

# 1:2 000 000 Scale Geological Compilation of the Superior Craton

Montsion, R.M., Thurston, P., Ayer, J.

<sup>1</sup>Mineral Exploration Research Centre, Harquail School of Earth Sciences, Laurentian University, Sudbury, Ontario rmontsion@laurentian.ca, Willet Green Miller Centre, Rm. 6029, 933 Ramsey Lake Rd., P3E 6B5, Sudbury, Ontario

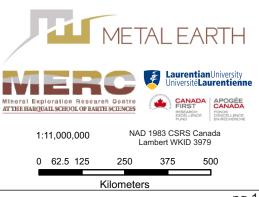
#### Disclaimer

These compiled GIS layers were prepared for the sole purpose of portraying recent, publically available bedrock geology layers of the Superior Craton at 1:2 000 000 scale. It should not be used for any other purpose. Use of this compilation map/dataset is governed by the following principles:

- The compilation map is scale dependent. Use of the information from the compilation at any scale other than 1:2 000 000 is unwarranted and will result in erroneous conclusions.
- 2) To enable the rapid dissemination of information, this digital compilation has not received a thorough technical edit. Discrepancies may occur for which the Mineral Exploration Research Center does not assume liability. The compilation does not fully portray the complex geology of the Superior Craton and users should verify critical information.
- 3) New data and observation are continually collected, synthesized and compiled. Users should be aware that the digital compilation was current at time of posting, but new information may substantially change the interpretation in any area. Users should verify the currency of data in any area before proceeding. Users are also directed to check the Metal Earth Website http://merc.laurentian.ca/metalearth/superior\_compilation) for future updates and any newer versions of this map compilation
- 4) The GIS layers were prepared from compilation of available province/state-scale products from relevant public surveys. These maps were updated within the confines of the available time with information collected post–1990. No attempt was made to check source material published prior to the creation of the manuscript maps.

5) The geology was subdivided to aid identification of economically important rock units.

For legend and additional information related to this map, see the Metal Earth website (http://merc.laurentian.ca/metalearth/superior\_compilation)



# 1:2 000 000 Scale Geological Compilation of the Superior Craton Legend

Montsion, R.M.<sup>1</sup>, Thurston, P.<sup>1</sup>, Ayer, J.<sup>1</sup>

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<sup>1</sup>Mineral Exploration Research Centre, Harquail School of Earth Sciences, Laurentian University, Sudbury, Ontario rmontsion@laurentian.ca, Willet Green Miller Centre, Rm. 6029, 933 Ramsey Lake Rd., P3E 6B5, Sudbury, Ontario

## Abstract

The Superior Craton is the world's largest Archean craton and has been the subject of geologic research for over 100 years. The craton is comprised of amalgamated fault bounded, lithotectonic subprovinces that trend northeast to southwest. Subprovinces alternate between granite-greenstone regions and high-grade gneissic blocks, separated by metasedimentary-dominated domains. The 1:2 000 000 scale compilation presented here integrates recent province/state-scale mapping products from public domain sources for the Superior Craton. The geospatial dataset includes Precambrian bedrock geology layers and geophysical grids. Original work contained within the compilation include new interpretations such as updated subprovince boundaries, reclassified lithologies into a standardized legend and classification of fault traces based on scale. Compilation work was done in collaboration with the Ministère de l'Énergie et des Ressources Naturelles, Ontario Geologic Survey, Minnesota Geological Survey, Manitoba Mineral Resources, and Geological Survey of Newfoundland and Labrador. The map provides a basis for future craton-scale and thematic projects within the Superior Craton as it presents recent regional mapping products throughout the craton and across political boundaries.

### **Acknowledgements**

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Special thanks to our research partners, the Ministère de l'Énergie et des Ressources Naturelles, Ontario Geologic Survey, Minnesota Geological Survey, Manitoba Mineral Resources, and Geological Survey of Newfoundland and Labrador, for their contribution of datasets through their public, online portals as well as correspondence and collaboration.

This product was significantly improved through assistance and support from Metal Earth technical staff, Ryan Paguette and Jacqueline Edwards. Additionally, the various researchers working on the Metal Earth project contributed through stimulating discussion during the course of the project.

In general, older bedrock units are named after younger ones.

- Towns and cities
- Highways (inset map only)
- Fault traces
- Canada United States border
- Waterbodies

Area of interest (50 km buffer to Superior Craton)

Political boundaries

UTM zone boundaries

(exposed at surface)

Boundary of the Superior Craton

Tectonic Subdivisions (inset map only)

1	Abitibi	17	Minto
2	Animikie Basin	18	Nemiscau
3	Ashuanipi	19	North Caribou Core
4	Beinville	20	Opatica
5	Cobalt Embayment	21	Opinaca
6	Diana	22	Oxford-Stull
7	Douglas Harbour	23	Oxford-Stull / Uchi
8	Eastern Wabigoon	24	Pontiac
9	Eastmain	25	Qalluviartuuq
10	English River	26	Quetico
11	Goudalie	27	Tikkerutuk
12	Hudson Bay Terrane	28	Uchi
13	Island Lake	29	Utsalik
14	La Grande	30	Wawa
15	Marmion	31	Western Wabigoon
16	Minnesota River Valley	32	Winnipeg River

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<ul> <li>14gd Diorite-monzonite- granodiorite suite: Diorite, tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents</li> <li>14gm Muscovite-bearing granitic rocks: Muscovite-biotite and cordierite-biotite granodiorite suite: Tonalite to granodiorite – foliated to massive</li> <li>14gf Foliated tonalite suite: Tonalite to granodiorite – foliated to massive with minor supracrustal inclusions</li> <li>14gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene. including charnokites, enderbites etc.</li> <li>14gi Gineirsci Carstic intrusions<sup>2</sup></li> <li>14gn Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Unsubdivided mafic and ultramafic intrusions: Nary from anorthosite to various pyroxene-bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12su Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12se Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	14gg Massive granodiorite to granite: Massive to foliated granodiorite to	and andesitic flows, tuffs and breccias, chert, iron
<ul> <li>granodiorite, syenite and hypabyssal equivalents</li> <li>Muscovite-bearing granitic rocks: Muscovite-biotite and cordierite- biotite granite, granodiorite-fonalite</li> <li>Foliated tonalite suite: Tonalite to granodiorite – foliated to massive with minor supracrustal inclusions</li> <li>Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>Isun Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	granite	formation, minor metasedimentary and intrusive rocks;
<ul> <li>Hagn Muscovite-bearing granitic rocks: Muscovite-biotite and cordierite-biotite granite, granodiorite-tonalite biotite granite, granodiorite-tonalite</li> <li>Foliated tonalite suite: Tonalite to granodiorite – foliated to massive of the minor supracrustal inclusions</li> <li>Granitoids<sup>2</sup></li> <li>Unsubdivided granitoid units: Includes all units listed below in areas without detailed maps</li> <li>Diorite-Nepheline syenite suite: Proxenite, diorite, monzonite, syenite, nepheline syenite</li> <li>Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>Tamu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>Ultramafic intrusions: Vary from anorthosite to various pyroxenebearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>Ton formation: Dominantly oxide facies minor sulfide, carbonate silicate facies</li> <li>Toro formation: Dominantly oxide facies minor sulfide, carbonate silicate facies</li> <li>Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	14gd Diorite-monzonite- granodiorite suite: Diorite, tonalite, monzonite,	
<ul> <li>biotite granite, granodiorite-tonalite</li> <li>foliated tonalite suite: Tonalite to granodiorite – foliated to massive</li> <li>foliated tonalite suite: Tonalite to granodiorite – foliated to gneissic – with minor supracrustal inclusions</li> <li>fugp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>fugn Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>fugn Mafic intrusions: Carboroic units, fine to coarse grained</li> <li>fugn Ultramafic intrusions: Vary from anorthosite to various pyroxene-bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>fuon formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>formation: Dominantly units: Dominantly coarse clastic</li> </ul>	granodiorite, syenite and hypabyssal equivalents	, ,
<ul> <li>14gf Foliated tonalite suite: Tonalite to granodiorite – foliated to massive</li> <li>14g1 Gneissic tonalite suite: Tonalite to granodiorite – foliated to gneissic – with minor supracrustal inclusions</li> <li>14gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>13mu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Mafic intrusions: Cabbroic units, fine to coarse grained</li> <li>13mu Ultramafic intrusions: Cabbroic units, fine to coarse grained</li> <li>13mu Unsubdivided clastic metasedimentary<sup>7</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12se Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
<ul> <li>14g Gneissic tonalite suite: Tonalite to granodiorite – foliated to gneissic – with minor supracrustal inclusions</li> <li>14gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>13mu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mu Ultramafic intrusions: Cabbroic units, fine to coarse grained</li> <li>13mu Unsubdivided clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	biotite granite, granodiorite-tonalite	<sup>4gu</sup> Unsubdivided granitoid units: <i>Includes all units listed below in areas</i>
<ul> <li>with minor supracrustal inclusions</li> <li>14gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>13mu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mu Ultramafic intrusions: Vary from anorthosite to various pyroxene-bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12se Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	-	
<ul> <li>14gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene, including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>13mu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mi Ultramafic intrusions: Vary from anorthosite to various pyroxene-bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12se Coarse clastic metasedimentary units: Dominantly coarse clastic</li> <li>4go Granitic orthogneiss and migmatite: Granitic orthogneiss and migmatite: Granitic orthogneiss and migmatite units from the Minnesota River Valley Gneiss (MRVG) suite. Possibly later than other MRVG units listed below.</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Massive granodiorite to granite: Massive to foliated granodiorite to granite</li> <li>4ga Dioritemetasedimetary units: Largely based on regional mapping or geophysical interpretation</li> <li>12se Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
<ul> <li>including charnokites, enderbites etc.</li> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>Iamu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>Iamu Unsubdivided mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>Iamu Ultramafic intrusions: Vary from anorthosite to various pyroxene-bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>Izsu Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>Izsu Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>Izse Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
<ul> <li>Mafic and ultramafic intrusions<sup>2</sup></li> <li>(MRVG) suite. Possibly later than other MRVG units listed below.</li> <li>Image of the second provide the second</li></ul>		
<ul> <li>13mu Unsubdivided mafic and ultramafic intrusions: Generally based on geophysical interpretation</li> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mi Ultramafic intrusions: Vary from anorthosite to various pyroxenebearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	· · · · · · · · · · · · · · · · · · ·	
<ul> <li>geophysical interpretation</li> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mi Ultramafic intrusions: Vary from anorthosite to various pyroxenebearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
<ul> <li>13mm Mafic intrusions: Gabbroic units, fine to coarse grained</li> <li>13mi Ultramafic intrusions: Vary from anorthosite to various pyroxene- bearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>	-	
<ul> <li>13mi Ultramafic intrusions: Vary from anorthosite to various pyroxenebearing units to dunite</li> <li>Clastic metasedimentary<sup>2</sup></li> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
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Clastic metasedimentary <sup>2</sup> Probably representing engulfment of earlier supracrustal units by granitoid units; produces moderately high and varied gravity and magnetic signatures.         12si       Iron formation: Dominantly oxide facies minor sulfide, carbonate & silicate facies       Image: Agd Construction of the section of the sec		Granitold grielss with donale to amphibolitic enclaves. Oranitold
<ul> <li>12su Unsubdivided clastic metasedimentary units: Largely based on regional mapping or geophysical interpretation</li> <li>12si Iron formation: Dominantly oxide facies minor sulfide, carbonate &amp; silicate facies</li> <li>12sc Coarse clastic metasedimentary units: Dominantly coarse clastic</li> </ul>		
regional mapping or geophysical interpretation 12si Iron formation: Dominantly oxide facies minor sulfide, carbonate & silicate facies 12sc Coarse clastic metasedimentary units: Dominantly coarse clastic 12sc Source	-	
12si       Iron formation: Dominantly oxide facies minor sulfide, carbonate & silicate facies       4gd       Diorite-monzonite- granodiorite suite: Diorite, tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents         12sc       Coarse clastic metasedimentary units: Dominantly coarse clastic       4gd       Diorite-monzonite- granodiorite suite: Diorite, tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents		
silicate facies granodiorite, syenite and hypabyssal equivalents          12sc       Coarse clastic metasedimentary units: Dominantly coarse clastic		
12sc Coarse clastic metasedimentary units: Dominantly coarse clastic	•	-
		granodiorite, syenite and hypabyssal equivalents
MERC-ME-2018-017 pg 3	<b>12sc</b> Coarse clastic metasedimentary units: <i>Dominantly coarse clastic</i>	
	MERC-ME-2018-017	pg 3

4gm Muscovite-bearing granitic rocks: <i>Muscovite-biotite and cordierite-biotite granite, granodiorite-tonalite</i>	2sfb Fine Clastic Successor Basin units: <i>Early (2690-2680 Ma),</i> wacke dominated, Porcupine-type successor basin unit
4ga Amphibolitic to dioritic gneiss: Relic volcanic units within the	Metavolcanic units <sup>2</sup>
Minnesota River Valley Gneisses	Ivu Unsubdivided metavolcanic units: Based on reconnaissance mapp
<sup>4gf</sup> Foliated tonalite suite: <i>Tonalite to granodiorite – foliated to massive</i>	– largely mafic
<sup>4</sup> gta Gneissic tonalite suite: <i>Tonalite to granodiorite – foliated to gneissic –</i>	1vm Mafic to ultramafic metavolcanics: <i>Mafic metavolcanic rocks with</i>
with minor supracrustal inclusions	minor komatiite, minor metasedimentary, and minor
4gtb Foliated to gneissic tonalite and granodiorite: Amphibole and/or	pyroclastic rocks
pyroxene bearing gneisses from the Minnesota River	Ivi Mafic to intermediate metavolcanics: Basaltic and andesitic flows,
Valley Gneiss suite	tuffs and breccias, chert, iron formation, minor
4gp Pyroxene-bearing granitic rocks: Granitic rocks containing pyroxene,	metasedimentary and intrusive rocks, related migmatite
including charnokites, enderbites etc.	1vf Felsic to intermediate metavolcanics: Rhyolitic, rhyodacitic, dacitic
Mafic and ultramafic intrusions <sup>2</sup>	and andesitic flows, tuffs and breccias, chert, iron
3iu Unsubdivided mafic and ultramafic intrusions: Generally based on	formation, minor metasedimentary and intrusive rocks;
geophysical interpretation	related migmatites
3im Mafic intrusions: Gabbroic units, fine to coarse grained	
3ii Ultramafic intrusions: Vary from anorthosite to various pyroxene-	
bearing units to dunite	<sup>1</sup> Subdivisions of Precambrian geologic time and units characterized by a
Metasedimentary units <sup>2</sup>	range of ages are cited in terms of Ga. The subdivisions of geologic time
2sma Migmatized clastic and chemical metasedimentary units: <i>Migmatized</i>	correspond to international standards. All ages of individual units cited in the legend are based on high precision U/Pb zircon ages, and are cited in term
clastic and chemical metasedimentary rocks with or	of Ma.
without komatiites	<sup>2</sup> Rocks in these groups are subdivided lithologically. The order does not
2smb Migmatized Successor Basin units: <i>Migmatized Successor</i>	imply age relationship within or among groups
Basin metasedimentary units with undefined or mixed	
grain size classification	
2sua Clastic and chemical metasedimentary units: <i>Clastic and chemical</i>	
metasedimentary rocks with or without komatiites           2sub         Unsubdivided Successor Basin units: Mixed conglomerate and	
2sub Unsubdivided Successor Basin units: Mixed conglomerate and wacke Successor Basin units	
2si Iron formation: <i>Dominantly oxide facies minor sulfide, carbonate and</i>	
silicate facies	
2sca Coarse clastic metasedimentary units: <i>Dominantly coarse clastic</i>	
metasedimentary rocks (sandstone to coarse	
conglomerate), with minor, mainly alkali, mafic to felsic	
metavolcanic flows, tuffs and breccias	
2scb Coarse Clastic Successor Basin units: Late (2680-2675 Ma),	
conglomerate dominated, Timiskaming-type sedimentary	
units	
2sfa Fine grained clastic metasedimentary units: Wacke, arkose, argillite,	
slate, marble, chert, minor metavolcanic rocks	

	wacke dominated, Porcupine-type successor basin units				
Ме	Metavolcanic units <sup>2</sup>				
1vu	Unsubdivided metavolcanic units: <i>Based on reconnaissance mapping</i> – <i>largely mafic</i>				
1vm	Mafic to ultramafic metavolcanics: <i>Mafic metavolcanic rocks with</i> <i>minor komatiite, minor metasedimentary, and minor</i> <i>pyroclastic rocks</i>				
1vi	Mafic to intermediate metavolcanics: <i>Basaltic and andesitic flows,</i> <i>tuffs and breccias, chert, iron formation, minor</i> <i>metasedimentary and intrusive rocks, related migmatites</i>				
1vf	Felsic to intermediate metavolcanics: <i>Rhyolitic, rhyodacitic, dacitic and andesitic flows, tuffs and breccias, chert, iron formation, minor metasedimentary and intrusive rocks; related migmatites</i>				

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