

Geophysical Data Compilation Project in British Columbia's Golden Triangle Area (NTS 103O, P, 104A, B, G)

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Introduction

Northwestern British Columbia (BC) has a long history of mineral exploration and mining, much of which has been focused in an area known within the exploration industry as the 'Golden Triangle'. The area of the Golden Triangle is only loosely defined, encompassing Stikine terrane from near Dease Lake in the north to south of the District Municipality of Stewart (Figure 1; BC Geological Survey, 2020). The area includes most of the major deposits in the western Stikine terrane, including the operating Red Chris and Brucejack mines, the proposed Galore Creek, KSM, Red Mountain and Kitsault mines, and the past-producing Snip, Eskay Creek, Premier, Dolly Varden, Granduc and Anyox deposits, many of which are experiencing new exploration activity (BC Geological Survey, 2020). Tombe (2020) notes that large porphyry Cu-Au-Mo, high-grade Au-Ag precious metal, Ag-Pb-Zn polymetallic and ultramafic-hosted Ni-Co-Pt-Pd deposits can all be potentially found in the Golden Triangle. In 2019, the Northwest mining region in BC saw over 50% of mineral exploration expenditures in the province, in large part because of industry activity in the Golden Triangle (Clarke et al., 2020).

With high mineral exploration interest in the Golden Triangle, correspondingly there is a huge amount of geoscience knowledge that exists within proprietary industry databases, including high-resolution airborne magnetic data. In contrast, the public airborne magnetic surveys for much of the area are low-resolution, widely spaced surveys that date back to the 1970s, apart from three surveys flown as part of Geoscience BC's QUEST-Northwest project in 2011–2012 (Simpson et al., 2013). Geoscience BC's Golden Triangle Geophysics Data Compilation Project has been designed to update the publicly available airborne magnetic dataset by acquiring privately held airborne magnetic data (and other airborne geophysical datasets if available), and collating them with geophysical data available in assessment reports

to publish a more comprehensive public airborne magnetic dataset for the Golden Triangle.

Updating the publicly available airborne magnetic data will be valuable to the mineral exploration sector, governments, Indigenous groups and academia to guide decisions about mineral exploration. The project can help guide future geoscience research and improve the understanding of the area's major geological features and mineral systems. In a broader sense, compiling quality mineral exploration industry data may help decrease the costs of future airborne surveys by identifying areas that already have excellent coverage.

Public Consultation

During the planning stage, Geoscience BC discussed the project with Indigenous groups in the area (Gitanyow Hereditary Chiefs, Nisga'a Lisims Government, Metlakatla First Nation, Tahltan Central Government). No major concerns were identified, and Indigenous interest in access to public geoscientific data was confirmed. Local economic development professionals (e.g., City of Terrace) have also recognized the importance of the project to attracting mineral exploration investment to the area.

Sources of Airborne Magnetic Data

The Golden Triangle Geophysics Data Compilation Project is focused on updating the publicly available airborne magnetic data in the area highlighted in Figure 2 by combining publicly available regional datasets, proprietary industry-held geophysical data and assessment report data.

Regional Datasets

Public geoscience agencies such as Geoscience BC, the BC Geological Survey and the Geological Survey of Canada collect and host airborne geophysical data and imagery, but these are regional in nature and as such are often flown at wider line spacings and higher elevations than industry-supported surveys. There are also multiple generations of public airborne magnetic data in some areas. Geoscience BC had three 250 m line-spaced airborne magnetic surveys

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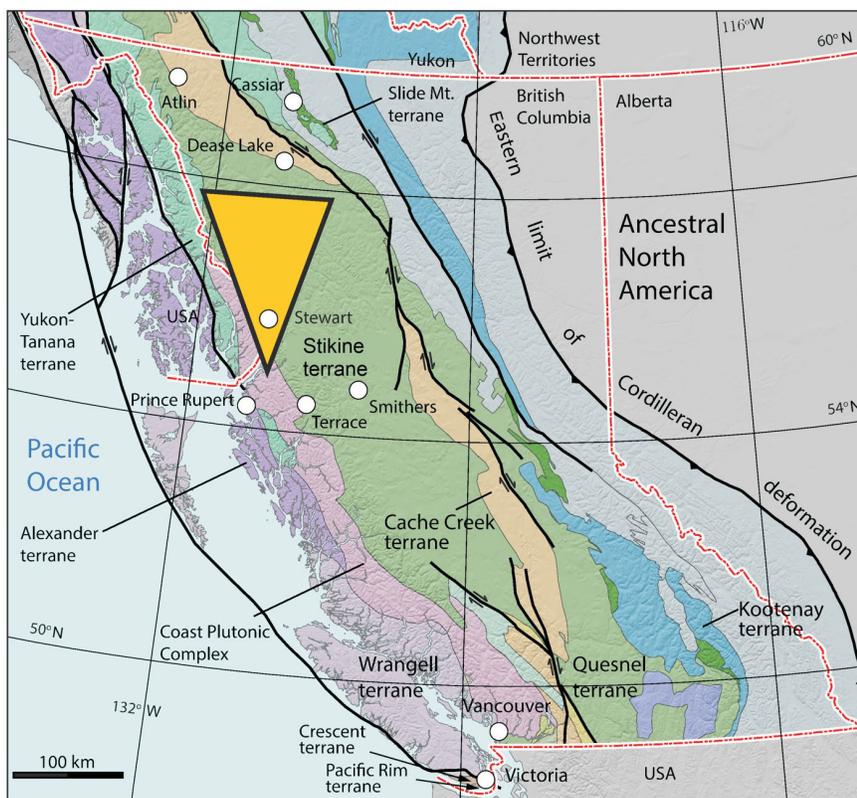


Figure 1. The Golden Triangle (yellow triangle) of northwestern British Columbia. The area of the Golden Triangle is only loosely defined, encompassing western Stikine terrane from south of Dease Lake to south of Stewart. Reproduced from BC Geological Survey Information Circular 2020-06 (modified after BC Geological Survey, 2020) with permission.

flown in the Golden Triangle area in 2011–2012 as part of the QUEST-Northwest project (Simpson et al., 2013; Figure 3a). These surveys are just north of the compilation project area (Figure 2). The rest of the Golden Triangle is covered by 1600 m line-spaced airborne magnetic surveys flown in the mid 1970s for the Geological Survey of Canada (Natural Resources Canada, 2020; Figure 3b).

Purchase of Proprietary Industry Data

Geoscience BC has purchased proprietary airborne geophysical data as part of past initiatives. Data from recent industry surveys were purchased and incorporated into both the QUEST-Northwest and TREK geophysical programs (Simpson et al., 2013; Clifford and Hart, 2014) and industry-held data were contributed as an extension to the Search Project Phase II airborne survey (Sanders Geophysics Ltd., 2017).

In July 2020, Geoscience BC put out a call for industry to sell or donate high-quality privately held geophysical data collected in the compilation project area (Figure 2) with the intention of releasing it to the public. Although Geoscience BC’s primary focus for this project is on airborne magnetic data, other airborne geophysical data in the designated area

is being considered. To be considered for purchase, data must be

- well documented and ideally supported by digital copies of a logistics report, flight logs, data archive descriptions and calibration files;
- unavailable to the public, however, maps and images derived from the data may be in the public domain (e.g., news releases, websites, Assessment Report Indexing System [ARIS] reports); and
- collected by a helicopter or fixed-wing aircraft survey.

ARIS Data

The project is benefiting from a collaborative approach to geoscience in the province by Geoscience BC and the BC Geological Survey. As part of a Memorandum of Understanding signed by the two organizations in July 2020, the project has benefited from the compilation of available ARIS geophysical data by BC Geological Survey geoscientists. BC’s Mineral Tenure Act Regulation requires that claim holders submit an assessment report, in PDF format, detailing their exploration or development work. The BC Geological Survey now encourages the submission of digital data along with current and previous assessment reports (data are then made available to the public for download after a one-year confidentiality period). For airborne geo-

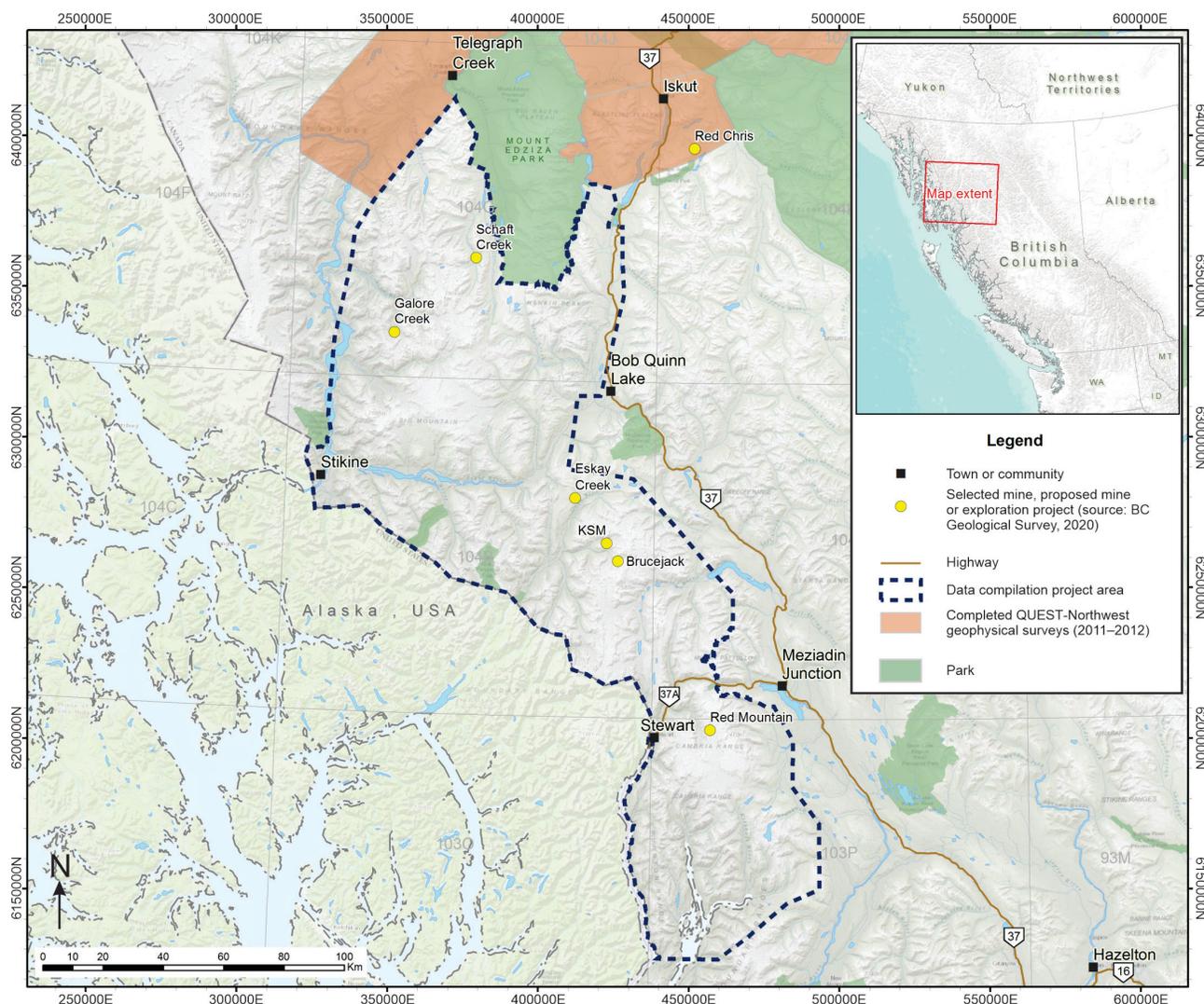


Figure 2. Golden Triangle Geophysics Data Compilation Project area, northwestern British Columbia. Light brown shading north of the project area shows the area of the Geoscience BC QUEST-Northwest project airborne magnetic surveys completed in 2011 and 2012. UTM Zone 09N, NAD 83.

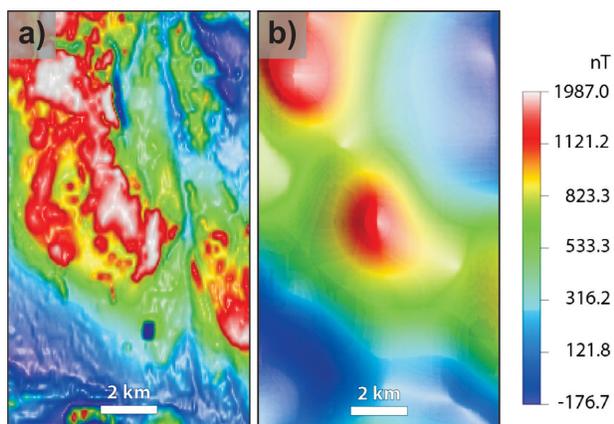


Figure 3. Comparison of regional public aeromagnetic data in the Golden Triangle: **a)** Geoscience BC's QUEST-Northwest project data collected in 2011–2012 at 250 m line spacings, **b)** National Resources Canada data collected in the 1970s at 1600 m line spacings (Natural Resources Canada, 2012). Figure reproduced from Simpson et al. (2013). Abbreviation: nT, nanotesla.

physical data, this includes the raw and processed data files (e.g., .gdb, .xyz, .csv or .grd files; BC Ministry of Energy, Mines and Low Carbon Innovation, 2020).

Project Progress and Future Work

As of mid-November 2020, 11 companies have expressed interest in participating in the program, and data from 17 separate survey blocks are currently being evaluated for purchase based on the age, method of collection and quality/desirability. Data purchases by Geoscience BC are expected to wrap up by the end of 2020. At the same time, BCGS geoscientists have identified nine blocks of ARIS data that are outside of the confidentiality period and contain the raw and processed data files, and therefore can be included as final products for this project. Once the final data are purchased and compiled, Geoscience BC will release the complete compilation of all the data products in early 2021.

Acknowledgments

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References

- BC Geological Survey (2020): The Golden Triangle of northwestern British Columbia; BC Ministry of Energy, Mines and Low Carbon Innovation, BC Geological Survey, Information Circular 2020-06, 8 p., URL <http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2020-06.pdf> [November 2020].
- BC Ministry of Energy, Mines and Low Carbon Innovation (2020): ARIS submission information; BC Ministry of Energy, Mines and Low Carbon Innovation, BC Geological Survey, URL <<https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/british-columbia-geological-survey/assessmentreports/submissionmineral>> [November 2020].
- Clarke, G., Northcote, B., Katay, F. and Tombe, S.P. (2020): Exploration and mining in British Columbia, 2019: a summary; *in* Provincial Overview of Exploration and Mining in British Columbia, 2019, BC Ministry of Energy, Mines and Low Carbon Innovation, BC Geological Survey, Information Circular 2020-01, p. 1–40, URL <http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2020-01-01.pdf> [November 2020].
- Clifford, A. and Hart, C.J.R. (2014): Targeting Resources through Exploration and Knowledge (TREK): Geoscience BC's newest minerals project, Interior Plateau Region, central British Columbia (NTS 093B, C, F, G); *in* Geoscience BC Summary of Activities 2013, Geoscience BC, Report 2014-01, p. 13–18, URL <http://www.geosciencebc.com/i/pdf/SummaryofActivities2013/SoA2013_CliffordHart.pdf> [November 2020].
- Natural Resources Canada (2012): Canadian Aeromagnetic Data Base; Natural Resources Canada, Earth Sciences Sector, URL <http://gdr.nrcan.gc.ca/aeromag/index_e.php> [November 2012; dead link].
- Natural Resources Canada (2020): Geoscience data repository for geophysical data; Natural Resources Canada, URL <<http://gdr.agg.nrcan.gc.ca/gdrdap/dap/search-eng.php>> [July 2020].
- Sander Geophysics Ltd. (2017): Technical report - magnetic gradient & radiometric survey: Search phase II; Geoscience BC, Report 2017-03, 335 p., URL <http://www.geosciencebc.com/i/project_data/GBCReport2017-03/2017-03_FinalTechnicalReport.pdf> [November 2020].
- Simpson, K.A., Kowalczyk, P.L. and Kirkham, G.D. (2013): Update on Geoscience BC's 2012 geophysical programs; *in* Geoscience BC Summary of Activities 2012, Geoscience BC, Report 2013-01, p. 1–4, URL <http://cdn.geosciencebc.com/pdf/SummaryofActivities2012/SoA2012_Simpson.pdf> [November 2020].
- Tombe, S.P. (2020): Exploration and mining in the Northwest Region, British Columbia; *in* Provincial Overview of Exploration and Mining in British Columbia, 2019, BC Ministry of Energy, Mines and Low Carbon Innovation, BC Geological Survey, Information Circular 2020-01, p. 41–58, URL <http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2020-01-02.pdf> [November 2020].