

Stratigraphic Column for Sunset National Monument, Arizona by: Cara Schiek, 2001

Era	Period	Epoch	Group	Formation	Member	Symbol	Lithology	
Q	Q	Holocene		Alluvium		Qar	Sand, silt, and clay with minor interbedded gravel	
				Basalt of Sunset Crater		Qbs	Time of eruption determined from Stratigraphic, dendrochronologic, and paleomagnetic data was approximately A.D. 1065-1250	
				Basaltic Cinder and Ash Blanket from eruption of Sunset Crater		Qcs	Shown only where underlying unit cannot be seen or interpreted from topography	
		Holocene/Pleistocene		Silt, Sand, Gravel, and Boulders		Qal	Includes alluvium, colluvium, and eolian, glacial, and glaciofluvial deposits	
				Eolian Deposits		Qe	Sand, well-sorted. Forms extensive sand sheet	
				Playa Deposit		Qp	Silt and clay, thinly stratified on flat floor of shallow, undrained desert lake basin	
				Landslide Deposit		Ql	Unsorted rock bedris, ranging in diameter from less than 0.1-10 m. commly occurring as large slump blocks	
				Alluvial			Qae	Gravel and sand
							Qafm	Silt, clay, and sand deposited as valley fill upstream from Grand Falls. Valley fill resulted from damming of the little Colorado River by basalt flow from the Merriam Crater area
							Qad	Gravelly sand and interbedded sand and silt, locally with large blocks of limestone derived from Permian Kaibab Formation
						Qac	Silt, clay, and sand with several thin interbedded pebbly gravels	
						Qaa	Gravelly sand with interbedded sand and silt	
				Gravel at Deadman Wash		Qdg	Gravel, pebble-to boulder-size, rounded to subrounded, with interbedded sand; clasts of silicic, intermediate, and mafic rocks derived form San Francisco Mountain	
				Basalt of Merriam Age		Qbm	Dated to 150,000 years old or less	

		Basaltic cinder and Ash Blanket from Vent of Merriam Age
		Basalt of Pre-merriam Age
		Basaltic Andesite of Pre-merriam Age
		Basalt of Pre-merriam age and within the Brunhes Epoch
		Basalt of Pre-Brunhes Age
		Rhyolite Flow or Dome
		Rhyolite Pyroclastic Deposit
Tertiary/Quaternary	Pleistocene/Pliocene	Andesite Flow, Flow Breccia, or Tuff Flow
		Alluvium
Tertiary	Pliocene	Basalt
		Basaltic Tuff and Tuff Breccia

Qcm	Shown only where underlying unit cannot be seen or interpreted from topography
Qb	Flow is undissected and lies close to level of present drainage
Qba	Andesite of basaltic texture; commonly contains sieved plagioclase, augite, and olivine in partly glassy groundmass. Quartz, amphibole, or hypersthene may be present
Qby	Normal polarity and less than approximately 0.7 m.y..
Qbo	Normal or reversed polarity and between approximately 0.7 and 1.8 m.y. old.
Qr	Locally with marginal rhyolite breccia or pumice
Qrp	Predominantly air-fall deposits on northeast side of San Francisco Mountain
QTan	Associated with San Francisco Mountain stratovolcano
QTa	Interbedded sand, silt, and clay with some interbedded gravel
Ta	Sand, silt, clay, deposits with some interbedded gravel
Tby	Generally smooth, alluvial-covered flows with dissected margins
Ttb	Deposits of cinders, hydrated basaltic glass, and accessory and accidental xenoliths

M	e	C	r	e	t	a	C	U	P	P	er	Mesaverde Group	Pliocene/ Miocene	Oldest Basalts of San Fransico Volcanic Field	Tbo	Rim Basalts			
														Bidahochi Formation	Upper Member	Tbu	Sandstone, weakly consolidated, mostly fluvial in origin		
															Lower member	Tbl	Calcareous mudstone, siltstone, sandstone, and minor rhyolitic ash. Mostly lacustrine in origin		
															Volcanic vent deposit	Tbv	Includes tuff breccia, agglomerate, and lacustrine deposits in marr craters. Lava flows may cover vents and other deposits. Age ranges from approximately 8.5 to 4.2 m.y.		
															Monchiquite lava flow	Tbf	Alkalic lamprophyre containing clinopyroxene, olivine, biotite, and analcite. Extends beyond its source, in some cases as much as several kilometers. Ages are 7-6 m.y.		
															Dike or neck	Ti	Monchiquite similar to lava flows; commonly includes tuff breccia. Age range is same as for vent deposits		
															Bedded monchiquite tuff	Tt	Mostly lacustrine or air-fall in origin; may extend several kilometers from the eruptive source		
														Miocene	Sandstone and Gravel		Tg	Weakly consolidated interbedded sand and gravel	
															Wepo Formation		Kw	Alternating beds of olive-gray siltstone, coal, and yellowish-gray sandstone	
															Toreva Formation	Upper Sandstone Member		Ktu	Yellowish-gray to grayish-orange-pink, fine grained sandstone
																Middle carbonaceous mudstone member		Ktm	Variiegated mudstone
																Lower Sandstone Member		Ktl	Light-brown to pale-yellowish-gray, fine to medium grained sandstone
														Togue of Toreva Formation			Ktlt	Sandstone intertongues with Mancos Shale	
	Mancos Shale		Km	Light to dark-gray claystone and siltstone															

Jurassic	Middle	Upper Tongue	Kmt	Light to dark-gray claystone and siltstone		
		Dakota Sandstone		Kd	Tan, brown, and gray sandstone, conglomeratic sandstone, and conglomerate	
		Cow Springs Sandstone		Jcs	Greenish-gray to light yellowish- gray, fine to medium-grained, cross-stratified sandstone	
		Entrada Sandstone and Carmel Sandstone		Jec	Reddish-brown siltstone and sandstone, and white cross-stratified sandstone	
		Navajo Sandstone		JTrn	Grayish-orange-pink, even-grained, thickly cross-stratified sandstone	
	Kayenta Formation	Trkt		Silty facies, grayish-red mudstone, siltstone, and silty sandstone		
	Triassic	Upper	Moenave Formation	Dinosaur Canyon Sandstone Member	Trmod	Orangish-red, cross-stratified and flat-bedded sandstone and sandy siltstone
			Wingate Sandstone	Lukachukai Member	Trwl	Reddish-brown fine-grained, cross-stratified sandstone
				Rock Point Member	Trwr	Reddish-brown siltstone and mudstone
			Chinle Formation	Owl Rock Member	Trco	Mottled light-gray and grayish-pink interbedded limestone and calcareous siltstone
Petrified forest Member				Trcp	Claystone, siltstone, and minor sandstone, variegated	
Shinarump Member		Trcs		Light-gray to yellowish-gray sandstone and conglomerate		
Moenkopi Formation			Trm	Reddish-brown mudstone, siltstone, silty sandstone, and sandstone		
Triassic and Paleozoic Sedimentary Rocks, Undivided	TrPzu		Sandstone, shale, Silstone, limestone, dolomitic limestone, and dolomite			
	Lower					
	Middle/Lower					

Paleozoic	Permian	Upper	Tonto Group	Paleozoic Sedimentary rocks, undivided	Pzu	Sandstone, shale, siltstone, limestone, dolomitic limestone, and dolomite	
		Lower		Kaibab Formation	Pk	Yellowish-gray to light-gray silty dolomite, dolomitic sandstone, minor sandstone, dolomitic limestone.	
				Toroweap Formation and Coconin Sandstone	Ptc	Light-colored, cross-stratified sandstone; facies of siltstone, sandstone, and dolomite	
				Hermit Shale	PPhs	Reddish shale and interbedded sandstone and shale	
	Supai Formation	Reddish siltstone, cross-stratified; some limestone in the lower part					
	Permian/Pennsylvanian	Lower		Redwall Limestone	MDrt	Massive light-gray limestone and dolomite	
	Mississippian	Lower/Upper		Temple Butte Limestone		Dolomite, reddish siltstone, sandy limestone, and gray sandstone	
	Cambrian	Middle			Muav Limestone	Cmbt	Mottled-gray and purple dolomitic limestone. Lower part of Mauv intertongues with upper part of Bright Angle
					Bright Angle Shale		Mainly green, purple, and reddish-brown siltstone interbedded with light-brown sandstone in the lower part
					Tapeats Sandstone		Medium- to coarse-grained sandstone and pebble conglomerate, commonly crossbedded

Reference: Map Showing Geology, Structure, and Uranium Deposits of the Flagstaff, 1x 2 degree Quadrangle, Arizona; 1984; G.E. Ulrich, G.H. Billingsley, Richard Hereford, E.W. Wolfe, L.D. Nealey, and R.L. Sutton; USGS Map I-1446; scale 1:250,000.