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PALEOZOIC STIKINE ASSEMBLAGE IN THE ISKUT RIVER AND CHUTINE RIVER REGIONS, NORTHWESTERN BRITISH COLUMBIA (104B/11, 12; 104F/9, 16)

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INTRODUCTION

Paleozoic rocks included in the Stikine assemblage (Monger, 1977) are well exposed east of the Coast Belt between the Taku and Iskut rivers (Figure 1-17-1). Recent studies have provided insight into the age and stratigraphy of these Lower to Middle Devonian, Carboniferous and Permian strata in the Forrest Kerr – Newmont Lake and Scud River regions (*e.g.*, Anderson, 1989; Brown *et al.*, 1991). These studies provide a framework for interpretation and correlation of poorly known, Permian and older rocks described by Kerr (1948), Geological Survey of Canada (1957) and Souther (1959, 1972) in the Chutine River area and south of the Iskut River (Figure 1-17-1).

The nature of the contact between Paleozoic rocks of the Stikine assemblage and metamorphic rocks in the Coast Belt to the west is uncertain. Recent studies in southeastern Alaska suggest that metamorphic rocks west of and within the Coast Belt are correlative with the Yukon-Tanana and Nisling terranes (*e.g.*, Gehrels *et al.*, 1990, in press; Gareau, 1991; Rubin and Saleeby, 1991; Samson *et al.*, 1991; McClelland *et al.*, in press; Figure 1-17-1). Although the juvenile Sm-Nd isotopic signature of the Stikine Terrane is distinguished from the evolved signature characteristic of the Yukon-Tanana Terrane (Samson *et al.*, 1991), McClelland and Mattinson (1991) suggested that the Stikine assemblage may be partly correlative with mid-Paleozoic rocks in the Yukon-Tanana Terrane.

Fieldwork during 1991 focused on pre-Permian rocks of the Stikine Terrane to establish and compare the age, character and geologic relationships of the Stikinian basement with the Yukon-Tanana Terrane in southeastern Alaska. Permian and older rocks of the Stikine assemblage were examined in the Chutine River and Forrest Kerr regions and south of the Iskut River to provide a stratigraphic and structural framework for geochronologic and isotopic studies. The following article summarizes field observations from these areas. Results of conodont, macrofossil, geochronologic and isotopic studies in progress will be reported elsewhere. The preliminary descriptions following summarize the lithologic sections observed at these localities but will be revised as the results of structural analysis and fossil and geochronologic results demand.

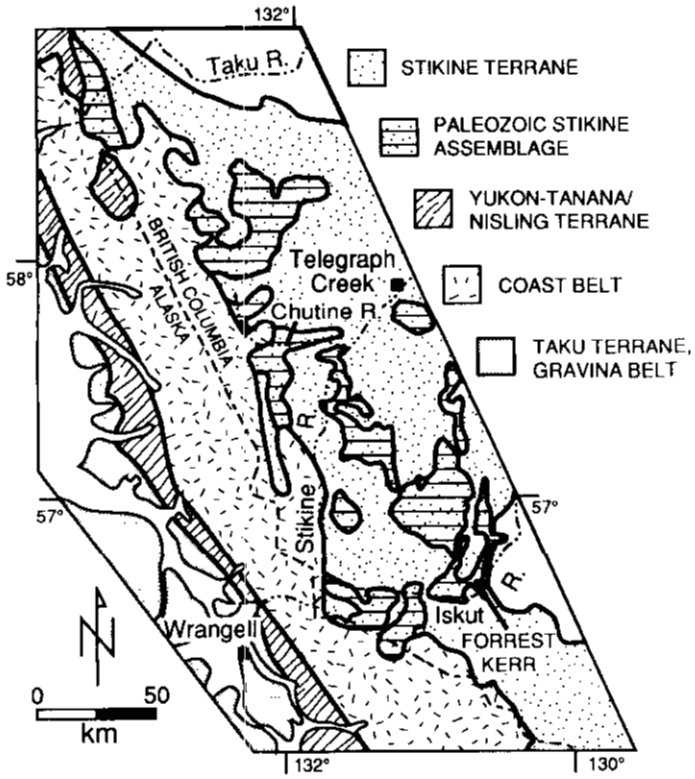

Figure 1-17-1. Simplified tectonstratigraphic map showing the location of the study area and distribution of the Paleozoic Stikine assemblage (modified after Wheeler and McFeely, 1987 and Brown *et al.*, 1991).

ISKUT RIVER – CRAIG RIVER REGION (104B/11, 12)

Kerr (1948) and the Geological Survey of Canada (1957) outlined the regional distribution of metamorphic rocks that underlie limestone of known or suspected Permian age in the Stikine and Iskut region. Schistose to gneissic argillite, metavolcanic rocks, quartzite and limestone were reported and examined in this study south of the Iskut River at localities shown on Figure 1-17-2.

Brunt Creek

Brunt Mountain (Figure 1-17-2) is underlain by a massive section of clinopyroxene-porphyritic tuff, flows, volcaniclastic rocks and argillite of probable Late Triassic age (Kerr, 1948; Geological Survey of Canada, 1957). These volcanic rocks overlie a section of interlayered black argillite, siliceous tuff, fine-grained volcaniclastic rocks and discontinuous layers of light grey weathering, white marble. The marble layers may either be Permian in age, based on along-strike projection of limestone of probable Permian age exposed at the mouth of Brunt Creek and along the Craig River; or Triassic, based on comparison of this sequence with similar rocks in the Telegraph Creek area

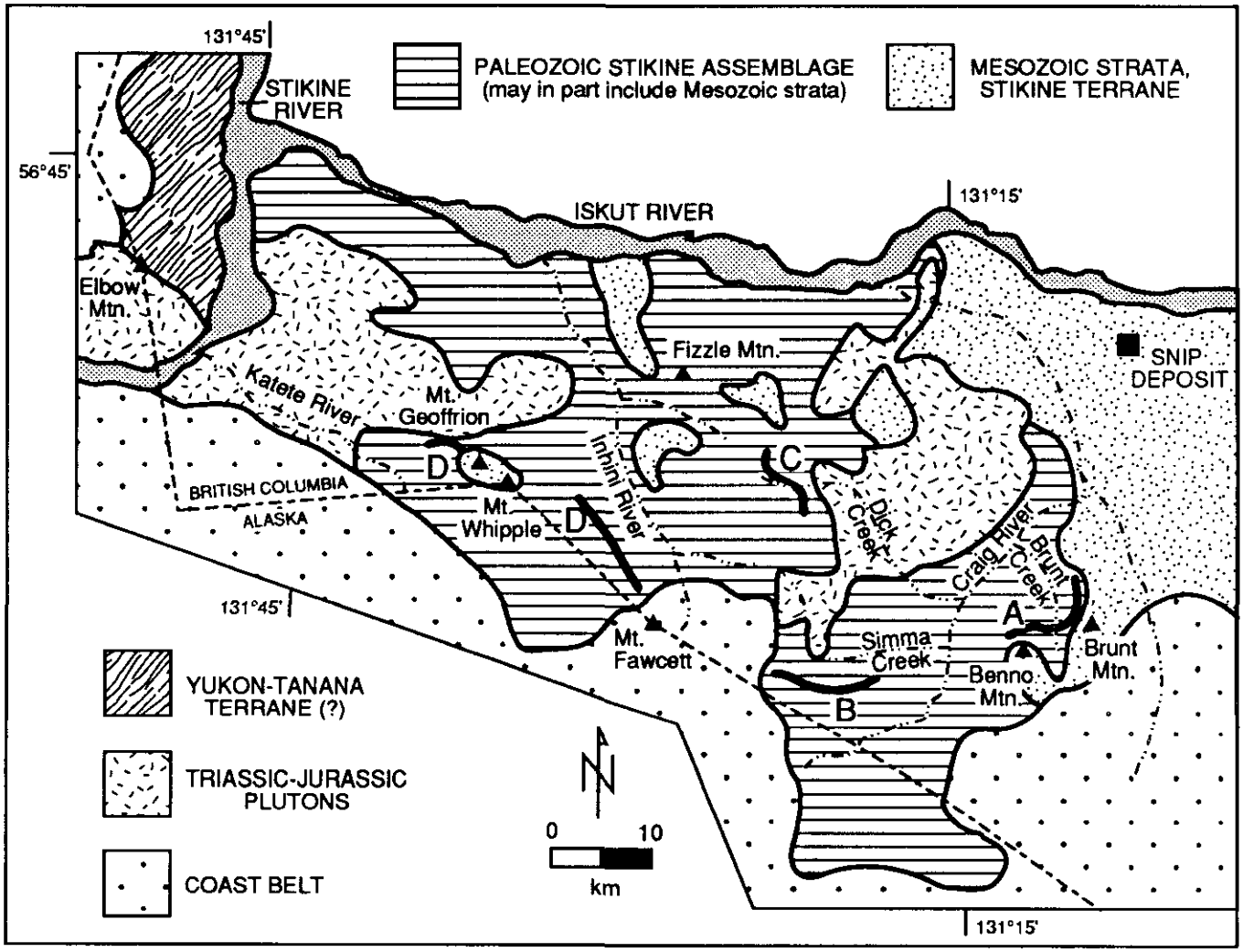

Figure 1-17-2. Location map of Iskut-Craig rivers study area showing the distribution of the Stikine assemblage (modified after Kerr, 1948 and Wheeler and McFeely, 1987) and general location of sections examined during this project.

(Souther, 1972; D.A. Brown, personal communication, 1991). In Brunt Creek, the marble-bearing section is underlain by phyllitic argillite and fine-grained volcaniclastic rocks with subordinate brown-weathering marble and mafic pillowed flows, fragmental rocks and tuff of uncertain but possible Carboniferous age. In Brunt Creek and north of Brunt Mountain, hornblende clinopyroxene gabbro and diorite that are inferred to be Late Triassic in age (Alldrick *et al.*, 1990) and appear compositionally similar to the uppermost volcanic sequence of probable Late Triassic age, intrude all of the above units.

Craig River – Simma Creek

The ridge between the Craig River and Simma Creek (Figure 1-17-2) is underlain by a thick sequence of garnet-biotite-white mica-feldspar-quartz schist derived from fine-grained quartzose, turbiditic strata and quartzite. Eastern exposures of the clastic sequence are intruded by foliated hornblende-biotite quartz diorite of unknown age. To the west, the quartzose turbidites grade upwards into a thick sequence of light green tuffaceous clastic rocks dominated by centimetre-scale beds of fine-grained sandstone, siltstone and mudstone. These rocks are in turn overlain by black argillite interlayered with dark brown marble and biotite-amphibole schist derived from mafic tuffs and flows. The argillite and volcanic section is capped by light grey weathering, white marble that is apparently laterally continuous with limestone of probable Permian age exposed along the Inhini River (Figure 1-17-2).

Quartz-rich clastic rocks at the base of this section are similar to continent-derived sediments of the Yukon-Tanana Terrane in southeastern Alaska (*e.g.*, Gehrels *et al.*, 1990). This correlation and the apparent depositional relationship between the quartzose clastic rocks and Permian rocks of the Stikine Terrane suggest that the Paleozoic Stikine assemblage either depositionally overlies or laterally grades into the Yukon-Tanana Terrane.

Dick Creek – Inhini River

East of the Inhini River, limestone of probable Permian age is faulted against a thick sequence of pyroxene crystal-lithic tuff and volcaniclastic rocks probably correlative with the Upper Triassic Stuhini Group (Figure 1-17-2). Nevertheless, the contact is probably a faulted depositional contact. Rocks conformably underlying the limestone in the unnamed creek south of Fizzle Mountain include tuffaceous siltstone and sandstone, siliceous siltstone, mafic tuff and minor brown-weathering limestone. North-dipping, massive Permian limestone along the north side of Dick Creek is underlain by probable Carboniferous interlayered green to brown tuffaceous siltstone, mafic flows, lapilli tuff and breccia. Thin limestone lenses within the volcanic section contain abundant crinoid fragments and rugose corals. Volcaniclastic rocks at the base of the unit grade downwards into light grey siliceous argillite. The upper part of the argillite contains a relatively thin (10 m) coarsely crystalline white marble. Exposures south of Dick Creek are dominated by a thick section of light green, tuffaceous to quartzose turbiditic rocks that are similar to the clastic rocks overlying the sequence of quartzose turbidites and quartzite south of Simma Creek. Centimetre-scale beds of fine-grained sandstone, siltstone and mudstone that make up the section may be Carboniferous or older as they appear to underlie the volcanic section exposed north of Dick Creek.

Mount Geoffrion – Mount Fawcett

Mount Geoffrion and Mount Whipple (Figure 1-17-2) are underlain by a thick sequence of probable Triassic mafic to intermediate, pyroxene, amphibole and plagioclase-bearing tuff, debris flows, volcaniclastic rocks and subordinate argillite that depositionally overlies massive light grey to white limestone of known Permian age (D.A. Brew, unpublished data). West of Mount Geoffrion, the limestone overlies centimetre-scale beds of fine-grained volcaniclastic rocks, tuff and argillite. The lower sequence contains at least two undated, massive limestone layers 5 to 20 metres thick. Probable Permian limestone along the ridge north of Mount Fawcett is underlain by mafic volcanic rocks, argillite and fine-grained tuffaceous clastic rocks. This section is similar to that below limestone of probable Permian age south of Simma Creek.

CHUTINE RIVER REGION (104F/9, 16)

Souther (1959) assigned rocks east of the Coast Belt in the Chutine River region to a metamorphic sequence that includes marble, quartzite and orthogneiss, a sequence of quartzose clastic rocks, mafic volcanic rocks and limestone. These rocks were examined at Chutine Lake and west of Triumph Creek, respectively (Figure 1-17-3). Penetratively deformed metamorphic rocks at Chutine Lake are derived from fine-grained turbiditic clastic strata and siliceous argillite intruded by granodioritic dikes. The ages of the metaclastic rocks and the granodiorite are unknown. These rocks are intruded by and locally faulted against plutonic rocks of probable Eocene age.

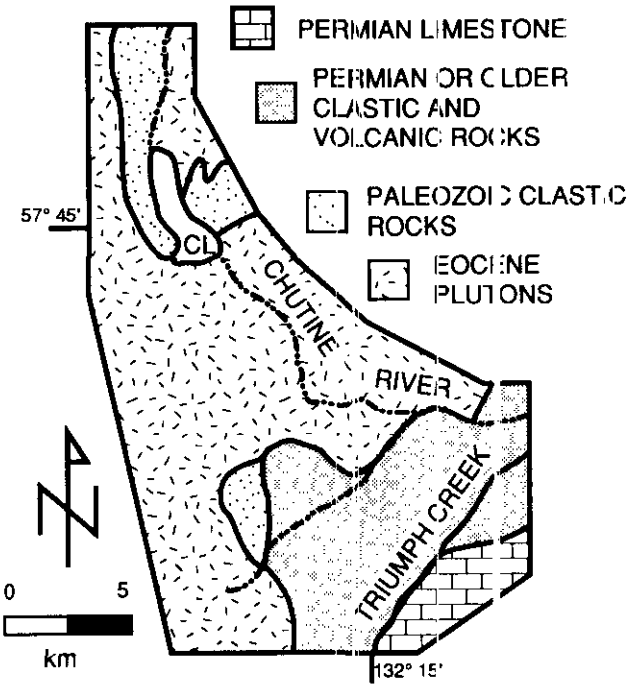

Figure 1-17-3. Generalized geologic map of the Chutine River area (modified from Souther, 1959) showing distribution of units discussed in text. CL-Chutine Lake Paleozoic Stikine assemblage (modified after Wheeler and McFeely, 1987 and Brown *et al.*, 1991).

West of Triumph Creek, the metaclastic section is overlain by a thick section of tuffaceous argillite, felsic tuff, limestone and mafic to intermediate flows, tuff and volcaniclastic rocks. Souther (1959) inferred a Triassic age for the volcanic portion of the section. A Permian or older age is more likely as these rocks are overlain by Permian limestone to the southeast (D.A. Brown, personal communication, 1991).

FORREST KERR REGION (104B/10, 15)

The Stikine assemblage exposed west of Forrest Kerr Creek (Figure 1-17-1) includes complexely deformed fine-grained clastic strata, siliceous argillite, limestone, mafic and felsic tuff, and mafic volcanic rocks (Anderson, 1989; Read *et al.*, 1989; Logan *et al.*, 1990a, b; Brown *et al.*, 1991). Massive limestone in the section has yielded Middle Devonian fossils (Anderson, 1989; Read *et al.*, 1989). It is interlayered with argillite, fine-grained tuffaceous clastic rocks, mafic volcanic rocks, intermediate fragmental rocks and intermediate to felsic tuff. This west-dipping section grades structurally down (to the east) into thinly bedded siliceous argillite and fine-grained clastic rocks, tuffaceous greywacke, maroon debris flows intermediate to felsic tuff and fine-grained tuffaceous clastic rocks. The age of this lower clastic sequence is uncertain, however, the section is similar to Permian or older clastic rocks that are depositionally overlain by Lower Permian limestone in the Scud River region (Brown and Gunning, 1989). Rocks of both

sections are intruded by a dioritic to granitic complex that is interpreted as the marginal phase of large plutons to the west. These plutons may be Mississippian in age (J.M. Logan, personal communication, 1991) suggesting that the clastic section is Mississippian or older.

Read *et al.* (1989) and Logan *et al.* (1990b) suggested that the upper limestone-volcanic section structurally overlies the lower siliceous clastic section along a west-dipping thrust fault. Based on the apparent gradational contact between these two units, this fault probably does not have significant offset and the Forrest Kerr section may be alternatively interpreted as an overturned Middle Devonian to Permian sequence.

SUMMARY

The Paleozoic Stikine assemblage in the Iskut River - Craig River region of the Iskut River map area consists of (1) quartzose turbiditic strata, (2) fine-grained tuffaceous clastic rocks of uncertain age, (3) mafic volcanic rocks and argillite of probable Carboniferous age, and (4) Lower Permian limestone and mafic and subordinate felsic volcanic and volcaniclastic rocks. The structurally and inferred stratigraphically lowest unit of quartzose clastic rocks is similar and probably equivalent to continent-derived clastic strata of the Yukon-Tanana Terrane in southeastern Alaska, suggesting that parts of the Paleozoic Stikine assemblage may be correlative with Paleozoic rocks of this terrane. Clastic and volcanic rocks in the Chutine River are probably correlative with the Devonian to Permian rocks in the Forrest Kerr region and Units 2 and 3 listed above for the Iskut - Craig Rivers region.

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NOTES