

EXPLANATION

METASEDIMENTARY AND METAVOLCANIC ROCKS

PRECAMBRIAN X

BARAGA GROUP

Michigan Formation

Xmg - Interbedded fine-grained quartzite and siltstone, mostly quartzite near base, becoming more silty upward.
Xmc - bedded ferruginous chert and chert breccia.
Xms - Interbedded black slate and graywacke.
Xmw - undifferentiated Michigan Formation, mostly interbedded slate and graywacke but with vitreous quartzite locally near base.

PRECAMBRIAN W

Goodrich Quartzite

Vitreous to ferruginous quartzite with quartz-pebble and ferruginous conglomerate near base.

MENOMINEE GROUP

Negaunee Iron-Formation

Undivided banded iron-formation, mostly siliceous facies, commonly oxidized with local secondary enrichment to soft ore; may contain jaspilite in highest horizons.

Siano Slate

Brown to black slate, typically well-bedded with interlayers of siltstone and quartzite.

Ajibik Quartzite

White to pink vitreous quartzite, typically massively bedded and commonly cross-bedded.

Reamy Creek Formation

Stratigraphic position within Marquette Range Supergroup is uncertain.

PRECAMBRIAN W

Polymictic conglomerate; massive to crudely bedded tillite in lower horizons; upper horizons are gray-green slate with a few arkosic interbeds. Slate contains sparse to abundant lithic clasts probably dropstones. May contain an upper massive conglomerate beneath Dead River Storage Basin.

PRECAMBRIAN W

(Relative stratigraphic positions of Mona and Kitchi Formations are not determined).

Mona Formation

Wml - metabasalt, typically layered with pillow structures common.
Wmn - metabasalt, typically massive with very rare layering and pillow structures.
Wmw - heavily brecciated - quartz-sericite-chlorite schist with subordinate metabasalt.
Wmr - sheared rhyolite - not exposed in quadrangle - projected from mapping to the east.

Kitchi Formation

Wks - agglomerate; dacitic lithic fragments in fine-grained felsic matrix; subordinate felsic tuff.
Wkf - complex of dacitic tuff, flows, and hypabyssal intrusive rocks; subordinate agglomerate.
Wkg - metabasalt similar to layered metabasalt of Mona Formation.

Metamorphism: Metamorphic mineral assemblages in Precambrian W and X rocks are typical of lower greenschist facies. Upper greenschist assemblages occur locally near contacts with intrusive rocks.

Structure: Precambrian W folds appear to be broad, moderately to steeply plunging, relatively tight, upright structures. The very limited number of top determinations does not permit the definition of axial traces. Precambrian W rocks are now exposed in three horsts and Precambrian X rocks are preserved in the intervening grabens. Much of the folding in Precambrian X rocks appears to be due to draping over horsts during faulting. Precambrian W rocks are moderately to intensely sheared and in part sericitized within a few hundred feet of faults that bound the horsts. The shear foliation is uniformly steep, typically dipping at 80-90 degrees, and probably reflects the dip of the fault zones.

Mineralization: Iron deposits of the Negaunee Iron-Formation within the Marquette Trough are well known and have been extensively exploited. Base and precious metal mineralization is present in many areas, mostly in Precambrian W rocks, and is of possible economic significance. About 30,000 ounces of gold were extracted from the Ropes Mine between 1882 and 1896 and about 100 ounces were recovered from a small operation near the W 1/4 corner of section 35, T. 43 N., R. 27 W. Many prospects showing base metal (Cu, Pb, Zn) sulfide mineralization are shown on the map. Most are associated with quartz-carbonate veins and north of Dead River Basin these veins are associated with felsic porphyry in both the Mona Formation (Precambrian W) and Reamy Creek formation (Precambrian X). The metagabbro body in the west half of section 30, T. 43 N., R. 27 W., and the east half of section 25, T. 43 N., R. 28 W., contains disseminated sulfides, mostly pyrite with subordinate chalcopyrite, which constitute up to a few percent of rock in places.

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Compilation and interpretation by: W. F. Cannon, 1972

INTRUSIVE ROCKS

PRECAMBRIAN Y

Keweenaw Diabase

Dikes of olivine diabase with reversed magnetic polarity.

PRECAMBRIAN X

Metadiabase

Dikes and sills of plagioclase-chlorite (- amphibole) rocks, much with relict diabasic texture. Some may be older and Precambrian W in age.

PRECAMBRIAN W

Felsic porphyry

Dikes, sills, and plugs of medium to coarse grained felsic intrusive rocks typically with feldspar phenocrysts. Commonly contains disseminated sulfide minerals and sulfide-bearing quartz-carbonate veins. Age is problematic, but many bodies, too small to be shown, include Reamy Creek formation (Precambrian X) north of Dead River Basin.

PRECAMBRIAN W

Serpentinized peridotite

Serpentinized peridotite - variably altered, typically totally serpentinized, locally asbestos-bearing, with talc and carbonate minerals also common; rarely contains relicts of olivine-pyroxene-plagioclase peridotite.

PRECAMBRIAN W

Metagabbro

Fine to coarse grained massive plagioclase-chlorite (- amphibole) rock. Most is probably Precambrian W, possibly synchronous with Mona Formation, but some could be younger, possibly of Precambrian X age.

MAP SYMBOLS

- area of abundant outcrops
- ↗ strike and dip of bedding
- ↖ strike and dip of overturned bedding
- ↑ strike of vertical bedding
- ↗ strike and dip of layering in volcanic rocks
- ↖ strike and dip of overturned layering in volcanic rocks
- ↑ strike of vertical layering in volcanic rocks
- ↗ strike and dip of slaty cleavage
- ↖ strike of vertical slaty cleavage
- ↗ strike and dip of foliation
- ↑ strike of vertical foliation
- ↗ top direction determined from pillow structures
- ↖ bearing and plunge of fold axis
- geologic contact
- fault
- possible fault
- shear zone
- diamond drill hole
- ✕ mineral prospect: pit, shaft, or adit
- mine shaft

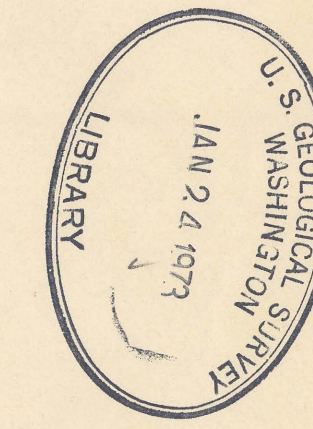
PRELIMINARY GEOLOGIC MAP OF THE NEGAUNEE SW QUADRANGLE, MICHIGAN

by

LORIN D. CLARK
1973

U.S. Geological Survey
OPEN FILE MAP
This map is preliminary and has
not been edited or reviewed for
conformity with Geological Survey
standards or nomenclature.

Michigan (Negaunee SW quad). Geol. 1:24,000. 1973.
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