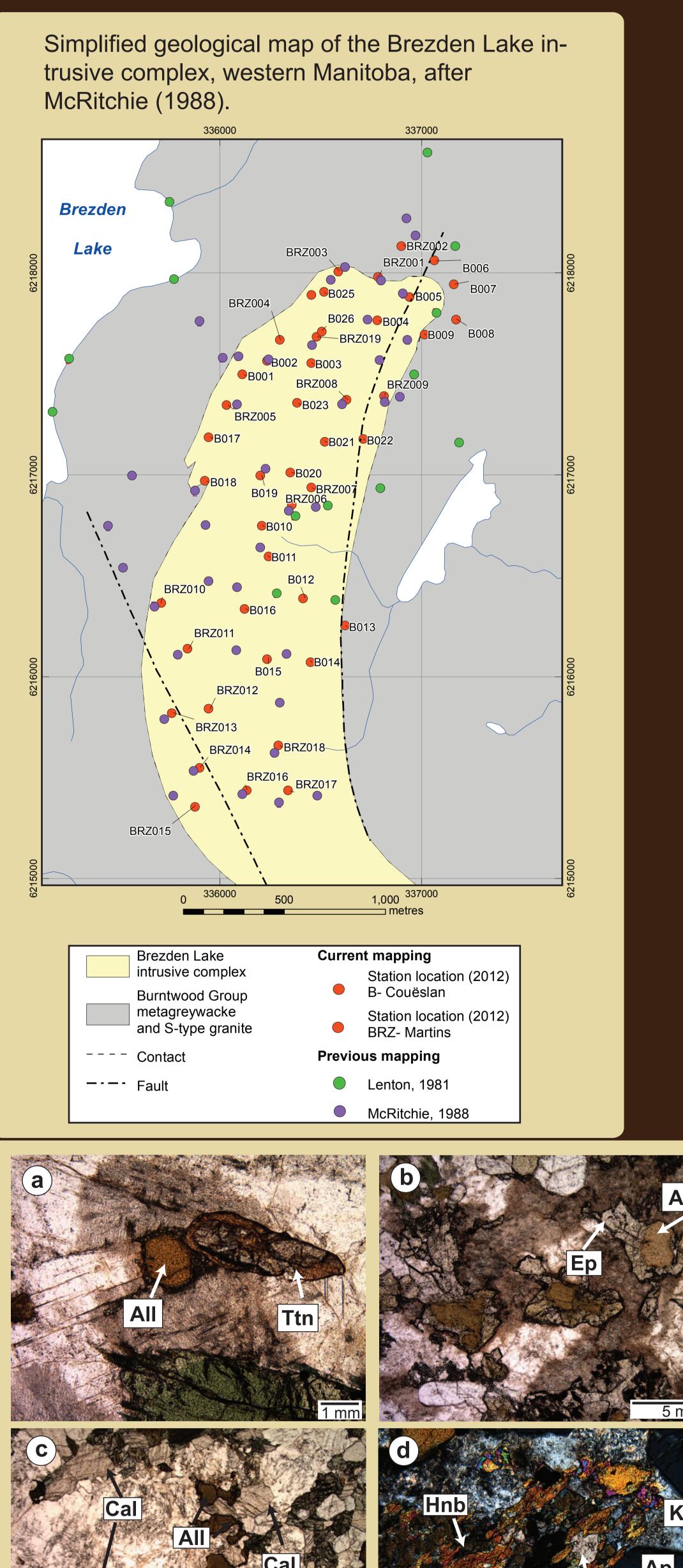
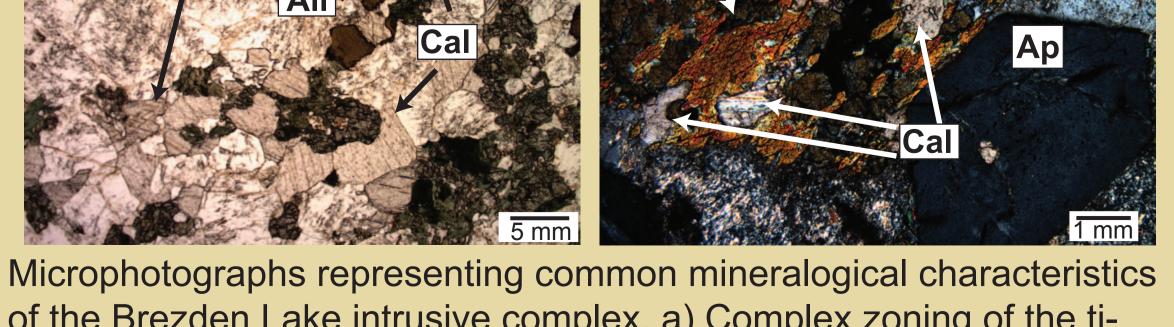


Rare Metals in Manitoba: Brezden Lake; Bernic Lake and Rush Lake T. Martins, C. Couëslan, C. Böhm & P. Kremer

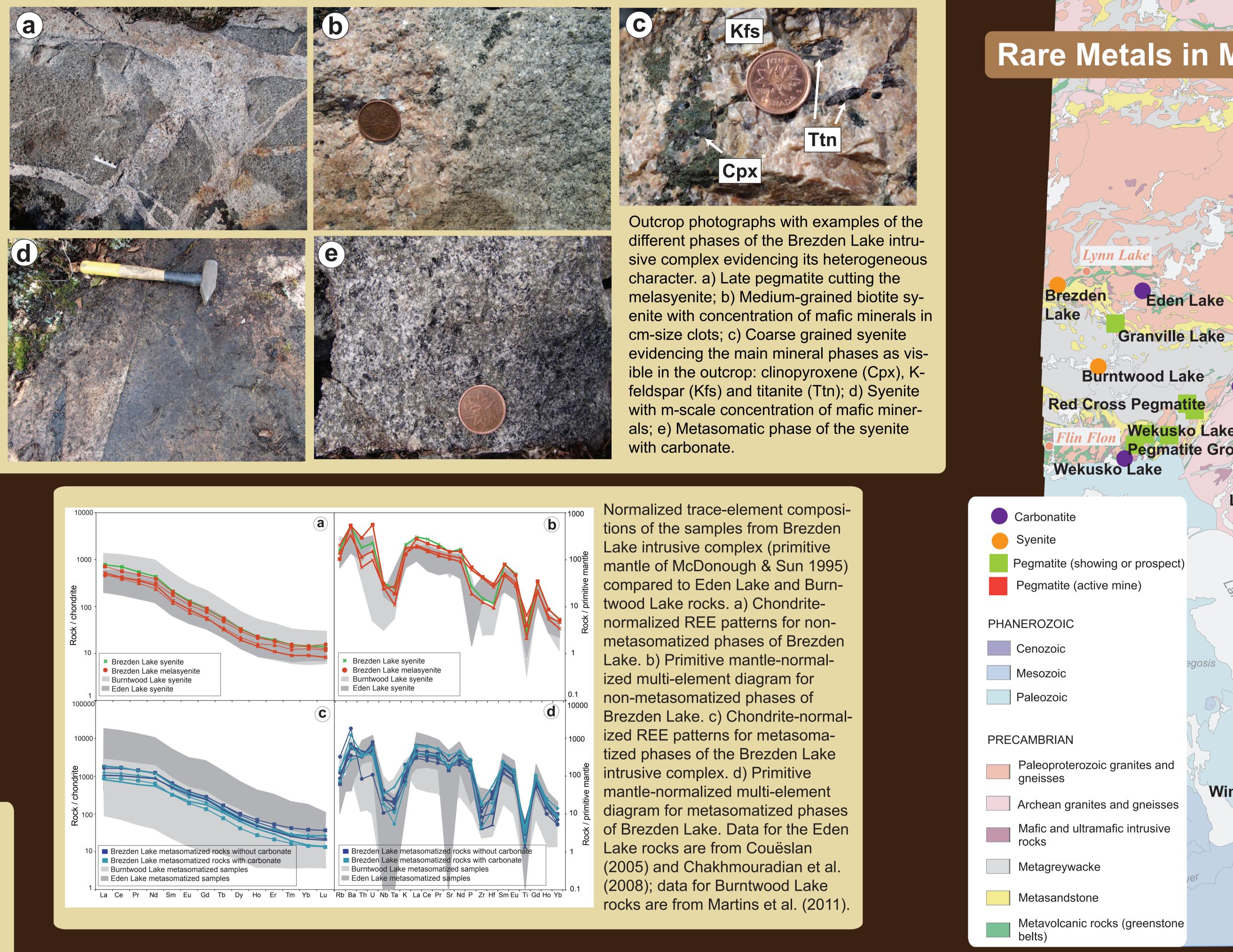
GS-13 Rare Metals scoping study of the Brezden Lake intrusive complex, western Manitoba

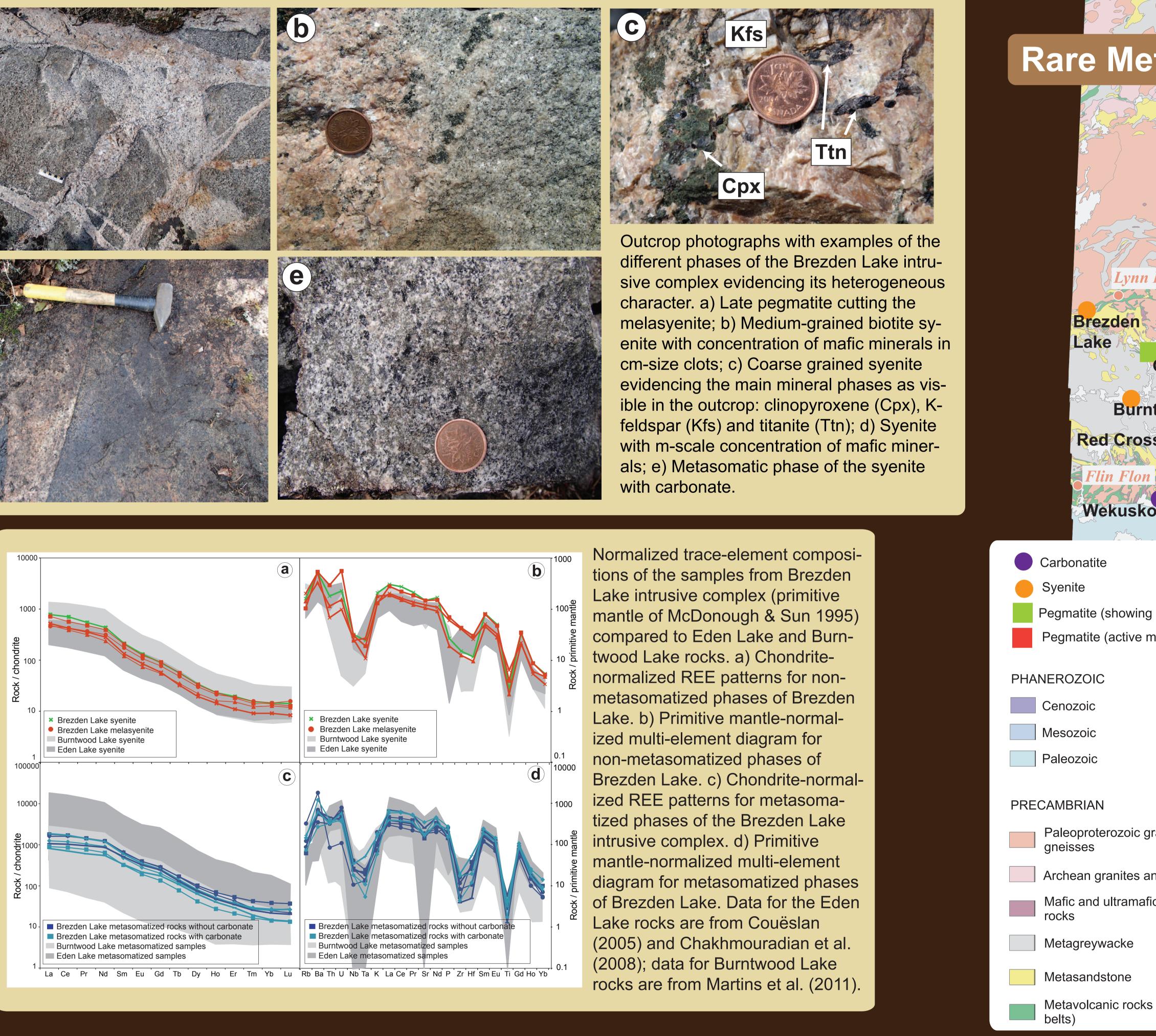
Summary: The Brezden Lake intrusive complex is a heterogeneous multi-phase intrusive body, identified as having the potential to host rare metals and rare-earth-elements. This heterogeneous intrusive complex is located southwest of Lynn Lake where it is hosted by Burntwood Group metasediments and peraluminous granitoids of the Kisseynew Domain. Localized metasomatism led to enrichment in rare-earth-elements. Carbonate was identified associated with the metasomatized phases. Petrographic study revealed granoblastic calcite and calcite replacing other mineral phases. Granoblastic calcite suggests equilibrium and could be derived from a carbonate fluid, whereas interstitial and replacing calcite suggests non-equilibrium and possible remobilization of the carbonate. No carbonatite was found associated with the Brezden Lake intrusive complex but many aspects including mineralogy, textures and geochemistry are similar to the syenite that hosts the carbonatite at Eden Lake.





of the Brezden Lake intrusive complex. a) Complex zoning of the titanite (Ttn); b) Epidote (Ep) overgrowing allanite (All); c) Granoblastic calcite (Cal) in apparent equilibrium with the other mineral phases; d) Clinopyroxene being replaced by hornblende (Hnb) and calcite, surrounded by apatite (Ap) and sericitized K-feldspar (Kfs).





continue to be in high demand by a number of industries from automobile and electronics manufactures to medical applications. Couëslan C.G. 2005 Geochemistry and petrology of the Eden Lake carbonatite and associated silicate rocks; M.Sc. thesis, University of Western Ontario, London, Ontario, 201 p. Over 500 rare metal and REE occurrences are known throughout Canada, as compiled by Simandl et al. (2012). In Manitoba, over 40 rare metals occurrences (including REE) are presently known. This number is steadily growing Gilbert H.P. et al. 2008 Geology of the Bird River Belt, southeastern Manitoba (parts of NTS 52L5, 6); with new discoveries and/or assessment of known occurrences. Geoscientific Map MAP2008-1 Lenton P.G. 1981 Geology of the MacKnight-McCallum Lakes area; Mineral Resources Division; Geo-As it is the case for the Brezden Lake intrusive complex. Geochemical analysis of the Brezden Lake intrusive complex revealed up to 3055 ppm of total REE, which is comparable to the highest total REE concentrations of 3585 for logical Report GR79-1. 39 p the clinopyroxene-feldspar fenite at Eden Lake, Manitoba (Couëslan 2005). Moreover, the mineralogical (clinopyroxene, titanite, and carbonate) and textural similarities (e.g. textural and modal heterogeneities) as Martins T. et al. 2011 The Burntwood Lake alkali-feldspar syenite revisited, west-central Manitoba (part well as trace element geochemistry make it a potential target for REE exploration. Even though outcrop observations at Brezden Lake intrusive complex were very limited, geochemical results particularly the high total of REEs, toof NTS 63N8); in Report of Activities 2011, Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, 79–85. gether with compositional, textual and alteration characteristics similar to Eden Lake syenite as a potentially interesting target for REE exploration. McDonough W.F. & Sun S.-S. 1995 The composition of the Earth; Chem. Geol., 120, 223–253. Granitic pegmatites are important sources of rare metals such as Nb, Ta, Be, Sn, Li, Rb, Cs and Ga. They also host a variety of important industrial minerals, precious and semi-precious gems, and mineral specimens. McRitchie W.D. 1988 Alkaline intrusions of the Churchill Province, Eden Lake (64C/9) and Brezden Lake (64C/4); in Report of Activities 1988, Manitoba Energy and Mines, Geological Services, 5–11. Pegmatites from the Cat Lake-Winnipeg River district are usually enriched in some of the rare metals associated with granitic bedies found in this district, most of them belong Simandl G.J. et al. 2012 Specialty Metals In Canada. British Columbia Geological Survey Open File to the rare-element class, LCT (lithium, cesium, and tantalum) group (as defined by Černý & Ercit 2005) and are enriched in Li, Cs, and Ta making the Bird River greenstone belt an outstanding target for rare metal exploration. A systematic re-examination of the pegmatite groups in the Cat Lake-Winnipeg River pegmatite field is an important step in determining a) the temporal and genetic relationship between the various pegmatite groups, b) their fraction-Acknowledgments ation histories, and c) their associated rare metal endowments. A better understanding of these pegmatite bodies requires development of a model that integrates conditions of emplacement of the pegmatites, regional geology, geo-MGS logistical support by N. Brandson and E. Anderson is truly appreciated. R. Unruh, V. Varga chronology, structural data, and updated geochemistry. Integration of these data will further our understanding of pegmatites in the Cat Lake-Winnipeg River district and help focus exploration for these desired commodities. and G. Benger are thanked for their help in sample and thin section preparation. Many thanks to B. Bertholet and R. Hiebert for their competent and always enthusiastic field assistance.

Economic considerations: Rare metals define a large group of elements that can be found in very distinct types of rocks. Rare metals, including rare earth elements (REEs)

Paint Lake

Liz Lithium

Lake J

Lithium

Eden Lake

Vekusko Lake

Pegmatite Group

GS-14 Rare Metals in SE Manitoba: pegmatites from Bernic Lake and Rush Lake

Summary: Preliminary results of field work are presented for the Bernic Lake and Rush Lake pegmatite groups. These pegmatites are part of the Cat Lake-Winnipeg River district located in the Bird River greenstone belt, southeastern Manitoba. The studied pegmatites comprise part of the Bernic Lake and Rush Lake pegmatite groups, and intrude a variety of volcanic and metasedimentary rocks belonging to the south panel of the Bird River belt. The pegmatites of the two groups seem to differ in terms of contacts, mineralogy and degree of fractionation. Pegmatites from the Bernic Lake pegmatite group have sharp, irregular contacts; some are zoned and have quartz cores; and have Li, Ta, Nb, Sn and P enrichment. The pegmatites of the Rush Lake pegmatite group are less fractionated with generally sharp, straight contacts and graphic textures. Enrichment in rare metals, such as Li, Ta, and Cs suggests that these pegmatites have a great potential for rare metal enrichment in an area that is already famous for its Tanco pegmatite, a prime Ta-Li-Cs deposit and one of the largest pegmatites in the world.

BIRD RIVER SUBPROVINC LATE INTRUSIVE ROCKS Pegmatite Granite, granodiori EDIMENTARY ROCK Flanders Lake Formation Arenite, related paragne Polymictic conglomerat **Booster Lake Formation** Greywacke, siltstone Simplified geology of the Bird River greenstone belt including location of the Bernic Lake and Rush Lake pegmatite groups. After Gilbert et al. (2008) This generalized geological map of

• 200 Manitoba shows the Rare Metal occurences throughout the province. There are over 40 occurences of Rare Metals as compiled by Simandl et al. (2012) with data from Manitoba Geological Survey. Winnipeg River-Cat Lake Pegmatite Group Tanco Mine Winnipeg Dee Bear Lak Lucy no. 1

Godslith

Red Sucker

Lithum

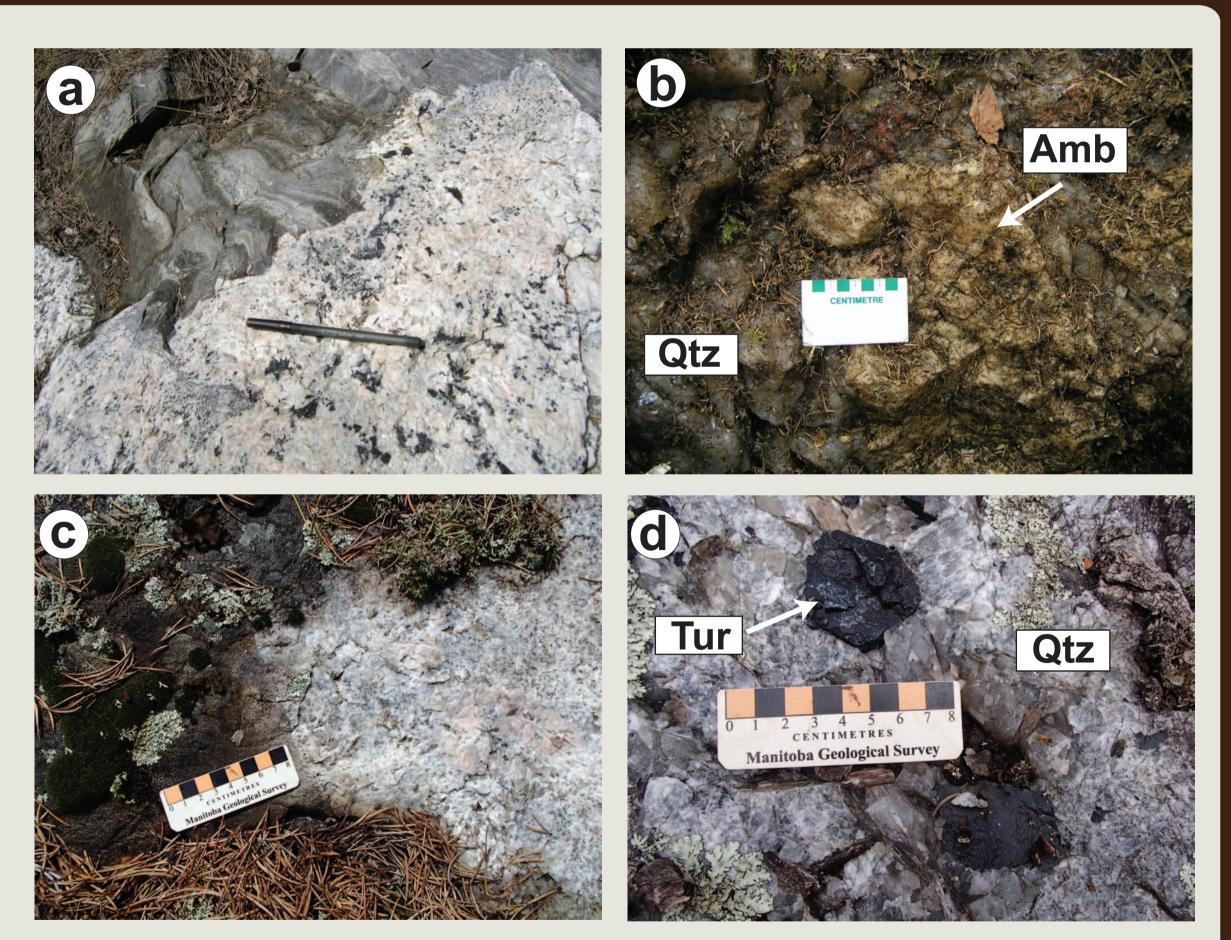
Tin Bar

These occurences can be associated with pegmatites (*e.g.* Li, Ta, Sn) or carbonatites (e.g. Nb, REE). For visualization purposes the map represents groups of occurences instead of individual ones.





Outcrop photos of pegma tites from the Bernic Lake pegmatite group and Rush Lake pegmatite group. a) Bulbous contact of the Oompa Loompa pegmatite intruding into the Southern **MORB-type formation** Bernic Lake pegmatite group. b) Coe pegmatite e hibiting a mass of amblygonite (Amb) surrounded b quartz (Qtz), Bernic Lake pegmatite group. c) Sharp contact of a pegmatite from the Rush Lake group. d) Detail of a basal section of tourmaline (Tur) of one of the pegmatites from the Rush Lake pegmatite group



Černý P. & Ercit T.S. 2005 Classification of granitic pegmatites revisited. Can. Mineral., 43, 2005–2026. Chakhmouradian A.R. et al. 2008 Postorogenic carbonatites at Eden Lake, Trans-Hudson Orogen northern Manitoba, Canada): Geological setting, mineralogy and geochemistry. Lithos, 103, 503–526.