

## Middle-Upper Devonian conodont faunas and biostratigraphy of the Horn River Group in the northern Mackenzie Mountains and Plain (NWT, Canada)

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### Summary

The Horn River Group (Middle and Upper Devonian) of the northern Mackenzie Mountains and Mackenzie Plain has been a topic of conodont biostratigraphic research since the early 1970's. The drowning of the lower Middle Devonian shelf with deposition of organic-rich black shales (Bluefish Member of the Hare Indian Formation, Canol Formation) and the development of platform and reefal facies (Ramparts Formation) produced diverse paleoenvironments for the study of conodont fauna. Conodonts are important index fossils for regional and interregional correlation in the Devonian and a detailed biostratigraphic framework is essential for understanding facies relationships within the Group, for the regional study of the Horn River Group and for correlation with other sedimentary basins.

This study is based on new sampling during several field campaigns (2016-2019; within NRCan's GEM II and GNES projects), combined with historical GSC conodont collections from the 1970's and 1980's. Conodonts from 16 sections, situated along the northern Mackenzie Mountain front and in the Mackenzie Plain near the town of Norman Wells, were studied for biostratigraphy and faunal diversity. The best-studied section in the study area, Powell Creek, is chosen as conodont biostratigraphic reference section to which other sections are compared and correlated.

In this new framework, most of the Givetian and several of the Frasnian conodont zones are now recognized. The base of the Horn River Group (base of the Hare Indian Formation) is situated within the *ensensis* Zone. The oldest Ramparts deposits are found in the Middle *varcus* Zone; its Kee Scarp Member starts in the *disparilis* Zone and possibly reaches up into the Frasnian Zone 4. The base of the Canol Formation is of Givetian age (*hermanni* Zone), in the western part of the study area where the Ramparts Formation is not present, but is of latest Givetian age (*norrissi* Zone) and early Frasnian age above the Ramparts Plateau and Key Scarp members respectively. Conodonts from the top of the Canol Formation suggest a late Frasnian age. Abundance of data depends largely on the lithology, favoring calcareous deposits for sample processing (Ramparts Formation limestone versus Hare Indian and Canol shales with some calcareous beds). Conodont faunas are reasonably diverse in the Hare Indian Formation and increase slightly in diversity and abundance in the Ramparts Formation. This decreases again in the Canol Formation. Using this biostratigraphic framework, multiple anoxic events within the Horn River Group can tentatively be correlated with black-shale events in other sedimentary basins.