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GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA

Saskatchewan Energy and Mines | Saskatchewan Research Council

Manitoba Energy and Mines | Manitoba Industry, Economic Development and Mines

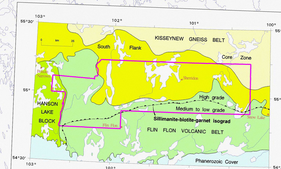
Mineral Deposits

1 Zn-Cu-Pb-Ag Yakushimichi Island
2 Zn-Cu-Pb-Ag Island
3 Cu-Zn Ham Lake
4 Cu-Zn Park Lake
5 Cu-Zn Fidelity
6 Cu-Zn Anderson
7 Cu-Zn Jungle Lake
8 Cu-Zn Alice Zone
9 Cu-Zn Hannah
10 Cu-Zn Hannah Lake S
11 Cu-Zn Sam (Wolverine Lake)
12 Cu-Zn Lake 311
13 Cu-Zn Johnson Lake
14 Cu-Zn Twaipip (Colt, Vista Lake)
15 Cu-Zn Ghost
16 Cu-Zn DRB (Schork's Lake)
17 Zn-Cu Nest (Wildmere Mines)
18 Au Puffy Lake
19 Au Nokomis
20 Au Nokomis Creek
21 Au Nest (Arko)
22 Au Dolly

Mine
1 Zn-Cu Callinan Mine

Abandoned Mine
1 Cu-Zn Sherridon West
2 Cu-Zn Sherridon Mine
3 Cu-Zn Flin Flon Mine
4 Au Graham

Lithotectonic and Metamorphic Zones



The **Flin Flon volcanic belt** consists of volcanic and related sedimentary rocks and synvolcanic plutons, which were formed in 1.9-1.84 Ga volcanic arc and ocean-floor environments. These rocks were amalgamated into a tectonostratigraphic assemblage by 1.84 Ga and intruded by 1.84-1.83 Ga plutons. The belt is bounded to the north by the Kisseynew gneiss belt, which represents a metamorphosed, dominantly turbiditic metasedimentary succession deposited in a back-arc basin between 1.86 and 1.84 Ga. The Kisseynew gneiss belt is bounded to the north by the Hanson Lake Block, which is dominated by volcaniclastic rocks that are intruded by 1.84-1.83 Ga plutons. The Hanson Lake Block is bounded to the north by the Sturgeon-weir thrust belt, which represents a collisional suture between the Hanson Lake Block and the Rottenstone domain. The suture is the two areas are probably separated by a mid-crustal discontinuity, the Sturgeon-weir Shear Zone. The Rottenstone domain consists of 1.9-1.86 Ga volcanic and plutonic rocks that are unconformably overlain by volcanic arc rocks and a foreland-basin succession. The Hanson Lake Block and migmatite aluminous wackes and leucogranitized metasedimentary rocks.

The **Kisseynew gneiss belt** consists of complexly folded mid-crustal gneisses, dominated by ca. 1.85-1.84 Ga metagreywacke (Burntwood suite), which is equivalent to low-grade metasedimentary rocks in the Wollaston belt. The belt is bounded to the north by plutons from the Core Zone of the Trans-Hudson orogen. The boundary between the Flin Flon belt and the Kisseynew belt represents a major change in the style of deformation. It is locally marked by early thrust faults and later discontinuous shear zones.

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PHANEROZOIC

Red River Formation
Ch Dolomite

PALEOPROTEROZOIC

INTRUSIVE ROCKS

Ron to post-Moist (<1845 Ma)

J6 Weakly deformed to massive medium-grained to pegmatitic
J5 Pink granoid to pegmatitic locally magnetic granite, granodiorite, monzogranite to granodiorite, quartzmonzodiorite to pegmatite
J4 Foliated granodiorite and tonalite; minor diorite, quartz diorite to hornblende-quartz diorite
J3 Foliated to gneissic gabbro, diorite, pyroxenite, peridotite
J2 Porphyritic gabbro
J1 Rhyolite/porphyry granodiorite to tonalite

Pre-Moist (>1845 Ma) and Uncertain Age

I10,A,B Porphyritic to gneissic granodiorite to monzogranite
I10c,d Foliated to gneissic granodiorite to tonalite
I9 Porphyritic to gneissic granodiorite to quartz diorite
I9a,b,c Foliated and gneissic tonalite to granodiorite
I8 Foliated and gneissic tonalite to granodiorite
I8a,b,c Foliated and gneissic granodiorite to monzogranite
I7 Quartz-porphyritic tonalite to quartz diorite, locally biotite-porphyritic
I7a Tonalite to granodiorite to quartz diorite with abundant inclusions
I6 Tonalite to granodiorite to quartz diorite with abundant inclusions
I5 Quartz-diorite to hornblende-biotite granodiorite to monzogranite, locally with abundant inclusions
I4 Quartz diorite and gabbro to gneissic quartz diorite
I3 Diabase
I2 Gabbro and diorite
I2a to diorite and gabbro with mafic inclusions
I1 Ultramafic rocks
I1a to hornblende-pyroxene metagabbro
Layered Intermediate to Ultramafic Intrusion (post-Amisk)
L1,a Porphyritized mafic sills and dominant amphibolite to metagabbro to metapyroxenite
L1b to quartz diorite, hornblendite
TECTONITES
T1 Mafic phyllonite

METASEDIMENTARY ROCKS, LOCAL VOLCANIC AND INTRUSIVE ROCKS

Minor Units

M4 Felsic volcanic rocks, minor sedimentary and intrusive rocks; Amisk-Lake-bearing fine grained basin gneiss
a) felsic tuff, hydrothermal volcanic gneiss
b) fine grained quartzofeldspathic granofelsite
M3 Intermediate to mafic volcanic, sedimentary and intrusive rocks; hornblende-mafic gneiss to amphibolite, ophimonzonite
M2 Mafic-ancmic, minor volcanic rocks (generally migmatitic (overlap) psammopelitic gneiss and locally metaluminous amphibolite
M2a a) quartzofeldspathic gneiss and locally metaluminous amphibolite
M2b a) quartzofeldspathic biotite-hornblende gneiss (garnet) subwacke
M2c a) quartzofeldspathic migmatite
M1 Psammitic metamigmatmonzonite, interlayered pelitic meta-arenite

Boundwood Suite

S2,4 Stromatolic, siliceous, mudstone (generally graphitic) granofelsite gneiss, biotite gneiss (subfacies)
S2b,c a) garnet-biotite gneiss and migmatite, quartzofeldspathic b) biotite-muscovite gneiss (garnet), locally mixed with psammite or granite
S1 Biotite, diabase, basalt, iron formation; amphibolite (diabase), garnet amphibolite, minor felsic gneiss

Boundwood Gneisses of Devonian Age (generally graphitic rocks)

W3 Interlayered feldspathic quartzite and minor pelitic gneiss
W2 Stromatolic, minor arenitic, siltstone, mudstone, turbiditic gneiss (garnet) (subfacies), local siliceous
W2a a) quartzofeldspathic gneiss (garnet) (subfacies)
W2b a) garnet-cordierite migmatite, +/-biotite, granitic lits
W1 Interlayered metasiliciclastic rocks, mudstone, tuff and arenitic biotite gneiss (monzonite (gneiss)
W1a a) hornblende-biotite gneiss (garnet)
W1b a) interlayered amphibolite, mafic-pyroxenite and mafic schist

VOLCANIC, SEDIMENTARY AND INTRUSIVE ROCKS (AMISK GROUP)

Gneisses of Uncertain Origin (includes alterations)

G4 Granodioritic to tonalitic gneiss (gneiss), local supracrustal rocks a) granodioritic to monzonitic gneiss (garnet) (granodioritic)
G4a Interior garnet-Fe-Mg-Al-silicate gneiss
mainly affected Lit and G3 (garnet) (monzonitic (subfacies) (gneiss)

G3 Calc-silicate rock, in part derived by alteration of G1 - G4
a) quartzofeldspar calc-silicate rock, alteration of (to or G4
G1 Quartz-hornblende mafic hypersthenite, impure mantle

Rocks of Hillocks, Intrusive and Volcaniclastic Origin

V4 Felsic volcanic rocks and derived gneisses, minor intrusive
V4a,b,5 a) felsic gneiss (quartz phenocrysts (garnet) (subfacies) b) foliated quartz porphyry
V4c a) anterior grained biotite gneiss (amphibolite), derived from V4 and subordinate rocks
V3 Intermediate to mafic volcanic and volcaniclastic rocks; amphibolite-hornblende gneiss (garnet) (subfacies)
V2 Mafic volcanic, minor volcaniclastic and intrusive rocks; layered to unitone amphibolite (diabase) (gneiss)
V2a a) fine grained amphibolite derived from aphyric basalt (locally pillowed) and diabase
V2b a) amphibolite and granofelsic (migmatite with abundant dykes of I6
V1 Mafic and minor ultramafic flows, dykes and sills; pillowed and massive basalt, gabbro, diabase and microdiorite a) amphibolite, largely derived from V1

ND Area with little or no outcrop

Long Bay Conglomerate (oneatic volcanic island chains)

C1 Mafic conglomerate

Flin Flon Assemblage (volcanic arc strata)

F5 Dyke complex
porphyritic and aphyric felsic to mafic dykes
F4 Rhyolite (quartz) phenocrysts
F3 Felsic to intermediate, volcaniclastic rocks and flows a) intermediate to felsic gneiss derived from F3
F2 Intermediate porphyritic volcaniclastic rocks and sills
F1 Basalt and basaltic andesite, local pillows or breccia a) fine grained amphibolite (pillowed) derived from diabase (sill (basalt), locally pillowed
a) fine grained amphibolite (aphyric flows, local breccia

Missi-Kisseynew Assemblage (ocean floor / back-arc strata)

A11 Basalt, local pillows or breccia, minor diabase a) fine/medium laminated basalt and diabase

Geological contact
Fault
Shear zone
Stratigraphic facing (generalized)
Foliation (undivided)
Mineral deposit
Mine
Abandoned mine
Gondwana-archaeophyte and garnet-archaeophyte assemblages in alteration
Mylonite zone
(white)

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LOCATION MAP

OPEN FILE 3004
GEOLOGY

FLIN FLON BELT
KISSEYNEW BELT TRANSITION ZONE

MANITOBA - SASKATCHEWAN

Scale 1:100 000 - Echelle 1/100 000

Kilometres 0 1 2 3 4 5 Kilomètres

Universal Transverse Mercator Projection
Projection transverse universelle de Mercator
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Any revisions or additional information known to the user would be welcomed by the Geological Survey of Canada

Digital base map assembled and modified by the Geological Survey of Canada

Copies of the topographical edition of the this map may be obtained from the Canada Map Office, Department of Natural Resources Canada, Ottawa, Ontario K1A 0E9

Mean magnetic declination 1995, 10°49' E, increasing 9.3' annually
Readings vary from 10°0' E in the NW corner to 9°0' E in the SE corner of the map

63 H/1	63 H/8	63 H/9	63 H/10	63 H/11
63 G/4	63 G/5	63 G/6	63 G/7	63 G/8
63 G/3	63 G/2	63 G/1	63 H/16	63 H/15
63 G/14	63 G/13	63 G/12	63 H/13	63 H/14

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