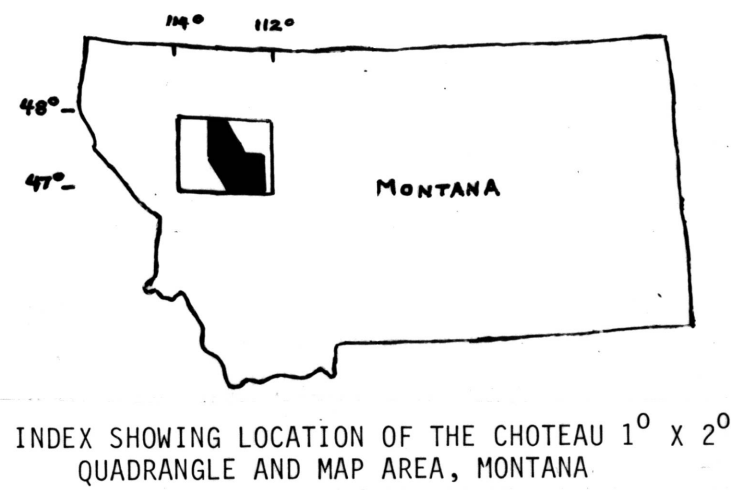


Base of Map 8 from U.S. Geological Survey, 1976.
Base of Map 8A, from U.S. Geological Survey, 1963.

MAPS 8 AND 8A--ABUNDANCE AND DISTRIBUTION OF ANTIMONY, CADMIUM, TUNGSTEN, AND THORIUM IN THE
OXALIC ACID-SOLUBLE IRON AND MANGANESE OXIDE FRACTION OF SAMPLES OF FLATHEAD SANDSTONE

Geology of Map 8 generalized from Mudge and others, 1980;
geology of Map 8A by James W. Whipple.



OXALIC ACID-SOLUBLE IRON AND MANGANESE OXIDES IN THE CAMBRIAN FLATHEAD SANDSTONE,
CHOTEAU QUADRANGLE, MONTANA--A SAMPLE MEDIUM FOR MINERAL EXPLORATION

By
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1981

CORRELATION OF MAP UNITS	
SURFICIAL DEPOSITS	
Qag	QUATERNARY
SEDIMENTARY ROCKS	
Kju	CRETACEOUS
Pz	PALEOZOIC
Ydr	PROTEROZOIC Y
Yc	PROTEROZOIC Z
IGNEOUS ROCKS	
Ti	TERTIARY
Tki	TERTIARY OR CRETACEOUS
Zd	PROTEROZOIC Z
DESCRIPTION OF MAP UNITS	
SURFICIAL DEPOSITS	
Qag	UNCONSOLIDATED DEPOSITS (QUATERNARY)--Chiefly of alluvial origins. Locally includes sedimentary and pyroclastic rocks of Tertiary age in southern part of map area
SEDIMENTARY ROCKS	
Kju	SEDIMENTARY ROCKS (CRETACEOUS AND JURASSIC)--Chiefly mudstone and sandstone
Pz	UNDIFFERENTIATED, MISSISSIPPIAN, DEVONIAN, CAMBRIAN SANDSTONE, LIMESTONE, AND DOLOMITE (PALEOZOIC)--Locally includes shale, siltstone, and quartzite; basal formation is Flathead Sandstone
Gu	DEARBORN LIMESTONE, DAMNATION LIMESTONE, GORDON SHALE, AND FLATHEAD SANDSTONE (CAMBRIAN)--Fine- to coarse-grained sandstone and quartzite, shale, and limestone
Ydr	ARGILLITE, SILTITE, AND QUARTZITE (PROTEROZOIC Y)--Includes dolomite and dolomitic limestone in easternmost exposures
Yc	DOLOMITE, DOLOMITIC LIMESTONE, AND LIMESTONE (PROTEROZOIC Y)--Locally includes dolomitic and calcareous argillite, siltite, and quartzite
IGNEOUS ROCKS	
Ti	INTRUSIVE ROCKS (TERTIARY)--Chiefly quartz monzonite stocks and dacite plugs, locally porphyritic
Tki	TRACHYANDESITE SILL (TERTIARY OR CRETACEOUS)
Zd	DIORITE AND GABBRO SILLS (PROTEROZOIC Z)
MAP SYMBOLS	
---	CONTACT--Dashed where approximately located
---	THRUST FAULT--BARBS ON UPPER PLATE
---	SYNCLINAL AND ANTICLINAL FOLDS
---	STRIKE AND DIP OF BEDS
---	AREA OF LEAD-ZINC MINERALIZATION
---	HEADLESTON DISTRICT
•	RPIR SAMPLE LOCATION

Table 1.--Concentrations of selected elements in 62 untreated samples of Flathead Sandstone, and their concentrations in the oxalic acid-soluble iron and manganese oxide fractions of the samples, Choteau quadrangle, Montana.
[All values reported in parts per million except Pb for sample 79-18R which is greater (G) than 2X. Lower limits of determination given in parentheses (5) at the top of table. N, not detected at lower limit; L, detected but less than lower limit; R, concentrations in the untreated rock samples; Ox, concentrations in oxide fractions. Samples analyzed spectrographically by D. J. Grimes.]

Sample no.	Elements															
	Cu (5)	Pb (10)	Zn (200)	Ag (.5)	As (200)	Sb (100)	Co (20)	Mo (5)	V (50)	Th (100)	R	Ox	R	Ox	R	Ox
RP 1R	7	1000	L	300	N	500	N	5	N	N	N	N	N	N	30	N
RP 2R	15	700	30	500	N	1000	N	N	N	N	N	N	N	N	70	N
RP 4R	15	10000	20	15000	N	3000	N	15	N	3000	N	1500	N	70	N	150
RP 7R	10	7000	70	20000	N	5000	N	2	N	1000	N	700	N	100	N	100
RP 11R	L	300	L	200	N	2000	N	N	N	N	N	N	N	N	7	N
RP 12R	L	300	L	500	N	2000	N	N	N	N	N	N	N	N	50	N
RP 13R	7	1500	L	2000	N	1500	N	1	N	N	N	N	N	N	15	N
RP 14R	20	5000	100	15000	N	2000	N	7	N	2000	N	N	N	N	70	N
RP 15R	10	700	200	20000	N	5000	N	1	N	300	N	N	N	N	50	N
RP 16R	7	500	150	1000	N	2000	N	5	N	300	N	N	N	N	30	N
RP 19R	5	2000	L	1000	N	700	N	5	N	300	N	N	N	N	20	N
RP 20R	7	300	L	500	N	1500	N	N	N	N	N	N	N	N	70	N
RP 20AR	5	300	L	500	N	1500	N	N	N	N	N	N	N	N	70	N
RP 20BR	5	1500	N	1000	N	2000	N	2	N	N	N	N	N	N	N	N
RP 20CR	7	1000	L	700	N	1500	N	2	N	N	N	N	N	N	15	N
RP 22R	10	1500	L	700	N	1500	N	2	N	N	N	N	N	N	15	N
RP 24R	30	7000	N	500	N	1500	N	5	N	300	N	N	N	N	50	N
RP 25R	10	3000	L	500	N	700	N	5	N	1000	N	N	N	N	150	N
RP 25AR	L	300	N	150	N	2000	N	N	N	N	N	N	N	N	N	N
RP 26R	10	1000	L	1000	N	2000	N	1	N	N	N	N	N	N	N	N
RP 28R	L	500	L	700	N	1500	N	N	N	N	N	N	N	N	N	700
RP 29R	10	1500	N	1000	N	2000	N	1	N	200	N	N	N	N	15	N
RP 95R	50	5000	1000	15000	N	10000	N	2	50	N	2000	N	150	N	30	N
RP 96R	15	2000	300	20000	N	10000	N	15	N	700	N	150	N	N	20	N
RP 97R	20	2000	L	700	N	3000	N	1	N	300	N	200	N	N	15	N
RP 98R	10	500	L	100	N	2000	N	1.5	N	N	N	N	N	N	15	N
RP114R	10	700	N	70	N	500	N	10	N	500	N	N	N	N	5	N
RP115R	10	150	20	50	N	300	N	N	N	N	N	N	N	N	N	N
RP116R	15	150	20	70	N	1500	N	2	N	N	N	N	N	N	7	N
RP117R	20	500	L	70	N	1000	N	.5	1.5	N	N	N	N	N	N	N
RP118R	15	1500	50	1000	N	500	N	2	N	500	N	N	N	N	70	N
RP119R	15	1500	30	700	N	500	N	2	N	200	N	N	N	N	20	N
RP120R	15	150	20	100	N	N	N	N	N	N	N	N	N	N	7	N
RP121R	7	500	L	300	N	500	N	1	N	N	N	N	N	N	15	N
79-1AR	100	5000	L	200	N	200	N	N	N	N	N	N	N	N	15	N
79-1BR	300	500	G(25)	30000	N	100	N	7	N	N	N	100	N	N	15	N
79-1CR	10	500	70	3000	N	300	N	1	3	N	1500	N	N	N	70	N
M 55	10	1000	15	500	N	500	N	.7	N	N	N	N	N	N	N	150
M240A	L	150	L	100	N	700	N	N	N	N	N	N	N	N	N	N
M354	L	500	N	300	N	300	N	N	N	N	N	N	N	N	30	N
M386	5	300	L	200	N	700	N	1.5	2	N	N	N	N	N	N	N
M403	5	500	L	300	N	200	N	N	N	N	N	N	N	N	N	N
M404	L	150	15	50	N	1000	N	N	N	N	N	N	N	N	N	N
M571	L	300	10	500	N	500	N	N	N	N	N	N	N	N	30	N
M683	7	1000	N	1000	N	200	N	N	N	N	N	N	N	N	N	N
B67A	5	700	10	500	N	700	N	N	N	N	N	N	N	N	N	N
B 91	N	500	L	1000	L	N	1.5	N	N	N	N	N	N	N	7	N
B150B	L	1000	10	1500	N	500	N	N	N	N	N	N	N	N	500	N
B267	L	700	L	700	N	200	N	1	N	N	N	N	N	N	5	N
B427	15	1500	N	500	N	500	N	N	N	N	N	N	N	N	N	N
B436	L	300	L	1000	N	500	N	N	N	N	N	N	N	N	N	N
B647	L	500	N	500	N	500	N	N	N	N	N	N	N	N	N	N
B168	L	200	L	300	N	700	N	N	N	N	N	N	N	N	N	N
B182A	L	300	L	200	N	500	N	N	N	N	N	N	N	N	N	N
L126	7	150	15	200	N	1000	N	N	N	N	N	N	N	N	N	N
L164A	7	1000	N	300	N	300	N	N	N	N	N	N	N	N	N	N
L188	L	300	100	10000	N	700	N	2	N	500	N	N	N	N	7	N
L302	7	200	N	150	N	L	N	N	N	N	N	N	N	N	N	N
L416	20	3000	10	700	N	500	N	150	N	700	N	N	N	N	7	N
L431	N	150	20	300	N	1000	N	N	N	N	N	N	N	N	N	N
R100	7	150	N	150	N	700	N	N	N	N	N	N	N	N	N	N
R104	15	1000	15	700	N	700	N	1	N	700	N	150	N	N	15	N