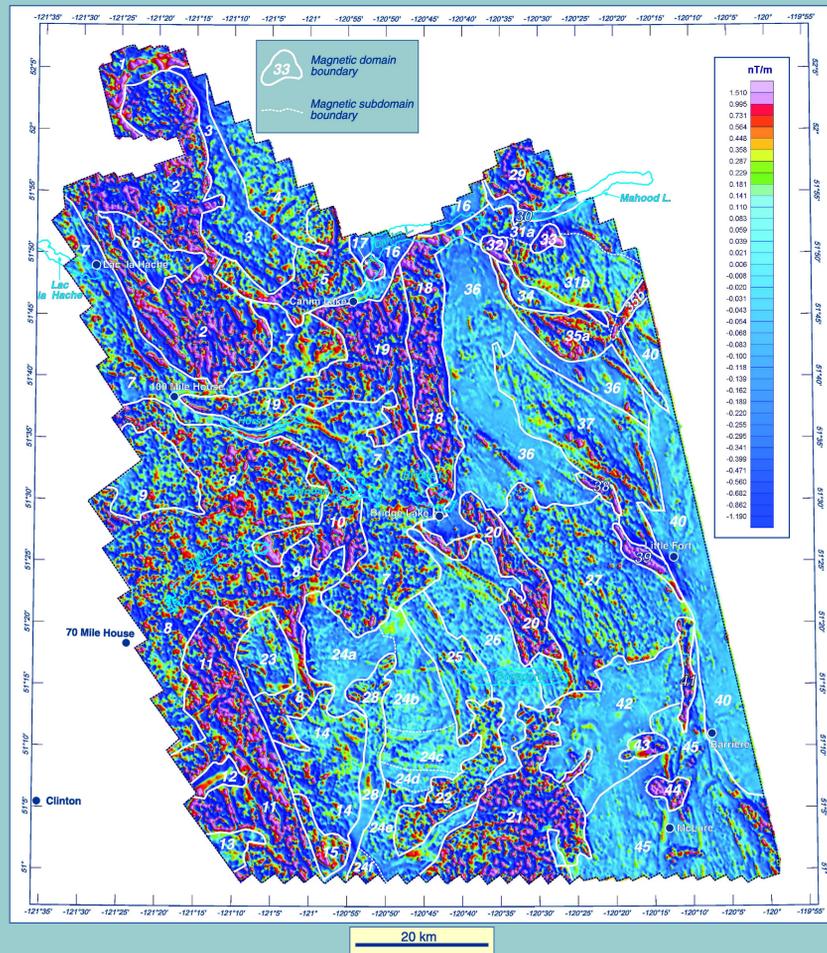


Sheet 2

(1) Map of the First Vertical Derivative of the Residual Total Magnetic Field



Magnetic Domains on First Vertical Derivative and Geological Maps

Boundaries of magnetic domains are outlined on the map of the first vertical derivative (vertical gradient) of the residual total magnetic field (1, upper left), and are plotted also on the geological map (2, upper right), along with contacts derived from the zero value of the vertical gradient. As pointed out on Sheet 1, the domains are defined mainly on the basis of the patterns of the derived contacts, but the density, intensity, continuity and geometry of vertical gradient anomalies were also considered. The other magnetic maps included in this open file were also consulted.

In general the domains cover comparatively large areas, although a few are quite small and based on a light concentration of distinct and sometimes isolated anomalies. Whereas strike direction of anomalies has been a consideration in domain definition, there are instances where lesser importance has been placed on direction, principally because there is a degree of randomness in the orientations within those particular domains. A case could be made to subdivide these domains into smaller units, but at this stage the intent is to define domains using a least common denominator approach. No attempt has been made to establish a hierarchy of domains in any terms.

There are 45 defined domains. Comparison of domain boundaries with geological boundaries (map 2) reveals close agreement in many cases, which is encouraging evidence for the utility of magnetic data in this region. However, there are instances where agreement is poor, and it has been suggested that for these the magnetic data highlight a need to re-evaluate geological mapping locally. A brief description of the magnetic domains and their relationship to mapped geology follows.

**Domain 1:** characterized by strong, short, linear vertical gradient (VG) anomalies, coinciding with a broad curvilinear residual total magnetic field (RTMF) high crossing volcanic rocks of the Kamloops and Nicola groups, and 'granitic' rocks of the Takomkane batholith. Magnetic signatures in this part of the area indicate that the magnetic high, and the associated volcanic rocks, are of the Nicola Group.

**Domain 2:** characterized by generally strong, short linear VG anomalies oriented NNW reflecting strong RTMF anomalies coinciding mainly with volcanic units of the Nicola Group. Marginal (mainly) portions of the domain falling on volcanic rocks of the Chilcotin Group suggest that these cover rocks are quite thin, or even absent. The coincidence of the northern part of the domain with rocks mapped as part of the Takomkane batholith suggests that the domain is a wide, low-intensity zone.

**Domain 3:** is a NNW-trending domain along the western margin of the Takomkane batholith, characterized by weak and spatially small VG anomalies of limited strike length. Some linear VG lows impart a weak NNW to NW fabric on the domain.

**Domain 4:** lies in the interior of the Takomkane batholith, and is characterized by weak to moderately strong VG anomalies of limited strike length. A linear fabric is not apparent. Linear VG lows striking NE across the domain, indicating a fault, the boundary between domains 3 and 4 may indicate a fault and/or an internal contact separating different phases of the batholith.

**Domain 5:** characterized by moderately strong VG anomalies. Some have a linear aspect, but orientations are variable and a distinct linear fabric is not developed. Northwestern portions of the domain coincide with the Takomkane batholith, and the remainder falls on volcanic rocks of the Kamloops Group. Because the magnetic texture of the eastern portion is not unlike that of domain 4, it is argued (Sheet 1) that the boundary between the batholith and Kamloops Group should be moved farther south. Alternatively, moderately strong RTMF anomalies within the domain suggest a significant presence of volcanic rocks of the Nicola Group.

**Domain 6:** characterized by spatially small, weaker VG anomalies having limited strike length and random orientation. It falls within the more intense domain 2, and is oriented NW, parallel to units of the Nicola Group. It may reflect a sedimentary-rich unit within the Nicola group, or a satellite of the Takomkane batholith.

**Domains 7, 8, 9:** collectively these 3 domains exhibit a reasonable correlation with a portion of the Chilcotin Group between the Thuya and Takomkane batholiths. All are characterized by variegated VG patterns dominated by spatially small, round to oval highs having no particular orientation. These patterns are considered typical of the magnetic expression of the basaltic volcanic Chilcotin Group. Domains are distinguished principally by the density and intensity of the highs. Highs in domain 8 tend to be more intense, and to have a greater concentration.

**Domain 10:** is distinguished from adjacent domains related to the Chilcotin Group by its stronger pattern of VG anomalies, which is similar to patterns (domains 18, 19, 20) associated with volcanic rocks of the Kamloops Group. A significant presence of the latter is proposed within the domain.

**Domain 11:** is a belt-like domain oriented NNW, distinguished by a strong pattern of VG anomalies, many of them linear. The pattern resembles those over basaltic volcanic rocks of the Nicola Group farther north, and likewise coincides with strong RTMF anomalies. The domain crosses volcanic rocks of the Chilcotin and Kamloops groups, but is attributed to volcanic rocks of the Nicola Group.

**Domain 12:** a very small domain oriented typically NE penetrating the southwestern margin of domain 11. It is defined by a single linear VG anomaly > 6 km long and up to about 1 km wide, flanked to either side by a relatively negative and featureless VG expression. The domain correlates with volcanic rocks of the Kamloops Group, and may signify a large feeder dyke.

**Domain 13:** is a small domain oriented NNW, distinguished by a strong pattern of VG anomalies, many of them linear. The pattern resembles those over basaltic volcanic rocks of the Nicola Group farther north, and likewise coincides with strong RTMF anomalies. The domain crosses volcanic rocks of the Chilcotin and Kamloops groups, but is attributed to volcanic rocks of the Nicola Group.

**Domain 14:** coincides principally with volcanic rocks of the Chilcotin Group. It is characterized generally by a variegated pattern of relatively weak, spatially small VG anomalies similar to patterns associated with volcanic rocks of the Nicola Group.

**Domain 15:** is small and characterized by relatively intense, roughly oval-shaped VG anomalies, oriented preferably N to NNW. Most of the domain covers the Chilcotin Group, but is ascribed to volcanic rocks of the Nicola Group, because its southeastern margin coincides with this group and a prominent RTMF anomaly.

**Domain 16:** is recognized by its relatively negative and featureless VG image. It coincides closely with, and is attributed to, sedimentary rocks of the Nicola Group. Sections of its boundary near the western part of Canim Lake lie very close to the geologically mapped boundary.

**Domain 17:** is defined by a strong magnetic high partially coinciding with a Cretaceous 'granitic' intrusion (Late Triassic-Early Jurassic according to Schiarizza and Boulton, 2006), which the high suggests is somewhat larger than mapped.

**Domains 18, 19, 20:** are small NW-trending domains defined by strong linear RTMF anomalies. Their VG signatures are defined by intense irregularly linear positive anomalies separated by roughly parallel/subparallel irregularly linear negative anomalies, and are similar to signatures over volcanic rocks of the Nicola Group farther northwest. The domains, with the exception of the western part of domain 19, seemingly have a weak linear fabric oriented NNW. The westward incursion of domain 19 into domain 7 (linked with Chilcotin Group) is a result of the intensity of VG anomalies, because the linear aspect observed farther east does not persist. Possibly, volcanic rocks from both the Chilcotin and Kamloops groups are present in this western 'tail'.

**Domain 21:** is characterized by VG anomalies having a concentration and intensities similar to those of the previous 3 domains, which are so characteristic of the Kamloops Group, although a significant linear pattern is not developed. The domain sits almost entirely on volcanic rocks assigned to the Chilcotin Group, but the evidence of the magnetic signature suggests a dominating presence of volcanic rocks of the Kamloops Group.

**Domain 22:** is characterized by a pattern of VG anomalies similar to patterns over the Chilcotin Group north of the Thuya batholith, and is itself situated on the Chilcotin Group. The VG anomalies are less intense than those over the adjacent domain 21 coincides with a portion of the batholith and several areas of the Chilcotin Group. It is characterized by weak, spatially limited VG anomalies barely distinguishable from background. This signature is attributed to the batholith, which probably occupies also the terrain mapped as Chilcotin Group. The subdomain is separated from Domain 23 by a linear section of domain 8 that includes strong linear anomalies, and is attributed to the presence of the Chilcotin Group, even though the batholith is mapped as continuous across this section. The linear anomalies might alternatively indicate a belt of volcanic rocks of the Nicola Group.

**Subdomain 24a:** is characterized by slightly stronger VG anomalies than those in subdomain 24b. Some are linear and locally impart a weak linear grain oriented NNW. Most of the subdomain sits on the Thuya batholith, and the remainder on the Chilcotin Group. Its VG signature suggests that batholithic rocks dominate within it, and that if any volcanic rocks of the Chilcotin Group are present, they are fairly thin.

**Subdomain 24c:** is similar to subdomain 24b in terms of intensity of VG anomalies. A noteworthy difference is the W to NNW orientation of linear anomalies, which probably relate to volcanic rocks of the Nicola Group, that underlie most of the subdomain. The lack of intensity of VG, or RTMF, anomalies indicates that any such rocks are thin and/or thinly distributed within a mainly granitic terrain, since 'granite' occurs within the subdomain. Another possibility is that the Nicola Group contains significant developments of sedimentary rocks.

**Subdomain 24d:** is quite featureless, and though located mainly on mapped volcanic rocks of the Nicola Group, it is probably underlain by the Thuya batholith.

**Subdomain 24e:** is defined by a variegated pattern of modest intensity VG anomalies overlying almost exclusively volcanic rocks of the Chilcotin Group, to which it also coincides mainly with, and is linked to, volcanic rocks of the Nicola Group. Domain 22, which is adjacent to, and also coincides with, the Chilcotin Group, has a variegated pattern of more intense VG anomalies, which is the basis for defining the domain. The more intense anomalies possibly signify a thicker development of the volcanic rocks, though the more rugged nature of domain 22 may also contribute.

**Subdomain 24f:** is defined by distinct VG anomalies echoing moderately strong RTMF anomalies. Some are linear with limited strike length, and strike NNW. The subdomain coincides mainly with, and is linked to, volcanic rocks of the Nicola Group.

**Domain 25:** is a NNW-trending domain isolated by narrow, discontinuous, linear VG and RTMF anomalies crossing the central part of the Thuya batholith near Bonaparte Lake. Its magnetic fabric is similar to that defining domain 27 on the east side of the batholith, suggesting that it is likewise related to a heterogeneous, more mafic, and more altered part of the batholith that might host copper mineralization.

**Domain 26:** is another domain characterized by a NNW-trending pattern of linear anomalies, which are somewhat less pronounced than those in flanking domains. The domain crosses a large segment mapped as Kamloops Group, but its magnetic signature indicates that 'granitic' rocks are widespread throughout the domain.

**Domain 27:** is a broad domain coinciding with the eastern tract of the Thuya batholith. Overall, its RTMF expression is fairly weak, but a series of weak, narrow, short, linear highs is sufficiently distinct to impart a NNW oriented magnetic grain throughout the domain, which is well defined in the VG image, which also reveals a series of linear low indicative of faults. The significance of the pattern for prospectivity in other parts of the batholith has been discussed previously.

**Domain 28:** a NNE-trending domain following closely the Deadman River valley. Its anomaly trends contrast with those in flanking domains, and may reflect a strong structural high, and north to south it falls on volcanic rocks of the Nicola Group and sedimentary rocks of the Chilcotin Group, and volcanic rocks of the Nicola Group. The northern half is characterized by weak, yet distinctive RTMF anomalies, whereas the southern half is relatively featureless and negative. The smooth signature in the south, where the Nicola Group has been mapped, could indicate a wider distribution of sedimentary rocks of the Chilcotin Group. The northern, more positive signature supports the mapping of coincident volcanic rocks of the Chilcotin Group.

**Domain 29:** sits largely on a unit of undivided sedimentary rocks of the Nicola Group, yet is defined by a pattern of prominent VG anomalies, some being linear and relatively extensive. They probably indicate a significant presence of volcanic rocks.

**Domain 30:** is a relatively featureless, narrow domain falling mainly on Pleistocene alkaline volcanic rocks along and near the west end of Mahood Lake. The lack of signature indicates that they are very weakly magnetic in this locality.

**Domain 31:** coincides closely with the Raft batholith, and is characterized by a fairly uniform pattern of positive VG anomalies. Some are narrow, linear and of limited extent. Together with more extensive linear VG lows they produce a NNW-trending linear fabric. Whereas the VG fabric is uniform, the RTMF is generally more negative north of the batholith, hence the domain is subdivided into two subdomains.

**Subdomain 31a:** north of the batholith coincides with basaltic volcanic rocks of the Fennell Assemblage, volcanic, sedimentary and volcaniclastic units of the Nicola Group, and Pleistocene volcanic rocks. The Fennell Assemblage and Pleistocene rocks are associated with some of the more positive aspects of this relatively negative subdomain. Surprisingly the volcanic unit of the Nicola Group has a distinctly negative expression, contrary to positive signatures observed elsewhere. However, Schiarizza and Boulton (2006) mapped the unit as a sedimentary unit.

**Subdomain 31b:** correlates with the Raft batholith.

**Domain 32:** is defined by a small group of intense positive anomalies attaining >5000 nT straddling the Raft batholith, Paleocene volcanic rocks and volcaniclastic rocks of the Nicola Group. Mapping by Schiarizza and Boulton (2006) indicates that the domain is probably largely related to the volcaniclastic rocks (Nicola Group) and their hidden extension beneath Quaternary sediments to the west.

**Domain 33:** is defined by a large (peak >5000 nT) positive anomaly. Although presumably located on basaltic volcanic rocks of the Nicola Group, it correlates with Late Triassic-Early Jurassic ultramafic rocks (Schiarizza and Boulton, 2006).

**Domain 34:** is relatively featureless and negative in terms of its VG and RTMF expressions, though it contains some local magnetic highs. It coincides mainly with sedimentary rocks of the Nicola Group, revised mapping of which indicates a volcaniclastic succession (Schiarizza and Boulton, 2006).

**Domain 35:** is defined by a series of narrow, linear, prominent VG anomalies, producing an intense pattern. Most are oriented NNW to NNW (subdomain 35a), but a single collinear series of highs strikes NE (subdomain 35b).

**Subdomain 35a:** falls mainly on a volcaniclastic unit of the Nicola Group and a unit of Pleistocene volcanic rocks. Anomaly trends within the units differ slightly, being NW and NNW, respectively. The NNW extremity of the subdomain traverses sedimentary rocks of the Nicola Group and Paleocene volcanic rocks, but the continuity of anomaly trends favours instead an extension of the volcaniclastic unit. The SSE extremity runs along undivided sedimentary rocks of the Nicola Group, but VG highs within, being more or less continuous with a belt of highs over Paleocene volcanic rocks, indicate that they are not continuous with the volcaniclastic rocks.

**Subdomain 35b:** coincides with a narrow belt of Paleocene volcanic rocks.

**Domain 36:** is a large domain coinciding mainly with sedimentary (in the north) and basaltic volcanic (in the south) rocks of the Nicola Group. A prominent SE projection traverses volcaniclastic and undivided sedimentary rocks of the Nicola Group. The domain is characteristically relatively featureless, but locally a weak (generally) linear fabric is present, which is weakly signalled by the presence of a series of linear anomalies within all mapped units. Areas containing weak/moderate magnetic highs probably indicate local developments of volcanic/volcaniclastic rocks.

**Domain 37:** is a domain characterized by a distinct linear fabric, defined by a series of generally weak to moderate (occasionally strong) narrow linear VG anomalies trending NW. It overlies sedimentary rocks of the Nicola Group in the northwest and volcanic rocks of the group, in the southeast. The linear highs probably reflect developments of volcanic and/or volcaniclastic rocks.

**Domain 38:** is a small NW-trending domain outlined by strong RTMF linear anomalies attaining >1000 nT and even >1500 nT. The domain falls entirely within basaltic volcanic rocks of the Nicola Group. The signature is consistent with the strong response of such volcanic rocks in the northwestern part of the survey area.

**Domain 39:** is a small NW-trending domain defined by strong linear RTMF anomalies (attaining >3000 nT), lying along the eastern margin of the Thuya batholith, where Schiarizza et al. (2002) have mapped ultramafic rocks, including serpentinite.

**Domain 40:** a domain correlating generally with basaltic volcanic rocks of the Fennell Assemblage, and with metamorphic rocks of the Eagle Bay Assemblage at its south end. It is relatively negative and featureless, though sporadic developments of weak, narrow, short linear or oval VG anomalies impart a weak linear grain locally.

**Domain 41:** is a narrow domain defined by two NNE-trending belts of narrow linear to oval-shaped VG anomalies falling on volcanic rocks of the Kamloops Group in the north and sedimentary rocks of the Harper Ranch and (?) Nicola groups in the south. Magnetic evidence suggests the entire domain is underlain by the Kamloops Group.

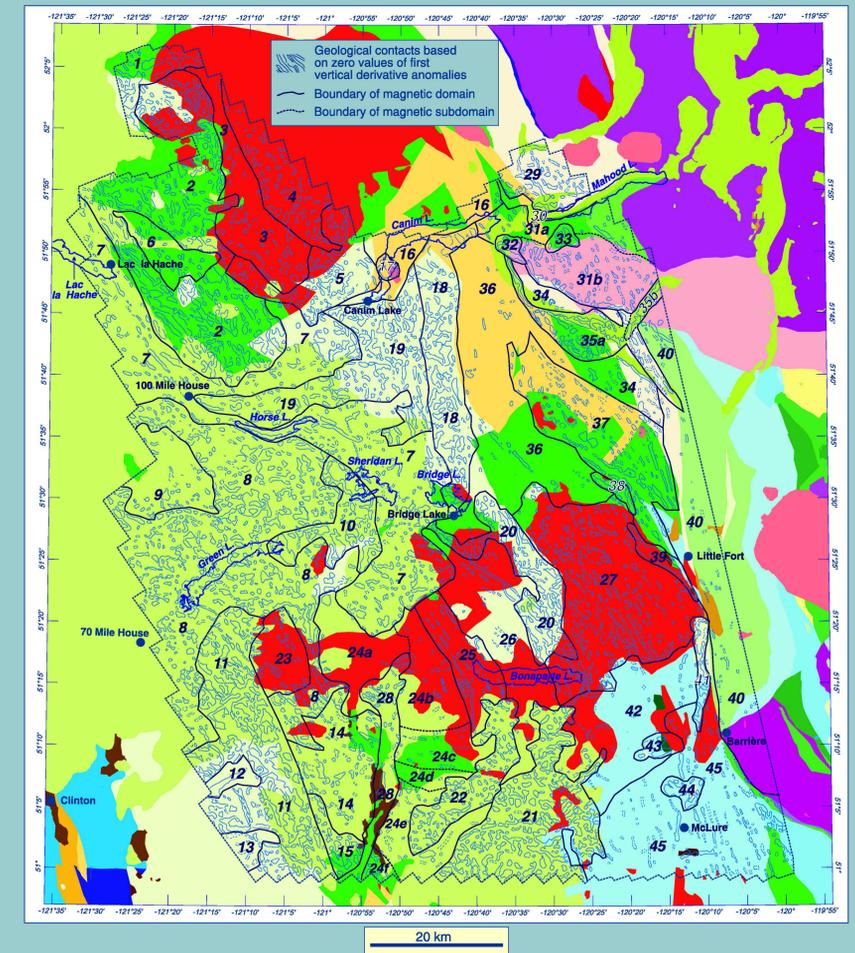
**Domain 42:** is characterized by a relatively weak and featureless VG image, coinciding with its coincidence with mainly sedimentary rocks of the Harper Ranch and (?) Nicola groups. Scattered local developments of weak oval to short linear anomalies punctuate the background field giving it a somewhat grainy appearance.

**Domain 43:** is small and defined by a moderate to strong avoid RTMF anomalies, the largest peaking at >1300 nT. The domain straddles a Late Triassic-Early Jurassic 'granitic' intrusion, and sedimentary and basaltic volcanic rocks of the Harper Ranch and (?) Nicola groups. The volcanic rocks are proposed to be the principal source of the anomalies, and may have a larger distribution than mapped.

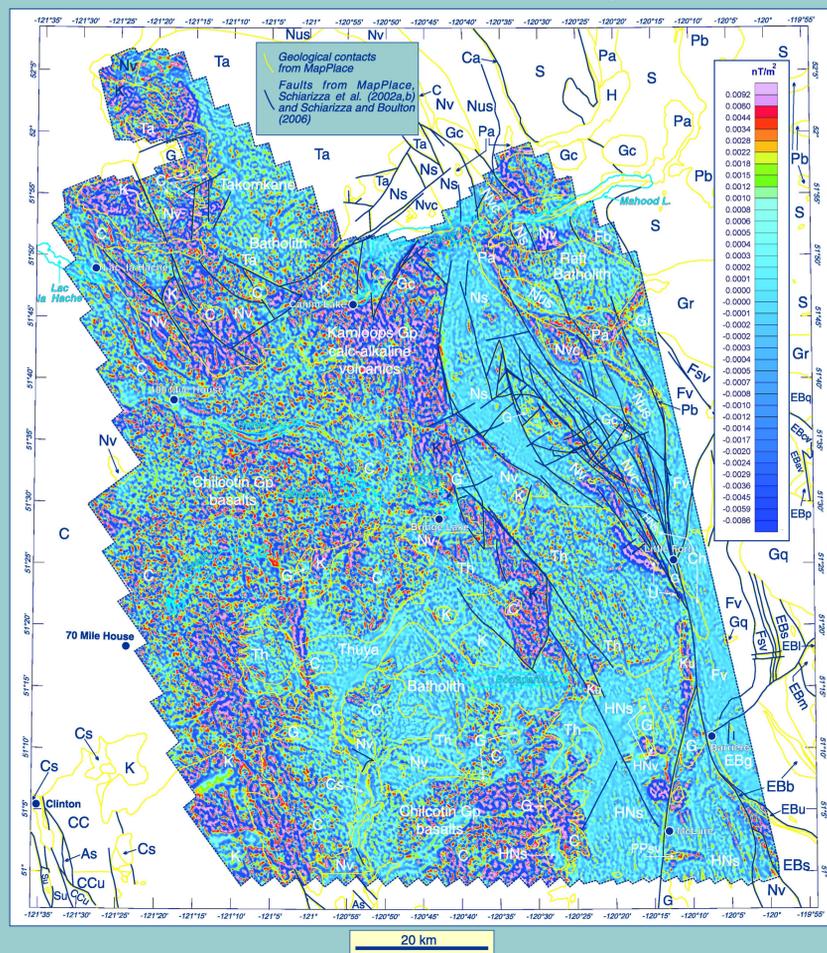
**Domain 44:** is based on a concentrated group of magnetic highs attaining >3000 nT, underlain mainly by sedimentary rocks of the Harper Ranch and (?) Nicola groups. Volcanic rocks of the Kamloops Group mapped locally are dismissed as the principal source of the highs, the large amplitudes suggesting a presence of ultramafic rocks.

**Domain 45:** is a large domain almost entirely on sedimentary rocks of the Harper Ranch and (?) Nicola groups. It is relatively negative, but has a distinct fabric defined by a mainly NNW-trending series of narrow and generally weak linear VG anomalies. These anomalies may signal developments of interbedded volcanic rocks.

(2) Geological Map with Superposed Magnetic Domains and Contacts



(3) Map of the Second Vertical Derivative of the Residual Total Magnetic Field



Map of Second Vertical Derivative of the Residual Total Magnetic Field

The high quality of the magnetic data has permitted derivation of a map of the second vertical derivative of residual total magnetic field (lower left panel 3) virtually free of noise. Such a map further enhances the details of magnetic elements portrayed in the first vertical derivative map, and provides another perspective of the magnetic fabric of the region, which in turn assists geological mapping. Geological contacts are superposed to facilitate comparisons between magnetic patterns and geology. This map highlights the high degree of compatibility between magnetic patterns and mapped geology, underscoring the utility of the magnetic data for geological mapping and studies.

Map of Horizontal Gradient Contacts

A map of contacts between units having different magnetizations is displayed in the lower right panel (4). The contacts are based on the position of maximum horizontal gradients of the residual total magnetic field, and serve as proxies for geological contacts. They define a detailed structural fabric, revealing an internal complexity of the geological units not readily appreciated from geological maps. The map provides another tool for mapping faults, major geological boundaries and boundaries of smaller scale elements within geologic units. Used in unison with other magnetic images it has potential for mapping the paths of favourable exploration horizons.

(4) Map of Horizontal Gradient Contacts and Superposed Geologically Mapped Boundaries

