



EXPLANATION

(Unit names are informal)

- Tr** Tertiary Rhyolite
- Tb** Tertiary Basalt
- Mm** Mississippian Modoc Limestone
- Dm** Devonian Morenci Formation
- OI** Ordovician Longfellow Limestone
- Ec** Cambrian Coronado Quartzite
- PCg** Proterozoic Metcalf Granite
- PCps** Proterozoic Pinal Schist

Geology of the Enebro Mountain Area, Greenlee County, Arizona

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ARIZONA GEOLOGICAL SURVEY

Contributed Map CM-94A
sheet 1 of 1

- Contact (dashed where inferred)
- Normal Fault (dashed where inferred)
- Strike & Dip
- Foliation
- Jointing

Scale 1:10,600



INTRODUCTION

The Enebro Mountain area lies approximately 25 km north of Morenci in Eastern Arizona. The study area is accessible by US Highway 191 and several unimproved dirt roads. This mapping project consisted of 10 field days between 19 May 1993 and 9 July 1993. Mapping was done directly on enlargements of USGS topographic maps.

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ROCK DESCRIPTIONS

Proterozoic Rocks

Pinal Schist- This group of fine-grained schists consists of a fissile reddish quartz-sericite schist interlayered with tan calcareous units and black amphibolite. A single bed of matrix supported metaconglomerate that is 3 to 10 meters thick was also noted in the vicinity of the Willis silica quarry. Foliation noted in the vicinity of the Willis silica quarry. Foliation and strikes roughly east-west and dips steeply both to the south and north. Numerous small faults have shattered this unit. In the north, cliffs northwest of Coronado Spring, an antiformal fold is exposed in the schist. This fold is highlighted by differential erosion of the soft schist and the more resistant metaconglomerate unit.

Metcalf Granite- This true granite is reddish brown on weathered surfaces and pinkish tan on fresh surfaces. The granite weathers to outcrops that are rounded and grass covered. The rock consists of equigranular coarse to medium grained orthoclase, plagioclase, and quartz. There are also rare larger (up to 1 cm) orthoclase phenocrysts. Minor secondary epidote, chlorite, and pyrite are present in varying proportions totaling less than 1%.

Paleozoic Rocks

Cambrian Coronado Quartzite- This sequence of thick bedded brown to pink quartzitic sandstones nonconformably overlies the Metcalf Granite. A basal conglomerate up to 25 feet thick is present in a few places. The quartzite exhibits closely-spaced jointing patterns and is a cliff-former.

Ordovician Longfellow Limestone- The Longfellow is an informal Morenci district name and is equivalent to the El Paso Formation. It consists of a lower calcareous shale and an upper thick-bedded dolomitic limestone. The limestone is tan in outcrop, while the shales are red to yellow. The limestone has irregular chert bands and nodules and two gastropod fossils were found near a large chert nodule.

Devonian Morenci Formation- The Morenci Formation unconformably overlies the Longfellow Limestone. This red to dark brown thinly bedded shale is fissile and forms gentle slopes. In most places the unit is poorly exposed as it weathers to a thick soil.

Mississippian Modoc Limestone- The Modoc is an informal name for the Escabrosa Limestone in the Morenci District. This fossiliferous limestone is light grey to white on weathered surfaces and unconformably overlies the Morenci Formation. A thin basal sandstone is present in places. The Modoc has abundant crinoid stem fossils. One brachiopod fossil and a possible coral fragment were also noted.

Tertiary Rocks

Basalt- This series of at least three flows has a maximum thickness of over 60 m. The basalt disconformably overlies and/or intrudes all older units (mainly the Modoc Ls, the Pinal Schist, and the Metcalf Granite), is massive with rare vesicular horizons, and is a dark grey to brown color on fresh surfaces. Weathered outcrops are black and blocky due to weak columnar jointing. The basalt unit experienced a period of extensive erosion and is deeply beveled with a few preserved paleosols exposed in the canyon below Good Springs.

Rhyolite- This unit unconformably overlies and intrudes the older basalt flows and attains a maximum thickness of over 300 m. The rhyolite is pink to red on fresh surfaces, and yellowish brown on weathered outcrops. This map unit consists of both rhyolitic dikes and eruptive centers, and tuffaceous deposits. The tuffaceous deposits are well bedded and show signs of fluvial reworking. A small isolated mass (approximately 100 square meters exposure) of grey rhyolitic glass was also observed near the peak of Enebro Mountain.

STRUCTURAL GEOLOGY

Faults The faults in the map area are without exception steeply dipping normal faults (70°-85°). Striations and slickensides on some of the faults indicate a right-lateral displacement component to the normal faulting.

Folds and Foliation

The Pinal Schist has a pronounced steeply dipping foliation that strikes NW-SE. Foliation is imparted by the parallel alignment of mica and elongated cobbles in the metaconglomerate. Foliation seems to be concordant with compositional layering (bedding). The foliation dips steeply away to the NE and SE from the area north of Coronado Spring. This antiformal fold predates the deposition of the Paleozoic section, as indicated by their on-lapping relationship to the Pinal. The fold also predates the intrusion of the undeformed Metcalf Granite.