



Arizona Rocks 18

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The second group of sedimentary rocks (the first was the clastic rocks) is the chemical sedimentary rocks. These rocks form from the material that goes into solution during weathering and then precipitates out to form new rocks. Calcium, sodium, magnesium and potassium are the major elements forming these rocks. Calcium being the most common of these elements combines with CO₂ to form the mineral calcite. The sedimentary rock made up of calcite is limestone.

Limestones can be quite varied in appearance, but they all will be made of calcite and will react to hydrochloric acid making them easy to identify. The color can be variable including black, gray, tan, or pink depending on trace elements present. They can be fine-grained or coarse grained. They will often contain fossil fragments and may be composed mainly of fossils (Coquina is a limestone made up of all fossil shells.) The shells qualify as limestone because they are also made of calcite.

Limestone weathers by going back into solution, so in humid areas it weathers quickly, and in arid regions like Arizona it weathers slowly and forms cliffs. The Kaibab formation is mainly limestone and forms the rim of the Grand Canyon. The Redwall limestone makes the largest cliff in the canyon; a good educational program about the Redwall is at http://repository.azga.az.gov/sites/default/files/dlio/files/nid1572/gootee_redwall_limestone_gts_2014.pdf.

The closest place to see limestone in the Phoenix area is along route 60 going east from Superior. The Escabrosa limestone (same age as the Redwall, Mississippian) and Naco limestone (Pennsylvanian age) are found there. Marine fossils can be found in this area in the limestone formations.



Grand Canyon, Kaibab Limestone (Permian) forming the rim and Redwall Limestone (Mississippian) forming the cliffs of Horseshoe Mesa in the foreground



Naco Limestone (Pennsylvanian) along route 60 just east of Superior



Montezuma Castle National Monument with limestone that formed in a lake in the area about 8 million years ago



Montezuma Well National Monument - a collapsed limestone sinkhole 11 miles north of Montezuma Castle
(Will Munny photo via Wikipedia)



Martin Formation fossils in limestone (Devonian)
Northeast of Payson
(S. Coté photo)



Muav Limestone (Middle Cambrian) underlies the Redwall Limestone (Mississippian). Locally underlies Temple Butte Limestone (Devonian) that fills narrow paleovalleys cut into the unconformity separating the Redwall Limestone from the Muav Limestone (NPS photo via Wikipedia)



Kartchner Caverns State Park - Big Room
Escabrosa Limestone (Mississippian Age) in the Whetstone Mountains in southeastern AZ
(Mike Lewis photo via Wikipedia)

EON	ERA	PERIOD	MILLIONS OF YEARS AGO
Phanerozoic	Cenozoic	Quaternary	1.6
		Tertiary	66
	Mesozoic	Cretaceous	138
		Jurassic	205
		Triassic	240
	Paleozoic	Permian	290
		Pennsylvanian	330
		Mississippian	360
		Devonian	410
		Silurian	435
		Ordovician	500
Proterozoic	Late Proterozoic		570
	Middle Proterozoic		2500
Archean	Late Archean		
	Middle Archean		
Pre-Archean			3800?

Reference Geologic Timescale (USGS)

Other caves in Arizona that are open to the public are Colossal Cave near Vail, AZ, south of Tucson and Grand Canyon Caverns east of Peach Springs, in northwestern AZ, along old route 66.

Interestingly, during the 1950's scientists, at Grand Canyon Cavern's, allegedly began searching for the source of fresh air one encounters in the Cavern's depths. It is said that the engineers set off a significant number of red flares in the Snowball cavern room and once it all dissipated the engineers searched for many days in the surrounding countryside for signs of seepage from the earth's surface but no smoke was ever seen. It is said that a few weeks afterward rangers who worked at Grand Canyon National Park reported seeing red smoke seeping from the rocks in the canyon walls nearly 63 miles to the north of the Caverns close by the village of Supai. (Via Wikipedia)