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COMMISSION GÉOLOGIQUE DU CANADA

DESCRIPTIVE NOTES

This note outlines stratigraphic relationships and terminology in Tuaton Lake (104HB) map area. The style and interpretation of northeast vergent folds and thrust faults of the regional Skeena Fold Belt are given by Evenchick (1991). Geology of surrounding areas is shown on a preliminary 1:250 000 scale geological map of Spatsizi River (104H) area (Evenchick and Thorkelson, 1993). Previous mapping was conducted by Geological Survey of Canada (1957), Eisbacher (1974a), and Gabrielse and Tipper (1984).

Upper Triassic to lower Middle Jurassic volcanic and sedimentary rocks **(TRJu, TRJ, TRSs, TRSv, TRJc, JGf, JGm, JS)** are the southeastern part of a belt which extends to northwest Spatsizi River map area. The oldest strata **(Stuhini Group)** are overlain by uppermost Triassic to Lower Jurassic polymictic conglomerate **(TRJc)**.

Overlying the conglomerates with apparent disconformity are the **Griffith Creek volcanics** of the **Hazelton Group**, which consist of subaerially deposited mafic lava flows **(JGm)** and intermediate to felsic volcaniclastic rocks and sills **(JGf)**. A basaltic andesite flow and a dacite sill yielded U-Pb zircon ages of 205.8 +/- 0.9 and 203.1 +/- 0.4 Ma respectively (Thorkelson, 1992). The Griffith Creek volcanics are the oldest of three volcanic successions of the Hazelton Group in Spatsizi River map area (Thorkelson, 1992).

Lower and lower Middle Jurassic fine grained clastic rocks **(Js)** overlie Hazelton Group volcanics in neighbouring map areas, and elsewhere around the Bowser Basin. They are the marine sedimentary equivalents of volcanic rocks of the Hazelton Group (Thomson et al., 1986; Anderson and Thorkelson, 1990; Marsden and Thorkelson, 1992). Although these strata are part of the Hazelton Group in other areas, in Spatsizi River map area they were defined as the Spatsizi Group, and divided into 5 formations (Thomson et al., 1986). Here they are considered the **Spatsizi formation** of the Hazelton Group, and the former constituent formations as members. In Tuaton Lake map only the **Quock member (JSQ)** is mapped separately. The distinctive well bedded siliceous siltstone is known informally as the "pyjama beds" throughout the Bowser Basin. The Spatsizi formation is conformably overlain by the Bowser Lake Group elsewhere in Spatsizi River map area, but at the head of Griffith Creek it is absent, and the Bowser Lake Group overlies the Stuhini Group with a 70° angular unconformity. This discordance has been attributed to contractional deformation after eruption of the Griffith Creek volcanics and prior to deposition of younger Hazelton Group strata (Thorkelson, 1992). Conglomerate and Griffith Creek volcanics, which probably overlay the Stuhini Group at this location, were apparently removed by erosion prior to Bowser Lake deposition. Hazelton Group strata younger than the Griffith Creek was either not deposited, or eroded.

Bowser Lake Group (JB) is composed of marine and nonmarine clastic rocks of Middle Jurassic to mid-Cretaceous age (Tipper and Richards, 1976; Gabrielse and Tipper, 1984; Cookenboo and Bustin, 1989). Complex structure, the lack of marker beds, and sparse fossil control have hindered definition of regionally mappable formations. As a result, 5 of the 9 units in Spatsizi River map area are lithofacies assemblages which are probably diachronous, interfinger laterally, repeat vertically, and are gradational over 10's to 100's of metres (eg. Eisbacher, 1974b; Evenchick, 1992; Evenchick et al., 1993). In Tuaton Lake map, only Middle and Upper Jurassic strata are known, and only 1 formation and 3 lithofacies assemblages are present. Stratigraphic position of the **Ashman Formation (JBA)** is known because it consistently overlies the Hazelton Group throughout northern Spatsizi River map area. It is dominated by black siltstone and very fine grained sandstone, with marine fossils. It includes common very thin, orange weathering calcareous siltstone and claystone beds, and grey weathering lenses and discontinuous sheets of chert pebble conglomerate. These strata are interpreted as deposits of submarine channel, slope, and prodelta outer shelf environments (eg. Ricketts and Evenchick, 1991; Green, 1992). Only near Griffith Creek is Jba typical of the unit in northern Spatsizi River map area. Elsewhere in Tuaton Lake conglomerate is rare or absent. Lithofacies assemblage **JBs** is dominantly green or brown weathering medium grained sandstone, and includes siltstone, rare conglomerate, and marine fossils. It is interpreted to have been deposited in shallow marine environments. Lithofacies assemblage **JBd** is characterized by cycles of grey (and minor rusty) weathering pebble conglomerate sheets, medium grained sandstone and siltstone, carbonaceous siltstone and mudstone, and coal. Abundant plant fossils, and local marine fossils are present throughout most sections. It is interpreted to encompass the range of deltaic environments from delta front to delta plain. Lithofacies assemblage **JBdr** is similar to **JBd**, but conglomerate is rusty weathering and more abundant, and although coal is present elsewhere in Spatsizi River, it absent in Tuaton Lake map.

Southwest of Sunday Pass, each of the major stratigraphic units is directly overlain unconformably by the Cretaceous **Sustut Group**. Stratigraphic omission below the unconformity is a result of pre-mid-Cretaceous deformation and erosion associated with early history of the Skeena Fold Belt. The group consists of 2000m of fluvial sandstone, siltstone and conglomerate (Eisbacher ,1974a). The **Tango Creek Formation** is distinguished from the Bowser Lake Group by abundant detrital micas, and common quartzite clasts. The **Brothers Peak Formation** overlies the Tango Creek conformably, and has sheets of conglomerate and tuff in its lower half.

REFERENCES

Anderson, R.G. and Thorkelson, D.J.
1990: Mesozoic stratigraphy and setting for some mineral deposits in Iskut River map area, northwestern British Columbia; in Current Research, Part E; Geological Survey of Canada, Paper 90-1E, p. 131-139.

Cookenboo, H., and Bustin, R.M.
1989: Jura-Cretaceous (Oxfordian to Cenomanian) stratigraphy of the north-central Bowser Basin, northern British Columbia; Canadian Journal of Earth Sciences, v. 26, p. 1001-1012.

Eisbacher, G.H.
1974a: Sedimentary history and tectonic evolution of the Sustut and Sifton basins, north-central British Columbia; Geological Survey of Canada, Paper 73-31, 57 p.

Eisbacher, G.H.
1974b: Deltaic sedimentation in the northeastern Bowser Basin, British Columbia; Geological Survey of Canada, Paper 73-33, 13 p.

Evenchick, C.A.
1991: Geometry, evolution, and tectonic framework of the Skeena Fold Belt, north-central British Columbia; Tectonics, v. 10, p. 527-546.

Evenchick, C.A.
1992: Bowser Basin facies and map units in southwest Toodoggone map area, British Columbia; in Current Research, Part A; Geological Survey of Canada, Paper 92-1A, p. 77-84.

Evenchick, C.A., Mustard, P.S., Porter, J.S., and Greig, C.J.
1993: Regional Jurassic and Cretaceous facies assemblages, and structural geology in Bowser Lake map area (104A), B.C.; Geological Survey of Canada, Open File 2582.

Evenchick, C.A. and Thorkelson, D.J.
1993: Geology of Spatsizi River, British Columbia (104H); Geological Survey of Canada Open File 2719, scale 1:250 000.

Geological Survey of Canada,
1957: Stikine River Area, Cassiar District, British Columbia; Geological Survey of Canada, Map 9-1957.

Gabrielse, H. and Tipper, H.W.
1984: Bedrock geology of Spatsizi map area (104H); Geological Survey of Canada, Open File 1005.

Green, G.M.
1992: Detailed sedimentology of the Bowser Lake Group, northern Bowser Basin, north-central British Columbia; Carleton University, unpublished M.Sc. thesis, 197p.

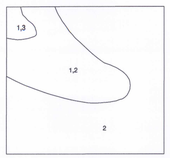
Marsden, H. and Thorkelson, D.J.
1992: Geology of the Hazelton volcanic belt in British Columbia: implications for the Early to Middle Jurassic evolution of Stikinia; Tectonics, v.11, p. 1266-1287.

Ricketts, B.D. and Evenchick, C.A.
1991: Analysis of the Middle to Upper Jurassic Bowser Basin, northern British Columbia; in Current Research, Part A; Geological Survey of Canada, Paper 91-1A, p. 65-73.

Tipper, H.W. and Richards, T.A.
1976: Jurassic stratigraphy and history of north-central British Columbia; Geological Survey of Canada, Bulletin 270, 73 p.

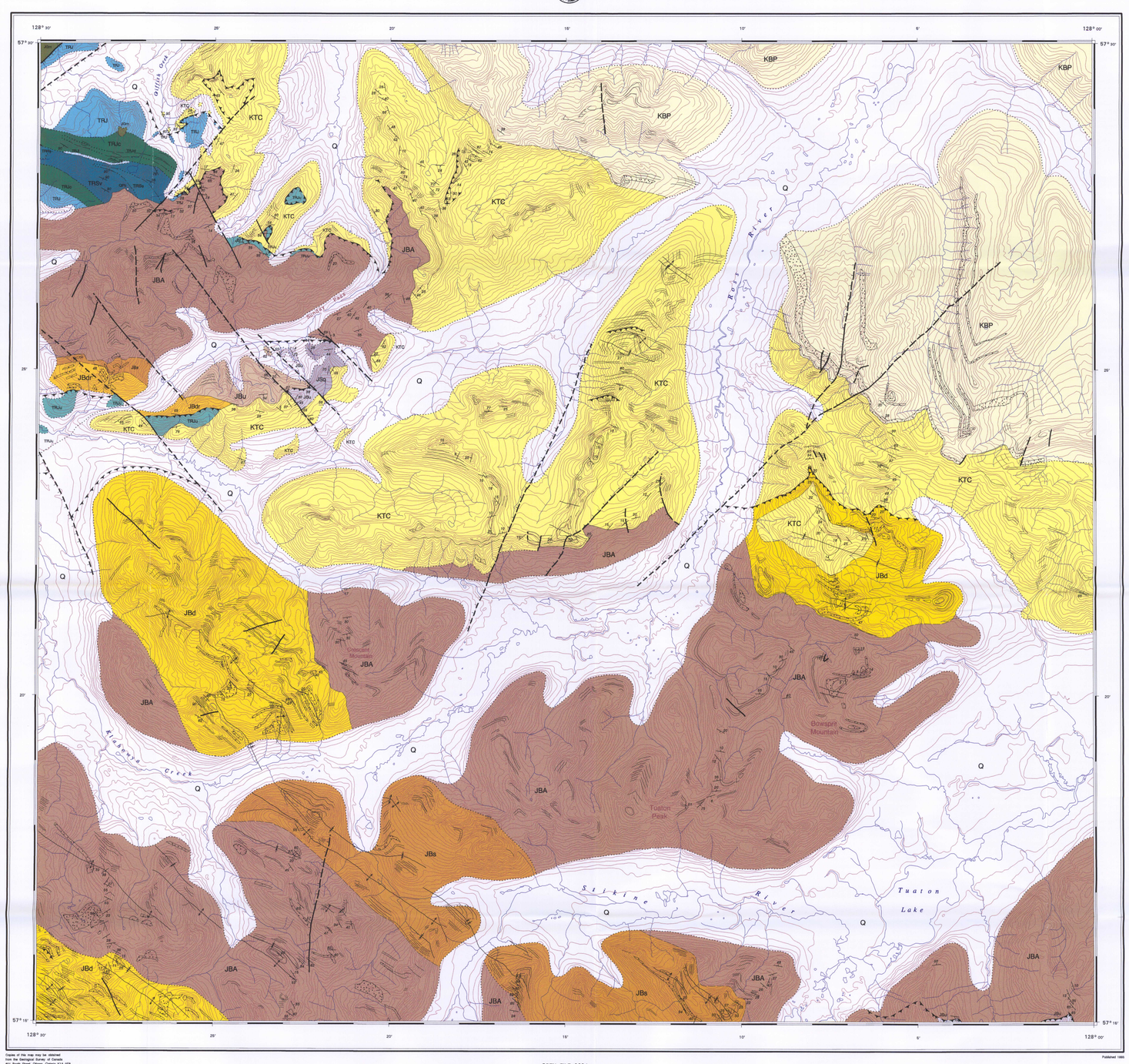
Thomson, R.C., Smith, P.L., and Tipper, H.W.
1986: Lower to Middle Jurassic (Pliensbachian to Bajocian) stratigraphy of the northern Spatsizi area, north-central British Columbia; Canadian Journal of Earth Sciences, v. 23, p. 1963-1973.

Thorkelson, D.J.
1992: Volcanic and tectonic evolution of the Hazelton Group in Spatsizi River (104H) map area, north-central British Columbia; Carleton University, unpublished PhD thesis, 281.



SOURCES OF INFORMATION

Sources of information are geological mapping by: 1. H.W. Tipper and H. Gabrielse (1979, 1981, 1983); 2. C.A. Evenchick (1985-1988), and 3. D.J. Thorkelson (1986, 1987)



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INDEX MAP

Geological compilation by C.A. Evenchick and D.J. Thorkelson

Critical review by L.C. Struik

Digital cartography by S. Churchill and M. Sigouin

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

OPEN FILE 2694

GEOLOGY

TUATON LAKE

BRITISH COLUMBIA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilometres

Universal Transverse Mercator Projection
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Projection transverse universelle de Mercator
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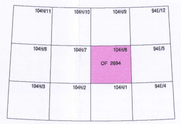
Mean magnetic declination 1993, 26°25' E, decreasing 10.8' annually. Readings vary from 26°18' E in the SE corner to 26°51' E in the NW corner of the map

Digital base map from Surveys, Mapping and Remote Sensing published at the same scale. Generalized and modified by the Geological Survey of Canada

Copies of the topographical edition of this map may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, Ontario, K1A 0E9



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

LEGEND

QUATERNARY
PLEISTOCENE AND RECENT
- Q — *Glacial till, alluvium*

QUATERNARY OR TERTIARY
- QPb — *Basaltic intrusion (nephelinite); 1.30 Ma (K-Ar; Thorkelson, 1992)*

CRETACIOUS
SUSTUT GROUP (KTC - KBP)
CAMPANIAN AND MAASTRICTIAN
- KBP — *BROTHERS PEAK FORMATION: sandstone, siltstone, conglomerate and tuff*

APTIAN OR ALBIAN TO SANTONIAN
- KTC — *TANGO CREEK FORMATION: sandstone, siltstone, mudstone and minor conglomerate*

JURASSIC
MIDDLE TO UPPER JURASSIC
BOWSER LAKE GROUP (JBdr, JBd, JBs, JBA, JBu)
- JBdr — *Rusty weathering chert pebble conglomerate, with lesser sandstone, siltstone (deltaic facies)*
- JBd — *Conglomerate, sandstone, siltstone, minor coal, local marine fossils abundant plant fossils (deltaic facies)*
- JBs — *Sandstone sheets and siltstone, minor conglomerate; marine fossils (shelf facies)*
- JBA — *ASHMAN FORMATION: siltstone, chert pebble conglomerate, sandstone; orange weathering claystone beds in siltstone; (slope and submarine canyon facies)*
- JBu — *Undivided*

LOWER AND MIDDLE JURASSIC
HAZELTON GROUP (JSQ, JSu, JGm, JGf)
PLIENSBACHIAN TO BAJOCIAN
SPATSIZI FORMATION
- JSQ — *QUOCK MEMBER: siliceous, well bedded, tuffaceous(?) siltstone, siltstone, limy siltstone; black, green, rusty, and pink weathering*
- JSu — *Undivided siltstone, siliceous siltstone, sandstone, limestone, conglomerate*

LOWER JURASSIC
HETTANGIAN TO SINEMURIAN
GRIFFITH CREEK VOLCANICS (JGm, JGf)
- JGm — *Mafic lava flows mainly with phenocrysts of plagioclase and augite or hornblende; minor welded lpyroblastic and felsic sills, some hosting grains of feldspar, biotite, quartz or hornblende*

UPPER TRIASSIC TO LOWER JURASSIC
CARNIAN(?) AND NORIAN(?) TO HETTANGIAN AND/OR LOWER SINEMURIAN
- TRJc — *Conglomerate, sandstone, shale, mafic to intermediate volcanic breccia, and ollistostrome. Conglomerate clasts are mainly hornblende and plagioclase porphyry andesite, but include augite phyric mafic lava, and other volcanic rocks, Norian and Permian limestone, undated varicolored chert and felsic to intermediate granitoid. TRJul predominantly Permian and Triassic carbonate clasts and undated chert clasts. Older than Griffith Creek volcanics*
- TRJ — *Undivided (TRS, TRJu, JGm, JGf)*
- TRJl — *Light grey oolcrite*
- TRJu — *Undivided (TRS, TRJu, JGm, JGf) may include Cold Fish volcanics (see Evenchick and Thorkelson, 1993)*

TRIASSIC
UPPER TRIASSIC
CARNIAN(?) TO NORIAN
STUHINI GROUP (TRSs, TRSv)
- TRSv — *Mafic lava flows, mainly aphyric to augite phyric; minor conglomerate, sandstone, mudstone, limestone and olistostrome*
- TRSs — *Mudstone, shale, sandstone and olistostrome; minor conglomerate and mafic lava*

SYMBOLS

- *Geological contact (defined, approximate, and assumed, or inferred under Q)*
- *Trace of individual beds from ground observation and airphoto interpretation*
- *Thrust fault (defined, approximate, and assumed, or inferred under Q) ornament on hanging wall side*
- *Normal fault (defined, approximate, and assumed, or inferred under Q) ornament on downthrown side)*
- *Fault, unknown displacement (defined, approximate, and assumed, or inferred under Q)*
- *Anticline, trace of axial surface (upright or inclined, overturned)*
- *Syncline, trace of axial surface (upright or inclined, overturned)*
- *Bedding (inclined, vertical, overturned)* 35/ 85/ 85/
- *Cleavage (inclined)* 60/
- *Conglomerate*

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