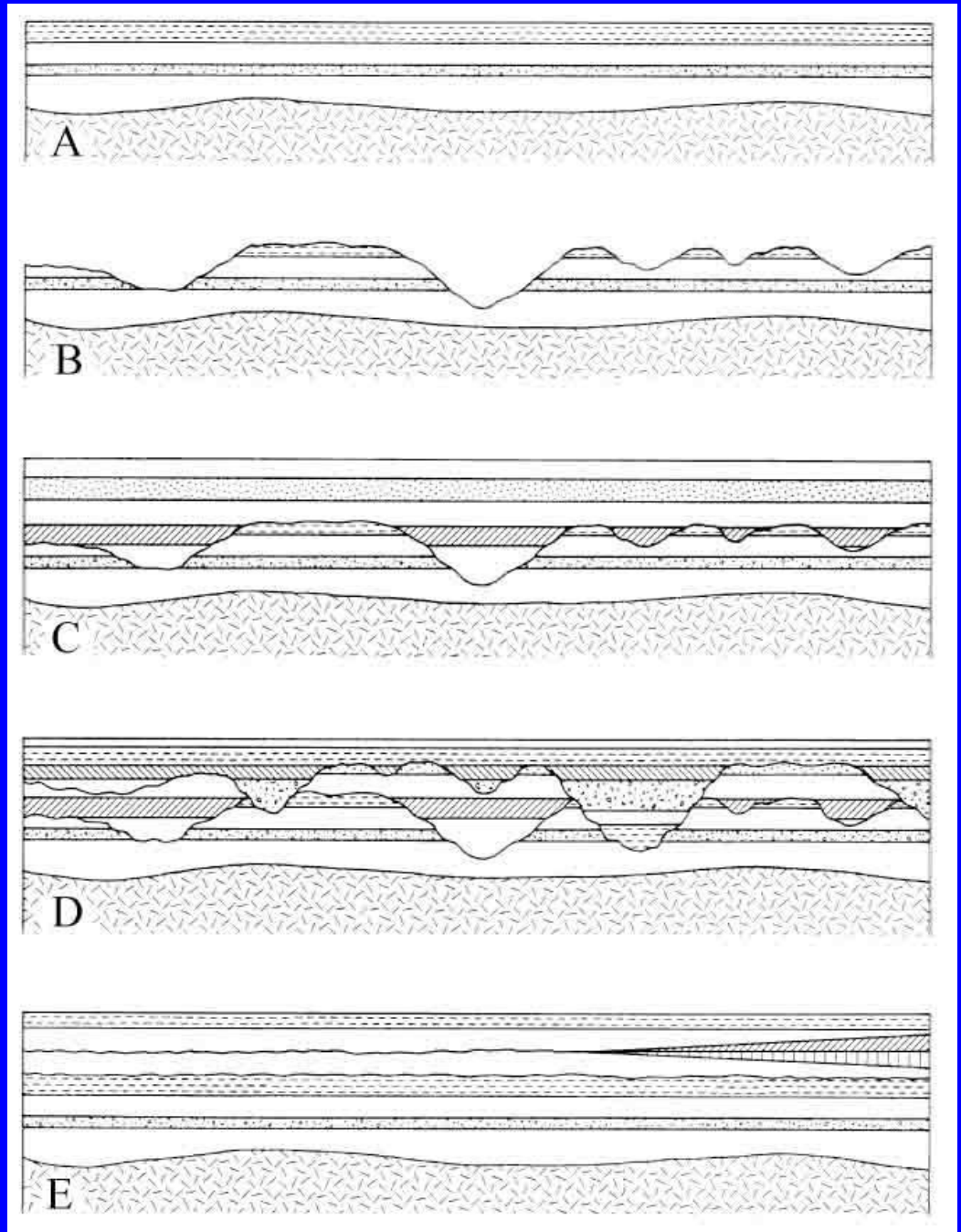
White = rock Black = presumed time that is not represented by rock

STRATIGRAPHIC HIATUSES IN SOUTHEASTERN UTAH



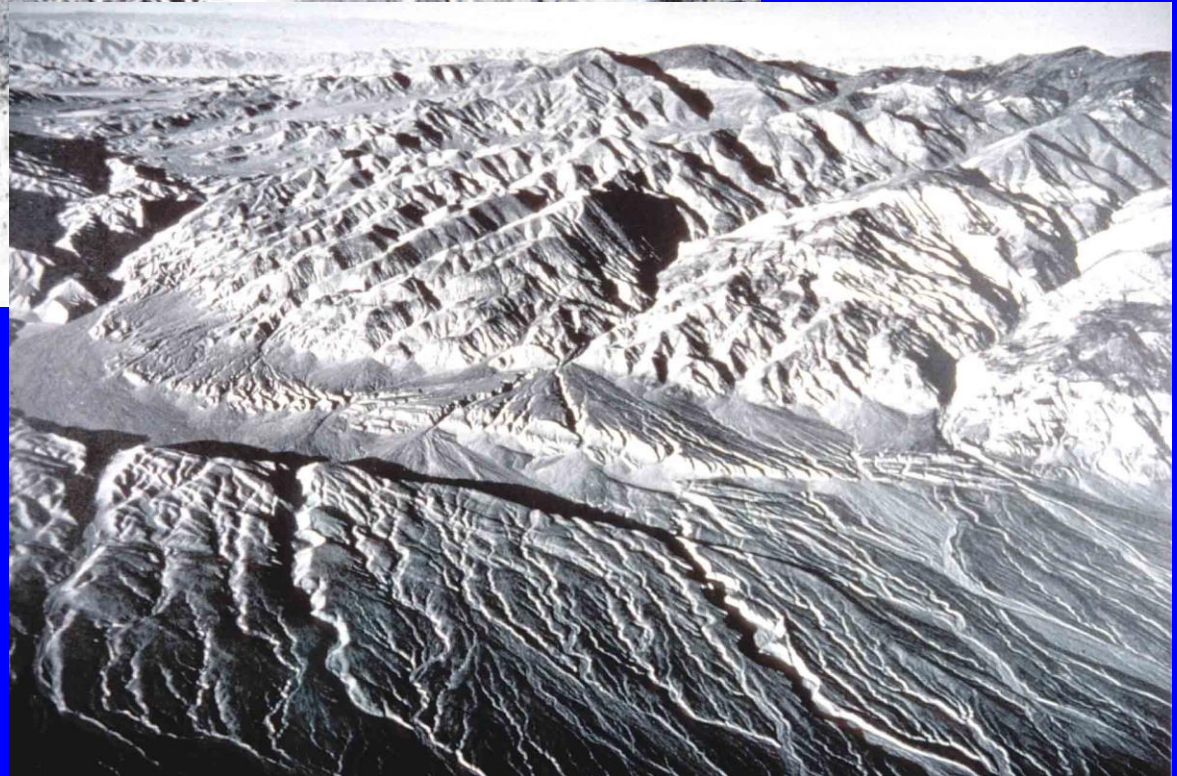
A-D is the sequence of events expected in conventional model; erosion occurs between episodes of sediment deposition

E is what actually exists



**EROSION of rocks into
landforms – landscape
development**





Erosion on different
scales; almost all
erosion is caused by
water



Time needed for eroding canyons and other landforms:



30,000 – 49,000 years to erode the canyon

Based on size of canyon, and estimate of amount of sediment removed each year

Time needed for eroding canyons and other landforms:



Problem: I walk this path several times a week.
This canyon did not exist 7 years ago

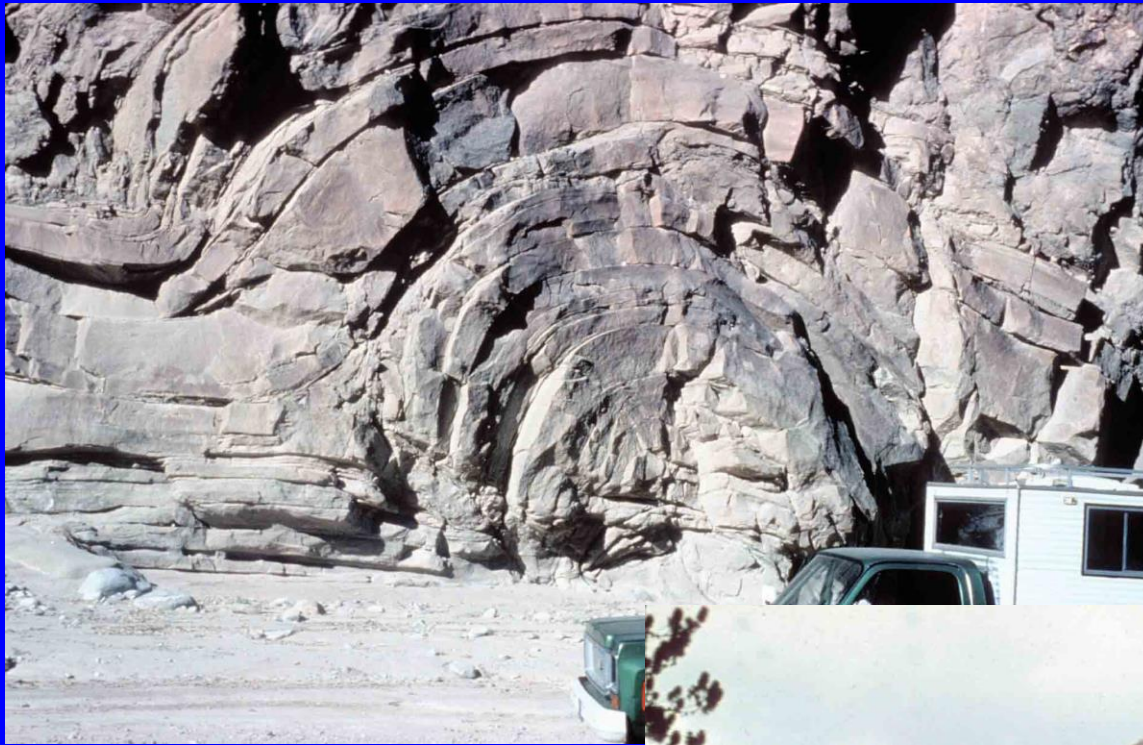
Time needed for eroding canyons and other landforms:



~~30,000 – 49,000 years to erode the canyon~~

One rainy season

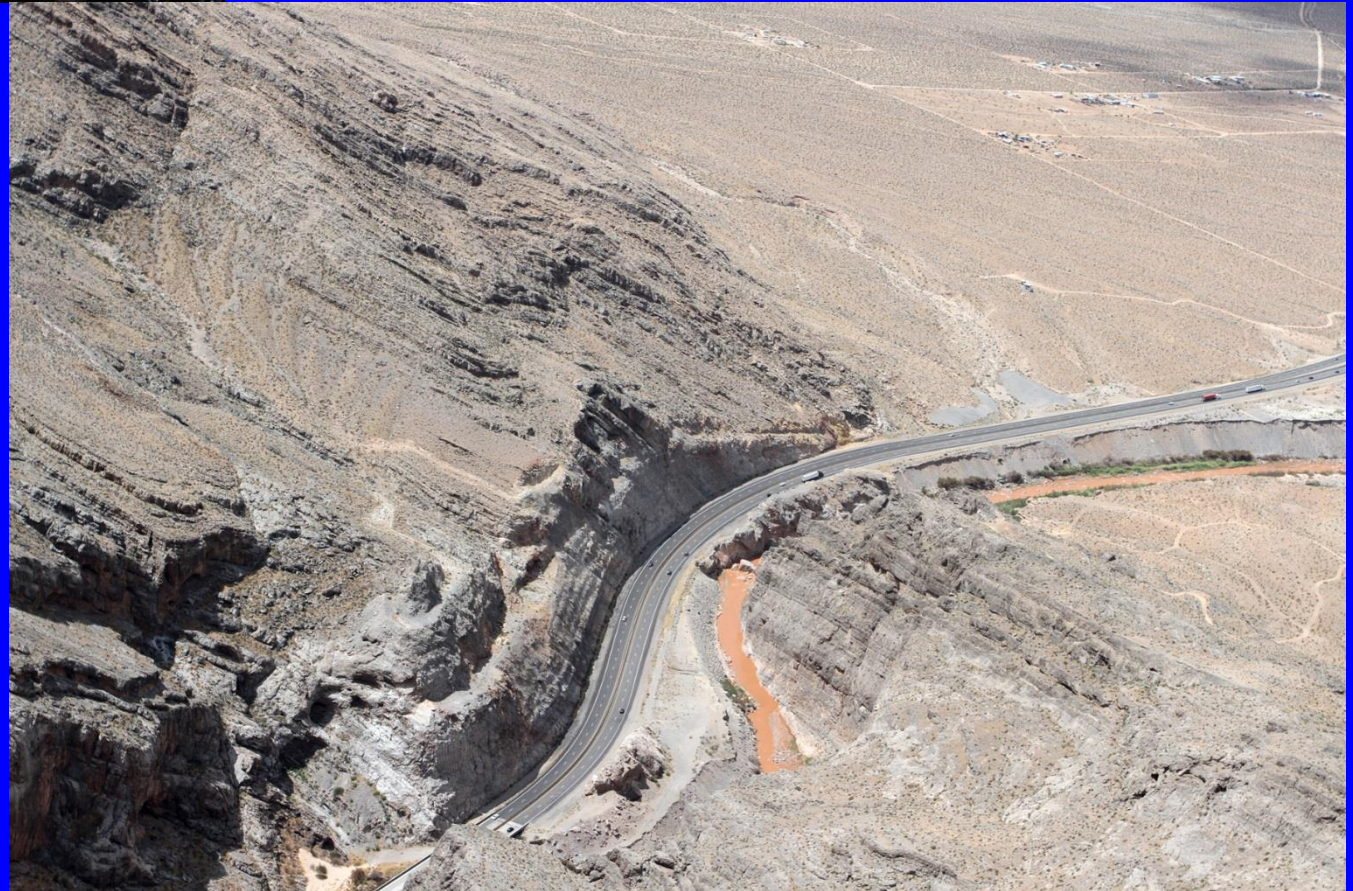
FOLDING



Folding



Virgin River
Gorge – cuts
through an
anticline



Folding

Virgin River Gorge and anticline

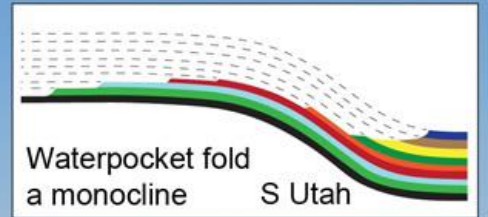




Triassic

Jurassic

Cretaceous



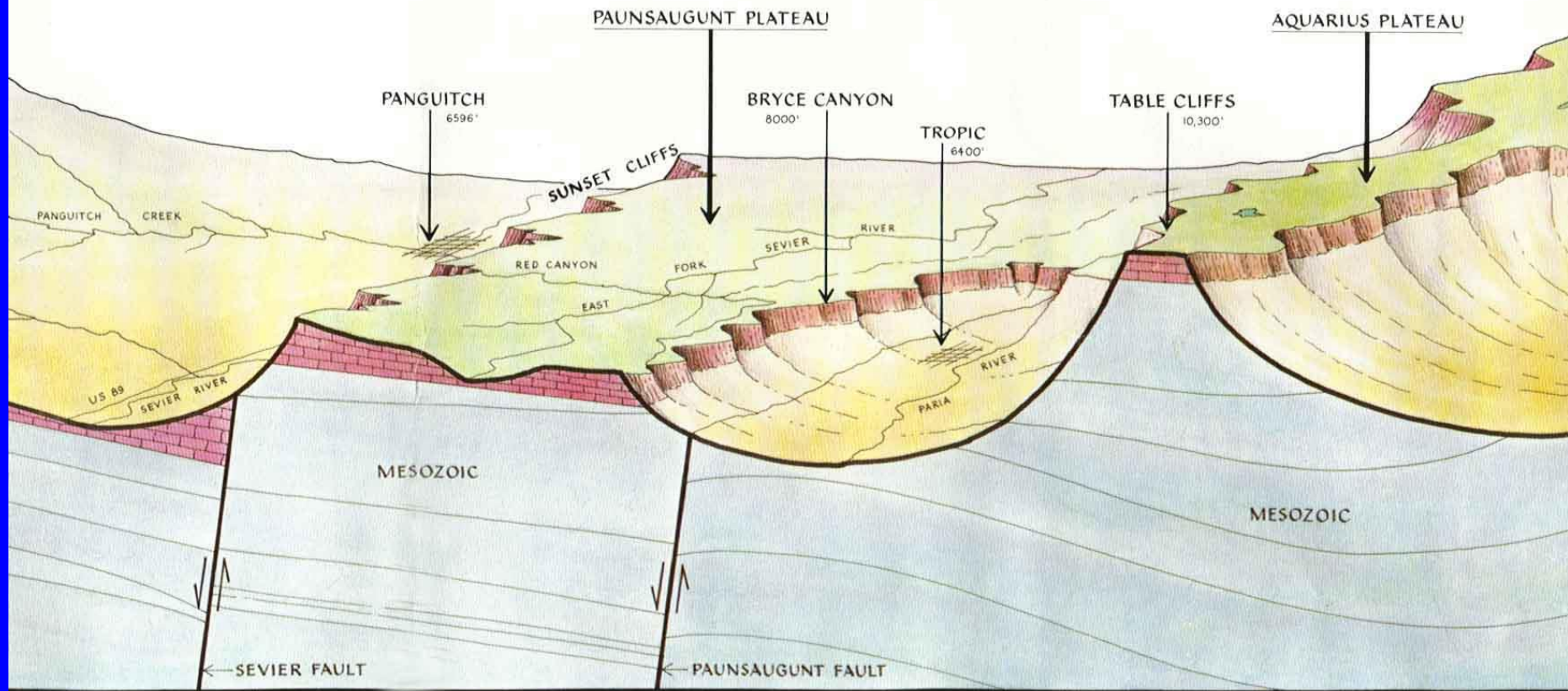


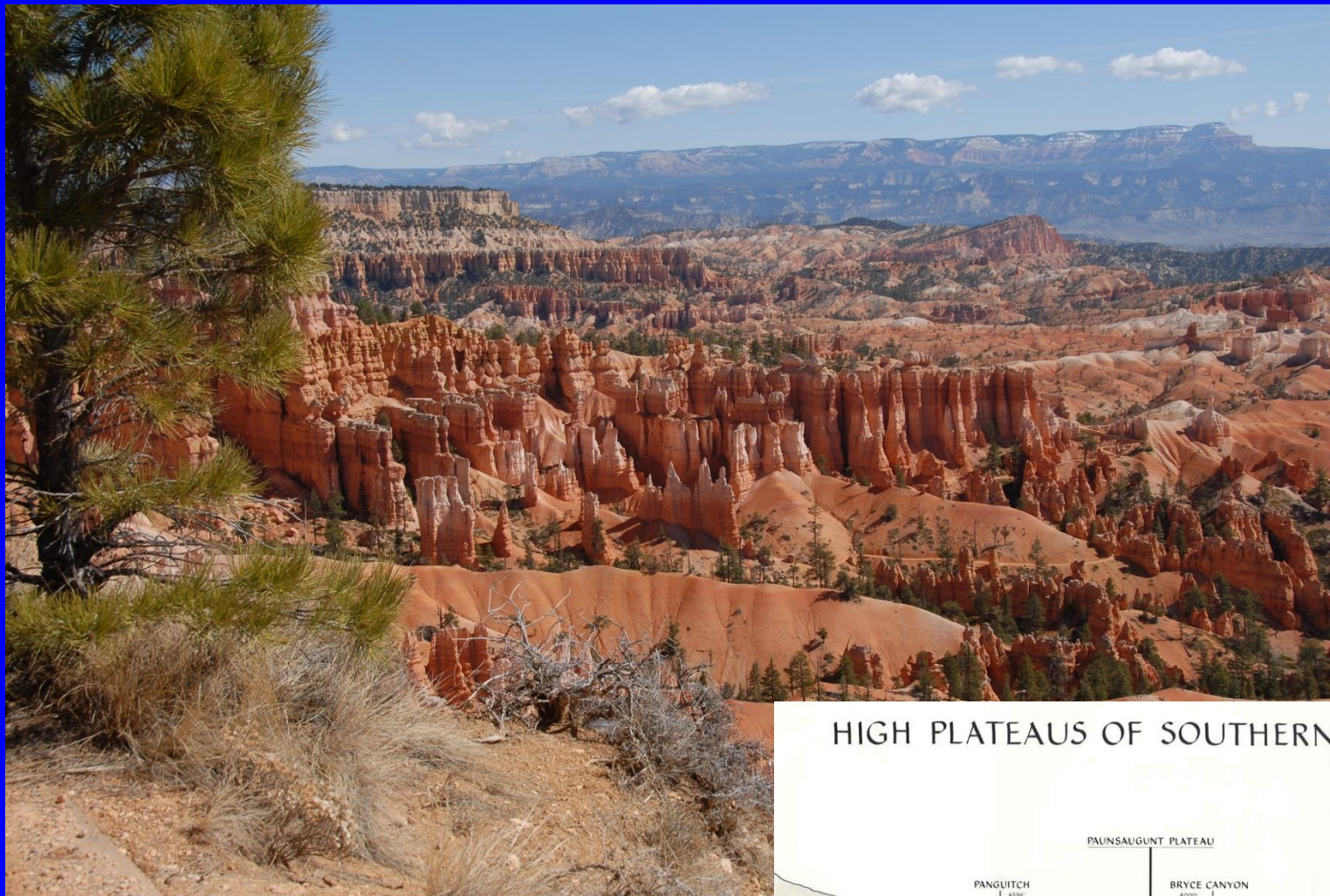
FAULTS



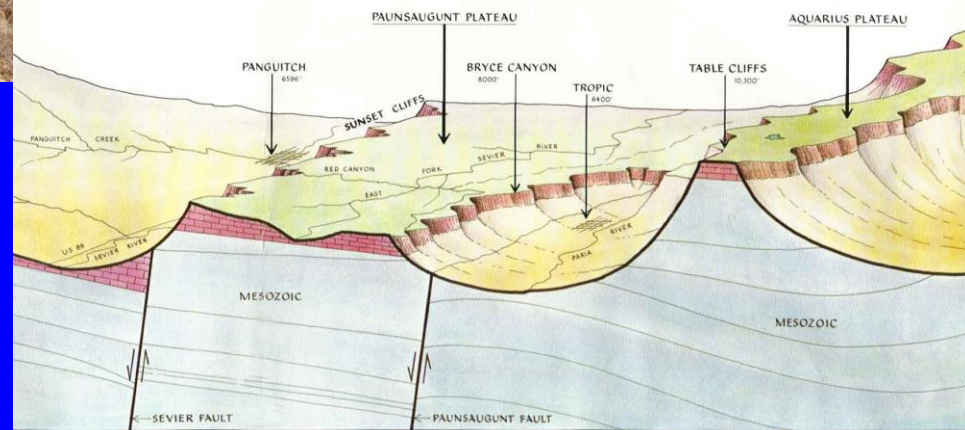
Several major north-south faults in Utah

HIGH PLATEAUS OF SOUTHERN UTAH

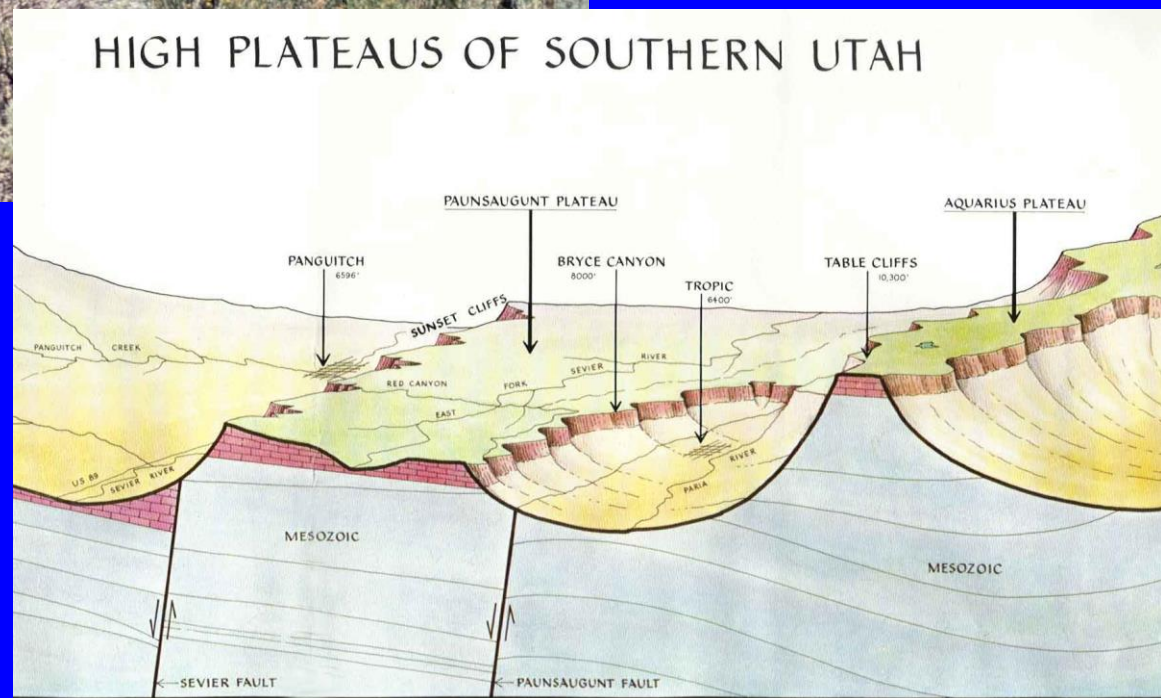
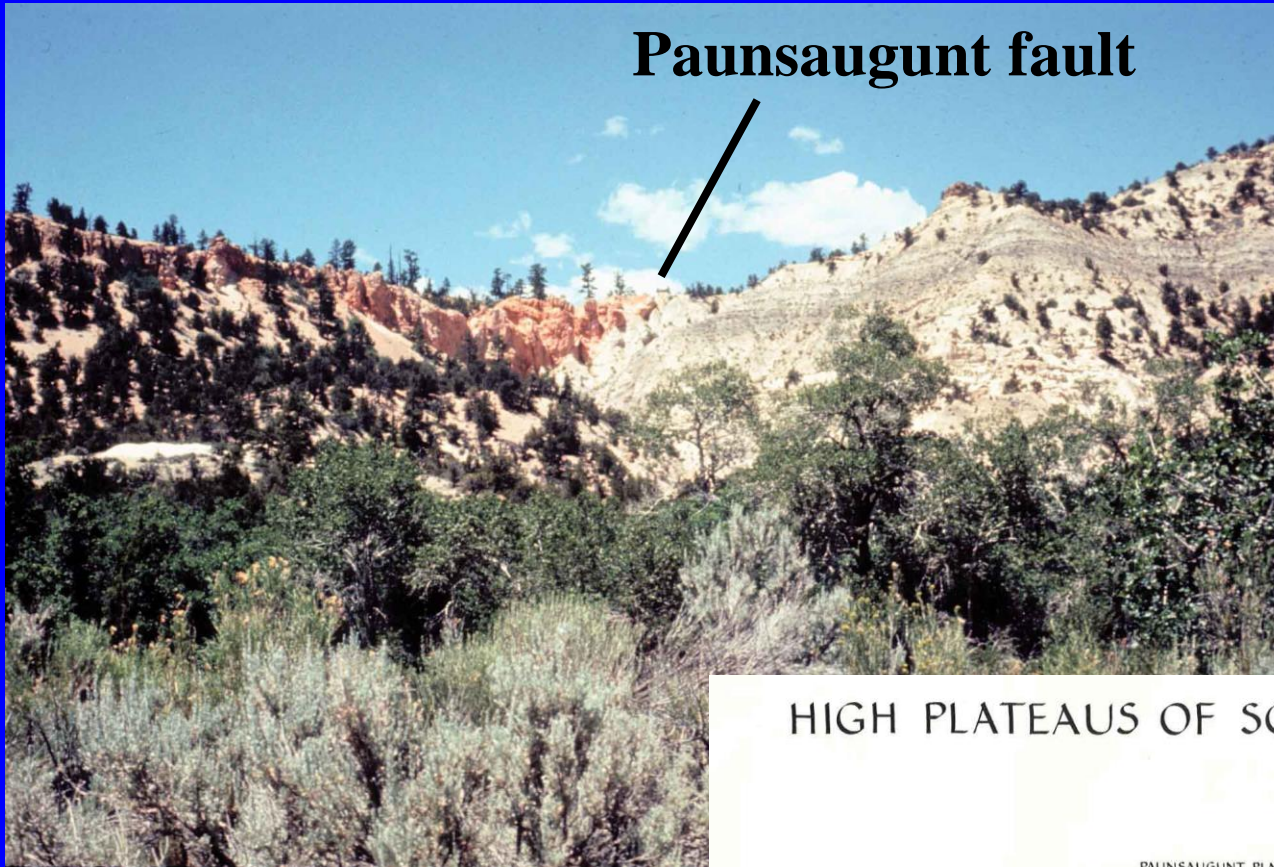


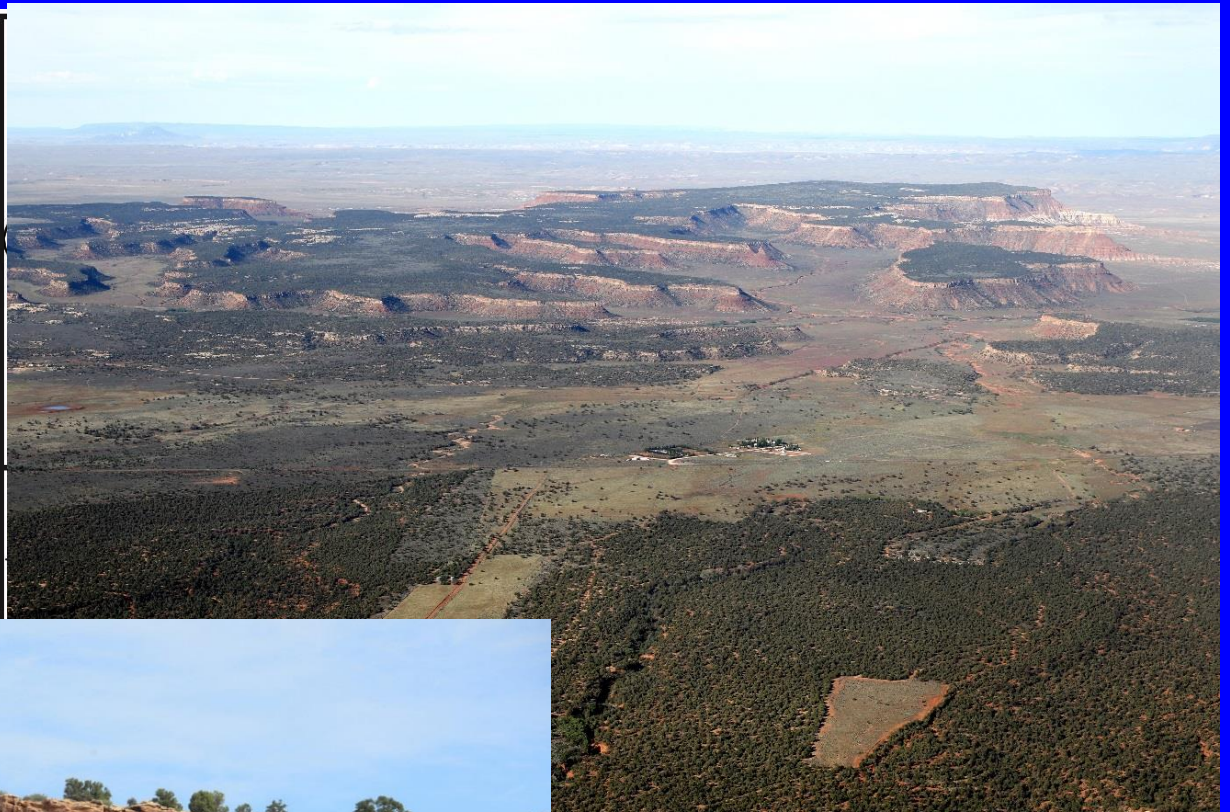
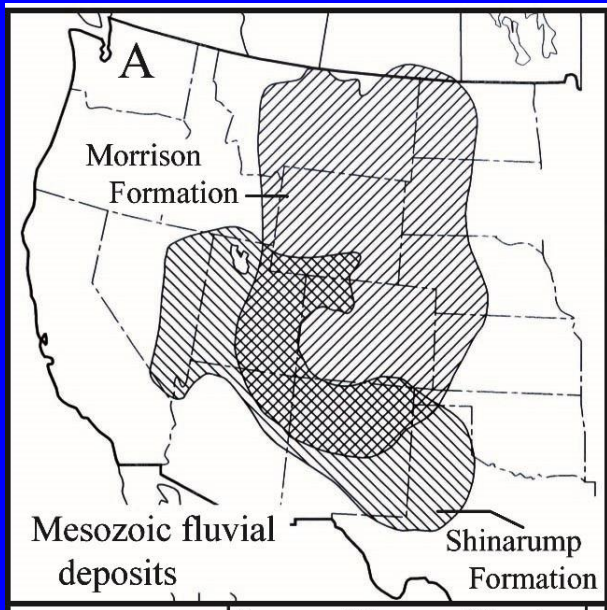


HIGH PLATEAUS OF SOUTHERN UTAH



Paunsaugunt fault





**WIDESPREAD
FORMATIONS**

Conclusions

- Southern Utah has examples of:
 - The geological column
 - Processes that help us understand catastrophic geology concepts
- Most basic processes of physical geology are part of any geological theory.
- The main differences are in how long they took, and how long ago