

200
Tb 7mm
No. 1026

U.S. GEOLOGICAL SURVEY
AUG 16 1983
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TRACE ELEMENTS
MEMORANDUM REPORT 1026

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
THIS MAP CONCERNS WORK DONE BY THE U.S. GEOLOGICAL SURVEY ON BEHALF OF THE DIVISION OF RAW MATERIALS OF THE U.S. ATOMIC ENERGY COMMISSION



EXPLANATION

Qs
Surficial deposits
Reddish-brown to buff surficial sand, sand dunes, and landslide debris derived from the East Vermilion Cliffs. The landslide debris consists of rubble from the Glen Canyon group and the Chinle formation.

Jc
Carmel formation
This map unit (Jc) is a tongue of the Carmel formation and also includes the base of a tongue of the Navajo sandstone (which coalesces with the main mass of that formation in the Lees Ferry quadrangle to the east). It caps buttes in this quadrangle, ranges in thickness from 60 to 80 feet, and is composed, from bottom to top, of: (1) a red silty limestone, 15 to 25 feet thick, containing up to 90 percent calcite; unit is thin-bedded and ledge forming where the carbonate content is high and slope forming where silty; (2) a bed 15 to 35 feet thick of white crossbedded Navajo sandstone; (3) a 6 to 8 feet thick bed of yellowish-brown highly calcareous medium-grained sandstone composed of well sorted rounded quartz grains; in part crossbedded.

Jn
Navajo sandstone
Reddish-brown, brown, buff, and white moderately sorted predominantly medium-grained cross-bedded sandstone composed of subrounded to rounded quartz grains and 2 to 5 percent feldspar grains; generally poorly cemented but locally well cemented with iron oxide or calcite; forms cliffs in which prominent joints are common; about 1,700 feet thick. The lower contact of the unit is sharp and conformable.

Jk
Kayenta formation
Alternating beds of predominantly reddish-brown siltstones and fine-grained sandstones. The sandstones are composed of well-sorted subangular to rounded quartz grains poorly cemented with iron oxide and noncalcareous clay; crossbedded in places; forms ledges and cliffs 10 to 30 feet high. The siltstone is thin bedded, fissile, and weathers to gentle slopes 10 to 30 feet high; locally bleached to a yellowish gray. The formation is about 500 feet thick in this area. The bottom contact is sharp and conformable.

Rmos
Rmod
Moenave formation
The Springdale member, Rmos, is a pale reddish-brown fine- to medium-grained sandstone composed of subrounded to rounded quartz grains and some mica; poorly cemented with noncalcareous clay and iron oxide; some beds crossbedded. Thin lenses (2 to 3 feet thick) of a siltstone-claystone conglomerate occur in the lower part of the unit. The member is about 150 feet thick and forms a prominent ledge; lower contact irregular. Dinosaur Canyon member, Rmod, consists of alternating beds of predominantly dark reddish-brown slightly to moderately calcareous siltstones and silty claystones. The siltstones weather to ledges and the claystones to slopes. One thin (1 to 2 feet) silty claystone bed in about the middle of the unit contains an abundance of fresh-water Ostracoda. The unit is about 100 feet thick. The lower contact is sharp and conformable.

Rco
Rcp
Rcs
Chinle formation
The Owl Rock member, Rco, consists of interbedded, moderately to highly calcareous siltstones and claystones. The siltstones, which constitute a major part of the unit, are predominantly pale reddish-brown and light greenish-gray beds. The claystones are less calcareous than the siltstones, and are mostly grayish red but bleached in places to pale green. Several thin (2 to 24 inches) beds of pale-red and light greenish-gray limestone and limestone-siltstone conglomerate occur throughout the middle and upper part of this unit and form ledges in the otherwise highly weathered, earthy slopes. The Owl Rock member is 280 to 320 feet thick. The complete member is exposed in only a few places. The Petrified Forest member, Rcp, is composed almost entirely of grayish red-purple to grayish-red, noncalcareous, silty claystone. This claystone weathers to rounded hills and slopes. An irregular sandstone bed, forming a cliff about 40 feet high occurs 40 to 50 feet from the bottom of the unit. The sandstone is white, coarse grained, and massive and is composed of angular to subangular, well-sorted quartz grains well cemented by noncalcareous clay. The lower 8 to 10 feet of the Petrified Forest member is gradational with the next underlying unit. The Shinarump member, Rcs, ranges greatly in thickness and composition. In many localities the Shinarump member is missing. Elsewhere, the unit is represented by a few scattered quartzite pebbles at the base of the Petrified Forest member. Where a bedded deposit occurs, it is a poorly sorted sandstone and conglomerate well cemented by white to yellow calcite and clay. The pebbles and cobbles of the conglomerate are predominantly quartzite and chert. This unit forms a ledge 5 to 20 feet thick. Locally, abundant carbonaceous material and petrified logs occur in the unit. Locally the Shinarump member has filled channels in the Moenkopi formation up to 130 feet thick; in these localities, the member is composed, from bottom to top, of (1) coarse quartzite-chert conglomerate; (2) coarse-grained crossbedded grayish-green sandstone; and (3) yellow- to reddish-gray siltstone-claystone containing scattered quartzite pebbles. Several of these channels contain concentrations of uranium-bearing minerals. The bottom contact of the member is sharp and disconformable.

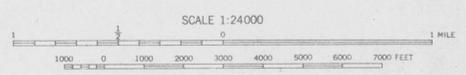
UNCONFORMITY

Rmu
Rms
Rmm
Moenkopi formation
The Upper Red member, Rmu, (shown only in section along line A - A') does not crop out in this quadrangle probably because of fluvial channeling and later filling by the Shinarump member of the Chinle formation. However, about half a mile to the south in the Emmett Wash NE quadrangle, the Upper Red crops out and consists of alternating layers of dark reddish-brown siltstone and silty claystone. Both the siltstone and the claystone are moderately calcareous and contain some mica flakes. The siltstone is massive, blocky, ripple-marked and forms vertical cliffs. The claystone is thin bedded, highly gypsiferous, and forms ledges and slopes. The member is about 160 feet thick with a sharp and conformable lower contact. The Shinarump member, Rms, is a uniform light grayish-green highly gypsiferous micaceous non-calcareous thin-bedded clayey siltstone. This member is about 100 feet thick and weathers to vertical cliffs and slopes. The lower contact is conformable and sharp. The Middle Red member, Rmm, is a uniform, pale reddish-brown highly gypsiferous noncalcareous thin-bedded ripple-marked siltstone. It forms a slope with an occasional resistant bed forming a ledge.

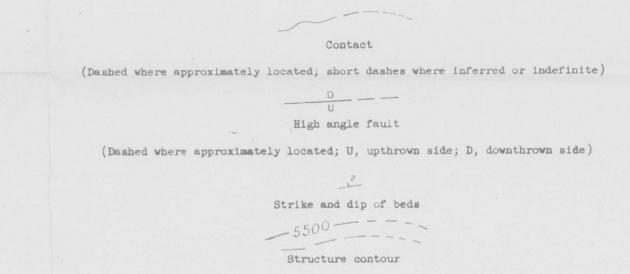
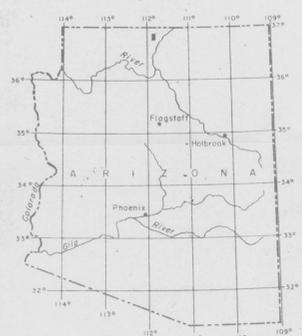
Pleistocene and Recent
Lower Jurassic and Lower Jurassic(?)
Lower Jurassic(?)
Glen Canyon group
Upper Triassic(?)
Upper Triassic
Lower and Middle(?) Triassic
Triassic
Triassic

Mapped by the Geological Survey 1954
Topography by multiple methods from aerial photographs taken 1949

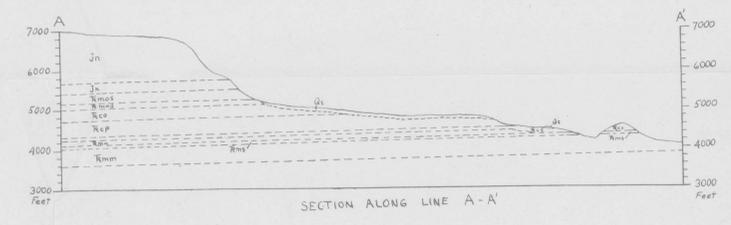
Geology mapped 1956



SCALE 1:24000
CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL



Drawn on base of the Navajo sandstone; dashed where approximately located; short dashes indicate projection above surface. Structure contour trends are influenced by controls in adjacent quadrangles. Contour interval 100 feet. Datum is mean sea level.



PRELIMINARY GEOLOGIC MAP OF THE PARIA PLATEAU SE QUADRANGLE, COCONINO COUNTY, ARIZONA

by
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