



**BRITISH  
COLUMBIA**

Ministry of Energy and Mines  
Geological Survey Branch

# **GEOLOGICAL FIELDWORK 2004**

**A Summary of Field Activities and  
Current Research**

**Paper 2005-1**

Mines and Minerals Division  
Geological Survey Branch

Parts of this publication may be quoted or reproduced if source and authorship is acknowledged. The following is the recommended format for referencing individual works contained in this publication:

Alldrick, D.J., Nelson, J.L. and Barresi, T. (2005): Geology and Mineral Deposits of the Upper Iskut River Area: Tracking the Eskay Rift through Northern British Columbia; *in Geological Fieldwork 2004, British Columbia Ministry of Energy and Mines*, Paper 2005-1, p 1-30.

Individual manuscripts in this publication are available, free of charge, as **colour digital files** in Adobe Acrobat PDF format from the BC Ministry of Energy and Mines internet website at:

<http://www.em.gov.bc.ca/Mining/Geolsurv/Publications/catalog/catfldwk.htm>

**COVER PHOTO:** *Mitch Mihalynuk, British Columbia Geological Survey, carrying out regional geological mapping in the area of the Nakina and Sloko rivers in the mountains south of Atlin, northern British Columbia*

**British Columbia Cataloguing in Publication Data**

Main entry under title:

Geological Fieldwork: - 1974 -

Annual.

Issuing body varies

Vols. For 1978-1996 issued in series: Paper / British Columbia. Ministry of Energy, Mines and Petroleum Resources; vols for 1997- 1998, Paper / British Columbia. Ministry of Employment and Investment; vols for 1999-, Paper / British Columbia Ministry of Energy and Mines.

Includes Bibliographical references.

ISSN 0381-243X=Geological Fieldwork

1. Geology - British Columbia - Periodicals. 2. Mines and mineral resources - British Columbia - Periodicals. 3. Geology - Fieldwork - Periodicals. 4. Geology, Economic - British Columbia - Periodicals. 5. British Columbia. Geological Survey Branch - Periodicals. I. British Columbia. Geological Division. II. British Columbia. Geological Survey Branch. III. British Columbia. Geological Survey Branch. IV. British Columbia. Dept. of Mines and Petroleum Resources. V. British Columbia. Ministry of Energy, Mines and Petroleum Resources. VI. British Columbia. Ministry of Employment and Investment. VII. British Columbia Ministry of Energy and Mines. VIII. Series: Paper (British Columbia. Ministry of Energy, Mines and Petroleum Resources). IX. Series: Paper (British Columbia. Ministry of Employment and Investment). X. Series: Paper (British Columbia Ministry of Energy and Mines).

QE187.46      622.1'09711      C76-083084-3 (Rev.)



VICTORIA  
BRITISH COLUMBIA  
CANADA

JANUARY 2005

## FOREWORD

The British Columbia Ministry of Energy and Mines presents the results of provincial geoscience surveys in its thirtieth edition of Geological Fieldwork: A Summary of Fieldwork and Current Research. Most articles are contributions from staff of the Geological Survey Branch or are related to field programs being carried out by the Branch. These field surveys have led directly to claim staking and enhanced mineral exploration expenditures, which may ultimately lead to new mines in the province. As in previous years, the volume also publishes studies by university and industry authors.

This past year, the British Columbia Geological Survey regional field surveys and collaborative geoscience studies were delivered largely through partnerships with government, industry and universities. The Geological Survey of Canada was a strong partner in the Iskut and Toodoggone field programs in northern British Columbia through their Targeted Geoscience Initiatives Program. Articles in this volume include reports on continuing programs of regional mapping and geochemical surveys in the area north and east of the Eskay Creek gold mine and in the Toodoggone mining camp north of Kemess mine.

Industry partnerships provided operating funds and access to private sector information for both the porphyry copper-gold program (Galore Creek, Iron Mask and Mt Polley) and the Kalum gold project near Terrace.

Two articles report results of investigations into the province's diamond potential. They provide significant new information on the setting and increased potential for discoveries in the northeast corner of British Columbia.

This volume also includes 16 articles derived from projects funded, at least in part, by the BC and Yukon Chamber of Mines through their Rocks to Riches program. These span a wide spectrum from geochemical and geophysical surveys, geological mapping and to new tools for accessing the provincial databases.

During the past year the Geological Survey Branch published Geological Fieldwork 2003, 17 Open Files, 4 Geoscience Maps, 13 GeoFiles, 7 Information Circulars and 1 Paper. Geoscience publications are now routinely posted to the Ministry of Energy and Mines website. MapPlace, one of the world's premier geoscience internet-map systems, continues to improve with the addition of new tools and data layers. The site is expected to exceed four million hits in 2004.

This Fieldwork volume reflects the hard work and expertise of numerous authors who have earned our thanks for their contributions. The articles have been improved by peer and supervisor review. The quality services of RnD Technical are acknowledged for their help in publication production. Again, for yet another year, Brian Grant earns special commendation for coordinating the organization and publication of the volume.

*D.V. Lefebure  
Director – Chief Geologist  
Geological Survey Branch*



# CONTENTS

ROCKS TO RICHES	
<b>Alldrick, D.J., Nelson, J.L. and Barresi, T.:</b> Geology and Mineral Deposits of the Upper Iskut River Area: Tracking the Eskay Rift through Northern BC . . . . .	1
<b>Barresi, T., Nelson, J.L., Alldrick, D.J. and Dostal, J.:</b> Pillow Basalt Ridge Facies: Detailed Mapping of Eskay Creek–Equivalent Stratigraphy in Northwestern BC . . . . .	31
<b>Barresi, T. and Dostal, J.:</b> Geochemistry and Petrography of Upper Hazelton Volcanics: VHMS-Favourable Stratigraphy in the Iskut River and Telegraph Creek Map Areas, Northwestern BC . . . . .	39
<b>Mortensen, J.K., Wojdak, P., Macdonald, R., Gordee, S.M. and Gabites, J.E.:</b> Regional Studies of VMS Mineralization and Potential within the Early Jurassic Hazelton Group, West-Central BC . . . . .	49
<b>Lett, R.E., Friske, P.W.B. and Jackaman, W.:</b> National Geochemical Reconnaissance Program in Northwestern BC: Bowser Lake Regional Geochemical Survey . . . . .	61
<b>Mihalynuk, M.G. and Friedman, R.M.:</b> Gold and Base Metal Mineralization near Kitsumkalum Lake, North of Terrace, West-Central BC . . . . .	67
<b>Canil, D., Mihalynuk, M.G. and Charnell, C.:</b> Heavy Mineral Sampling and Provenance Studies for Potentially Diamond-Bearing Source Rocks in the Jurassic Laberge Group, Atlin-Nakina Area, Northwestern BC .	83
<b>Diakow, L., Nixon, G., Lane, B. and Rhodes, R.:</b> Toodoggone Geoscience Partnership: Preliminary Bedrock Mapping Results from the Swannell Range: Finlay River–Toodoggone River Area, North-Central BC . . . . .	93
<b>Schiarizza, P. and Tan, S.H.:</b> Geology and Mineral Occurrences of Quesnel Terrane between the Mesilinka River and Wrede Creek, North-Central BC . . . . .	109
<b>MacIntyre, D.G. and Payie, G.:</b> Geological Setting and Economic Potential of Gold Occurrences in the Kliyul Creek–Solo Lake Area, North-Central BC . . . . .	131
<b>Friedman, F., Gabites, J., and Schiarizza, P.:</b> U-Pb and K-Ar Isotopic Dates from the Beece Creek–Tatlayoko Lake Area, Southwestern BC . . . . .	153
<b>Johnston S.T. and Pyle, L.:</b> Aley Carbonatite: A Paleozoic Iron Oxide Copper Gold (IOCG) Deposit in North-Central BC? . . . . .	159
<b>Scheel, E., Nixon, G.T., and Scoates, J.S.:</b> Geology of the Turnagain Alaskan-type Ultramafic Intrusive Suite and Associated Ni-Cu-PGE Mineralization, BC . . . . .	167
<b>Hora, Z.D., Langrova, A. and Pivec, E.:</b> Contribution to the Mineralogy of the Arthur Point Rhodonite Deposit, Southwestern BC . . . . .	177
<b>Lett, R.E. and Ronning, C.:</b> Towards a Rock Geochemical Atlas for BC . . . . .	187
<b>Deyell, C.L. and Tosdal, R.M.:</b> Alkalic Cu-Au Deposits of BC: Sulphur Isotope Zonation as a Guide to Mineral Exploration . . . . .	191
<b>Greene, A.R., Scoates, J.S. and Weis, D.:</b> Wrangellia Terrane on Vancouver Island: Distribution of Flood Basalts with Implications for Potential Ni-Cu-PGE Mineralization in Southwestern BC . . . . .	209
<b>Jackaman, W.:</b> Spatsizi River Stream Sediment and Water Survey, Northwestern BC . . . . .	221
<b>Höy T. and Jackaman, W.:</b> Geology of the Grand Forks Map Sheet, Southeastern BC . . . . .	225
<b>Kilby, W.E.:</b> MapPlace.ca Image Analysis Toolbox, BC: Phase 2 . . . . .	231
<b>Logan, J.M.:</b> Alkaline Magmatism and Porphyry Cu-Au Deposits at Galore Creek, Northwestern BC . . . . .	237
<b>Logan, J.M. and Mihalynuk, M.G.:</b> Regional Geology and Setting of the Cariboo, Bell, Springer and Northeast Porphyry Cu-Au Zones at Mount Polley, South-Central BC . . . . .	249
<b>Logan, J.M. and Mihalynuk, M.G.:</b> Porphyry Cu-Au Deposits of the Iron Mask Batholith, Southeastern BC . . . . .	271
<b>Mahoney, J.B., Hooper, R.L., Gordee, S.M., Haggart, J.W. and Mortensen, J.K.:</b> Initial Evaluation of Bedrock Geology and Economic Mineralization Potential of Southern Whitesail Lake Area, West-Central BC . . . . .	291
<b>Marshall, D., Close, S., Podstawskeyj, N. and Aichmeier, A.:</b> Gold Mineralization and Geology in the Zeballos Area, Nootka Sound, Southwestern BC . . . . .	301
<b>Gordee, S.M., Mortensen, J.K., Mahoney, J.B. and Hooper, R.L.:</b> Volcanostratigraphy, Lithogeochemistry and U-Pb Geochronology of the Upper Hazelton Group, West-Central BC: Implications for Eskay Creek–Type VMS Mineralization in Southwest Stikinia . . . . .	311
<b>Shives, R.B.K.:</b> Helicopterborne Gamma-Ray Spectrometric and Magnetic Surveys, Central BC: Status Report . . . . .	323
<b>Simandl, G.J., Ferbey, T., Levson, V.M., Demchuk, T.E., Smith, I.R. and Kjarsgaard, I.:</b> Kimberlite Indicator Minerals in the Fort Nelson Area, Northeastern BC . . . . .	325
<b>Simandl, G.J. and Davis, W.:</b> Cratonic Basement in Northeastern BC: New U-Pb . . . . .	337
<b>Simmons, A.T., Tosdal, R.M., Baker, D.E.L., Friedman, R.M. and Ullrich T.D.:</b> Late Cretaceous Volcanoplutonic Arcs in Northwestern BC: Implications for Porphyry and Epithermal Deposits . . . . .	347
<b>Smyth, C.P.:</b> Workshops on Multielement and Multisite Regional Geochemical Survey (RGS) Anomalies Meriting Follow-Up Work in BC . . . . .	361

