



Rock-Eval, lithochemistry, gamma ray spectrometry, thermal maturity, and X-ray diffraction analysis of the Grayling and Toad formations (Montney and Doig formations equivalent), Halfway River map area (94B/14)

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Front cover: Characteristic differential weathering of beds in the lower-middle (~140 to 300 m) part of the Toad Formation section. Image illustrates four stacked coarsening-upward sequences in which the number and thickness of recessive dark grey finer grained, calcareous and carbonaceous siltstone beds decrease up section at the expense of relatively resistant, buff-weathering, slightly coarser grained, dolomitic siltstone beds, which are about 1 m thick at the top of each sequence.

Photo by Filippo Ferri.

Appendices, including datafiles, for this GeoFile can be downloaded from

http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/GeoFile/BCGS_GF2019-12.zip



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Keywords: Grayling Formation, Toad Formation, Liard Formation, Montney Formation, Doig Formation, Halfway Formation, shale-gas, Western Canada Sedimentary Basin, Triassic

Summary

Triassic calcareous siltstones and fine-grained sandstones of the Grayling and Toad formations exposed in the Halfway River area of the Rocky Mountains in northeastern British Columbia (Fig. 1) represent the western equivalents of gas-bearing units in the Montney and Doig formations in the subsurface of the Western Canada Sedimentary Basin (Fig. 2). Previously, Ferri et al. (2010) provided descriptions, preliminary interpretations, and regional correlations of these exposures. To better document these units, herein we present the results of a section, more than 640 metres thick, that we systematically measured and sampled across the Grayling and Toad formations and the lower part of the Liard Formation (Figs. 3-5). These results include lithologic, organic and whole rock geochemical, thermal maturation, x-ray diffraction, and gamma ray spectrometer data.

The UTM coordinates (NAD 83, Zone 10) for the base of the main measured section are 473869E, 6311693N; the coordinates for the top are 474484E, 6311271N. The base of the section across the lowermost Liard Formation is at 474495 E and 6311271N.

In the accompanying files ([BCGS GF2019-12.zip](#)) we summarize our analytical methods (Appendix 01), Rock-Eval, lithogeochemistry, gamma ray spectrometry, thermal maturity, X-ray diffraction, and gamma ray spectrometer data (as Microsoft Excel spreadsheets; Appendix 02), and graphic logs, lithologic descriptions, and images of representative rock types (Appendix 03).

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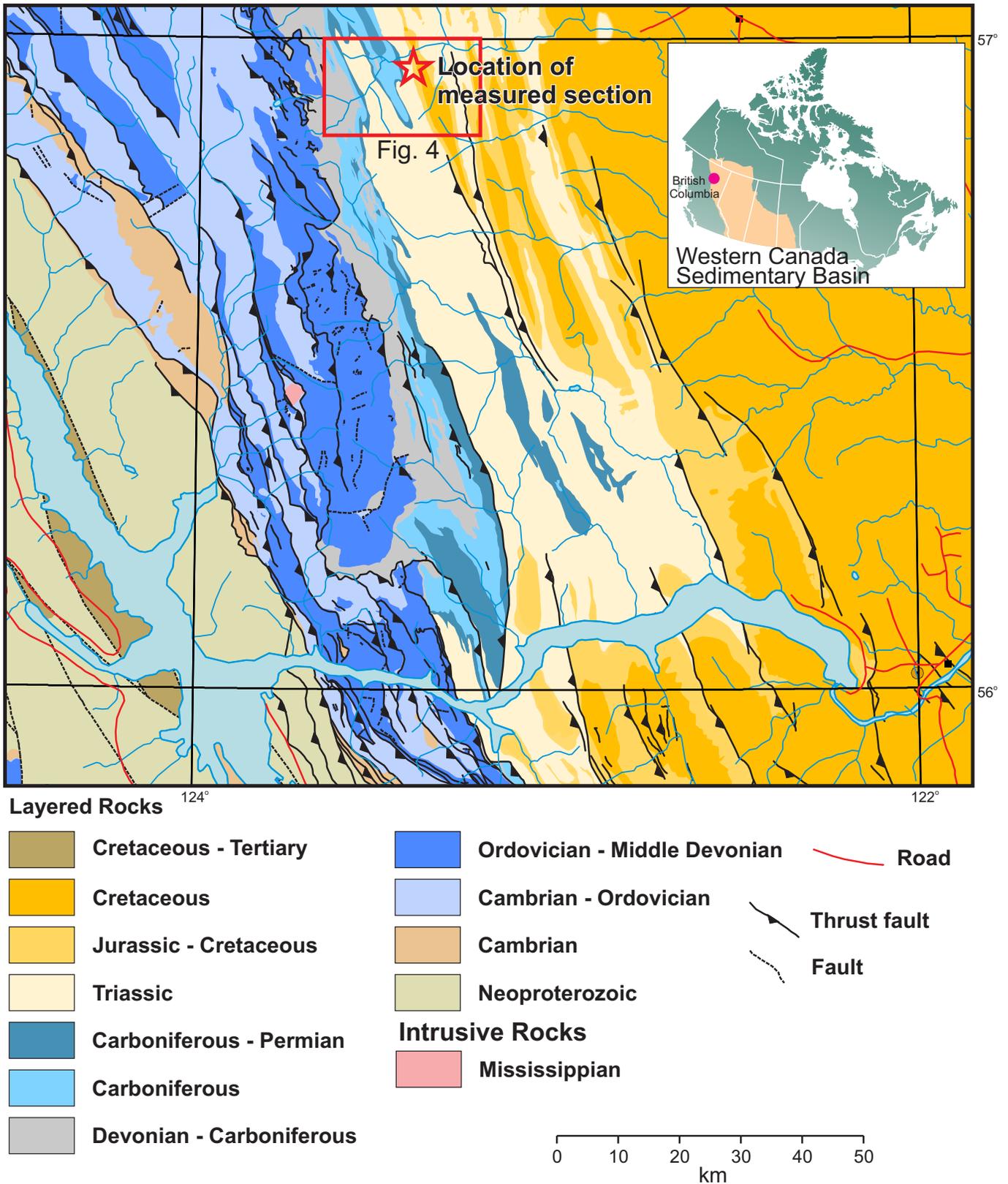


Fig. 1. Regional geological setting of the Halfway River area. Geology from Armstrong (1948), Irish (1958), Gabrielse (1975), Thompson (1977, 1986), Taylor (1979), Stott et al. (1983), McMechan (1994), and Okulitch et al. (2002).

Stratigraphic Age		Foothills - Halfway to Pine Rivers	Peace River Subsurface	Foothills - Sukunka River		
Jurassic		Fernie Formation				
Triassic	Upper	Rhaetian	Bocock Fm			
		Norian	Pardonet Fm	Pardonet Fm		
	Middle	Carnian	Baldonnel Fm	Baldonnel Fm	Whitehorse Fm	
			Charlie Lk	Charlie Lk Fm		Winnifred
		Ladinian	Liard Fm	Halfway Fm		Brewster
	Lower	Anisian	Toad Fm	Doig Fm	Starlight Evaporite	
		Grayling Fm	Montney Fm	Llama		
Permian		Fantasque/Ishbel				

Fig. 2. Triassic stratigraphic nomenclature used in the surface and subsurface of northeastern British Columbia.

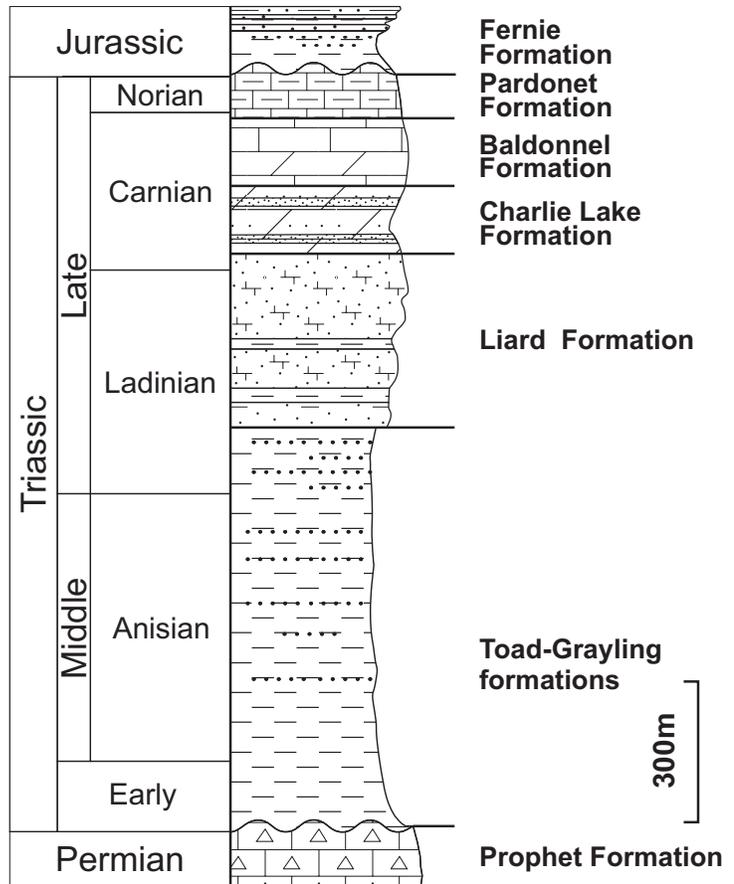


Fig. 3. Generalized stratigraphic column of Triassic rocks in the Halfway River area.

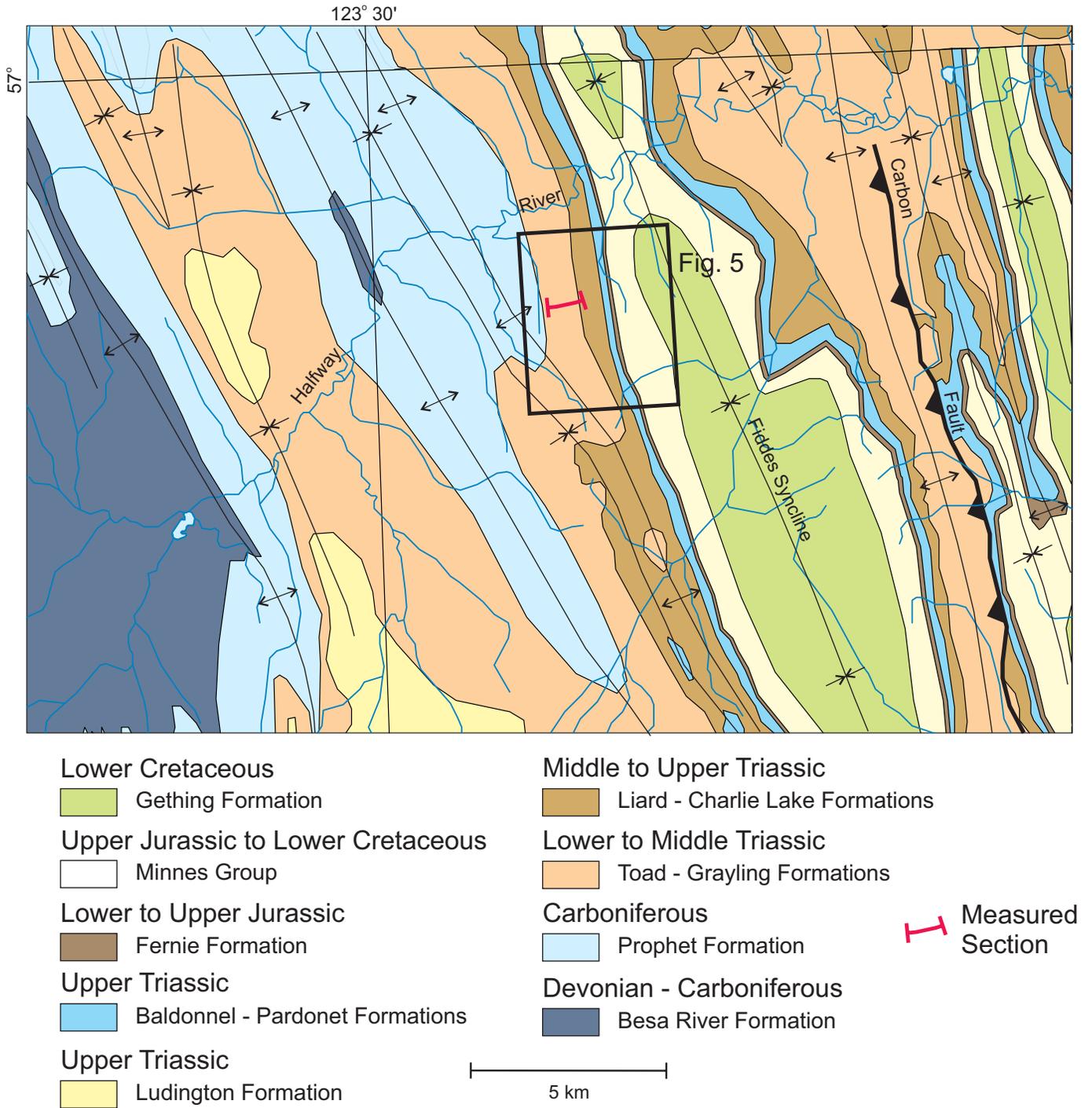


Fig. 4. Geology in the immediate vicinity of the measured section. Geology from Thompson (1986).

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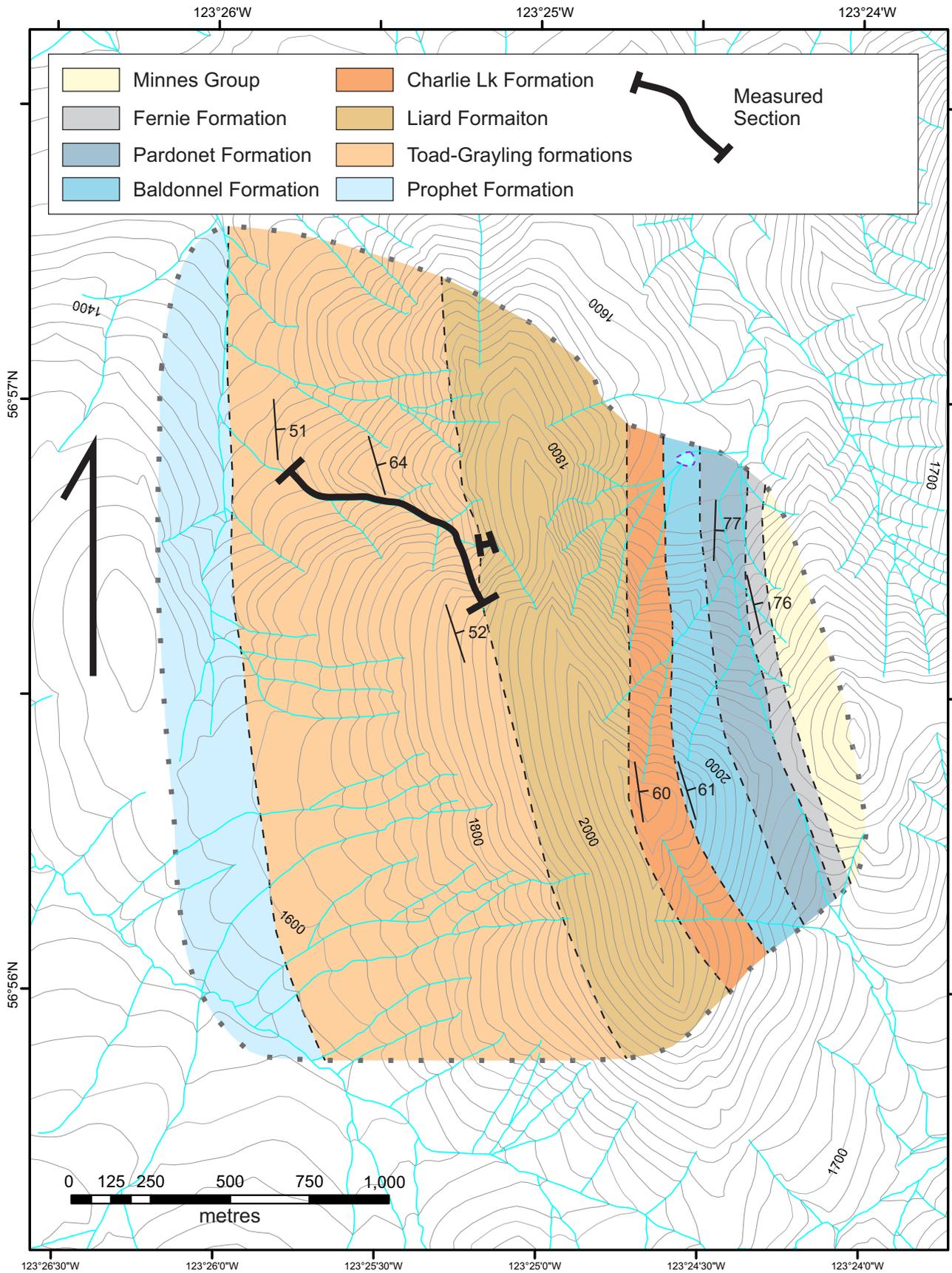


Fig. 5. Detailed map of the measured section.

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