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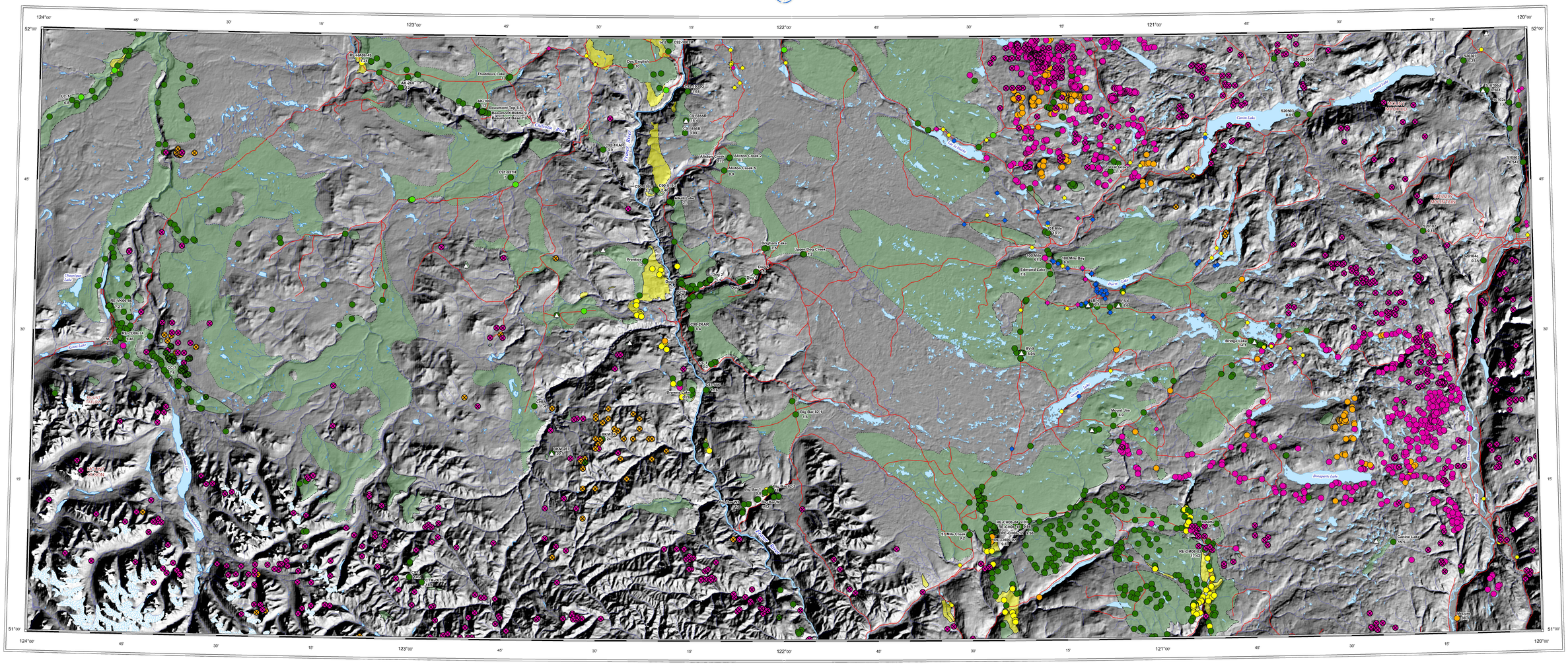

DESCRIPTIVE NOTES

The Oligocene to Late Pleistocene Chilcotin Group (CG) comprises stratified olivine-phyric basaltic flows that underlie much of the Interior Plateau of British Columbia. The distribution of the CG portrayed on published maps is imprecise because of poor outcrop exposure on the plateau, multiple generations of mappers, and lack of consensus concerning definition of the Group. The thickest and most extensive sections are exposed in the valley-margins of major rivers (e.g. the Fraser River). This Open File contains part of the M.Sc. thesis work by Dohaney (2009) to collate and interpret multiparameter spatial datasets leading to a reassessment of the distribution of the CG within the Taseko Lakes (NTS 92O) and Bonaparte Lake (NTS 92P) map areas.

The Chilcotin "plateau lavas" were first mapped and described by Dawson (1879, 1895) in large-scale reconnaissance. Tipper and Richards (1965, 1973) identified several gabbro plugs considered coeval with CG such as Mile Hill, Green Mt, Beglie, and Forestry Hill which were described by their petrographic, geochemical, and isotopic character (Farquharson and Stipp, 1969). Bevier (1982, 1983b) recognized the CG as consisting of 5 - 140 m thick (average of 70 m thick) sequences of thin, flat-lying to gently-dipping, pahoehoe flows. The CG was shown to be chemically uniform, transitional (nepheline to hypersthene normative) basalt which resembles that of oceanic island basalts (OIB) (Bevier, 1982, 1983b; Dostal et al., 1996). To the north, near Odina Lake, the Chesluta suite of mainly basaltic intrusive plugs was correlated with CG but distinguished from it by composition, petrology and form (Resnick, 1996; Resnick et al. 1999; Anderson et al., 2001).

Recent studies have concentrated on the physical volcanology and emplacement models for the CG (Andrews and Russell, 2007; Andrews and Russell, 2008; Mihalynuk, 2007; Farrell et al., 2007; Farrell et al., 2008; Gordee et al., 2007). Andrews and Russell (2007) suggested that the CG is less voluminous and extensive, as well as thinner, than previously thought.

To derive this map, all regional and detailed geological maps displaying the CG in the Bonaparte Lake (NTS 092P) and Taseko Lakes (NTS 092O) map areas were digitized because these maps are a primary source of data for the reassessment of the distribution reassessment of the CG. CG exposures were digitized from 1:50 000 to 1:250 000 scale maps. Where available, digital geological compilation surveys were obtained in order to supplement previous geological mapping. These "point" data sets include: (1) UBC samples; (2) geochronological data; (3) geochemical data; (4) data from Assessment Reports (BCGS, 2008); (5) data from public water well logs (BCME, 2008; Andrews and Russell, 2008); and (6) physical properties data. Outcrop areas (obtained from geological maps and fieldwork) and primary point data are the best indication of the extent of CG rocks. All vector and point data were collected, geo-referenced, and put into geo-referenced database (Microsoft Access™) formats (Dohaney et al., in press)

The compilation process included:

Step 1: Compile and re-interpret existing geological maps;

Step 2: Examine existing CG point data to determine areas where improved data are needed;

Step 3: Use aeromagnetic geophysics to refine and distinguish basement rock types, particularly where obscured by glacial till; and

Step 4: Draw final geological contacts by iteratively integrating point data, aeromagnetic surveys and raster topography.

The new distribution map in the Open File leads to several important conclusions: (1) the CG is less extensive than shown in previous compilations for Taseko Lakes and Bonaparte Lake map areas by as much as 48%; by analogy, this implies that elsewhere the areal extent of CG is also significantly over-estimated; (2) the numerous areas indicated as not overlain by CG in the compilation constitute previously unidentified basement "windows" that are geologically and economically important; (3) CG volcanism spanned the Oligocene to the Pleistocene (approximately 30 my duration) and was centered in the central Fraser River area (south of Williams Lake, B.C.) throughout the Pliocene-Pleistocene; (4) episodic eruption of CG lavas was likely via a multitude of small-volume, short-lived, monogenetic vents, rather than a series of long-lived volcanic centres or fissures, and (5) the CG is thickest where lavas ponded in paleo-valleys, a key indicator for mapping the distribution of Neogene channels in the Fraser Basin drainage.

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GSC OPEN FILE 6344

GEOSCIENCE BC MAP 2010-02-1

DISTRIBUTION OF THE CHILCOTIN GROUP

TASEKO LAKES AND BONAPARTE LAKE MAP AREAS

BRITISH COLUMBIA

Scale 1:250 000/Échelle 1/250 000

5 0 5 10 15 20

kilometres / kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

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Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

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Compilers: J. Dohaney, G.D.M. Andrews, J.K. Russell, and R.G. Anderson

Geology by J. Dohaney

Digital cartography by C.L. Wagner, Geological Survey of Canada

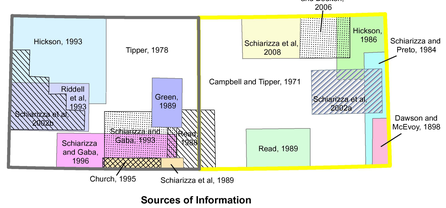
Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

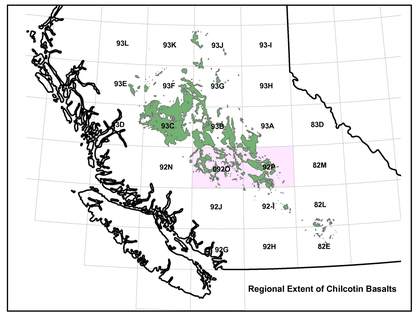
Digital base map from data compiled by Geomatics Canada, modified by GSC

Mean magnetic declination 2010, 17°57'E, decreasing 14.1' annually. Readings vary from 17°23' in the SE corner to 18°32' in the NW corner of the map

Elevation image is Shuttle Radar Topography Mission (SRTM) Finished 3 arc sec' data obtained free of charge from the National Center for Earth Resources Observation and Science (EROS) website. Note: Areas of 'No Data' are displayed as white blocky areas. Viewed with hillshade using light source from 135° (southeast)

Sources of Information





LEGEND

NEOGENE

Chilcotin Group

Chilcotin Group Basalts

Oligocene-Pleistocene: Transitional olivine-phyric basalt flows. Subaerial to submarine facies, including intrusive plugs and intercalated ash tephra. (Localities: The Chasm, Dog Creek, Beaumont Scar, Mt. Beglie, Cardiff Mountain, Vedan Lake)

Chilcotin Group sediments

Oligocene-Early Pleistocene: Tuff, bracciа, diatomite, diatomaceous siltsone, pebbly arenite and conglomerates. (Localities: Deadman Creek, Gang Ranch, Big Bar)

SYMBOLS

Geological contact (defined, approximate, assumed)

Glacier

Outcrops (including sampled locations)

Selected Geochronology Sample with Sample Name and Age (Ma) — CMT-76TD 18.6

Mineral Exploration Assessment Report (ARIS), Inferred lithologies

Public Water Wells, Inferred lithology (Andrews and Russell, 2008)

Volcanic Vents

Lithologies (for above symbols)

Basalt — *Basalt Float* — *Sediment* — *Eocene (undifferentiated)* — *Basement (undifferentiated)* — *Basement (limestone)*

OPEN FILE
DOSSIER PUBLIC
6344
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2010

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