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Investigating the Ediacaran Byng Formation from the Neoproterozoic Miette Group: Geochemical and Palaeobiological implications

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The Late Neoproterozoic Ediacaran (ca. 635-539 Ma) represents a crucial period in the Earth's history characterized by a severe negative carbonate carbon ($\delta^{13}C_{carb}$) i.e., the Shuram excursion[1,2] and the dawn of first macroscopic eukaryotes communities, i.e., the Ediacaran fauna[3,4]. However, the radiation remains asynchronous, depending on the locality and paleoenvironmental depositional conditions[5,6]. Therefore, additional investigations need to be conducted to integrate both chemostratigraphic and paleobiological data on Ediacaran deposits to study the global pattern of these events. The Ediacaran-aged Byng Formation (Jasper, Alberta Canada) contains a carbonate platform outcropping stratigraphically at the top of the Neoproterozoic Miette group. Previous studies at Mount Robson, British Columbia, have reported the earliest evidence of calcified-shelly macrofossils of *Cloudina* - *Namacalathus* within biostromal carbonates that overlies sequences of siliciclastic deposits bearing Ediacaran fossil assemblage[7,8]. By contrast, the Byng Formation at Jasper has not been investigated despite its outcropping as a prominent cliff exposure (ca. 50 m). Preliminary findings have demonstrated that the upper part of the section (~5 m thick) is dominated by biostromal-reef concretions that exhibit a variety of well-preserved morphotypes of microbialites. Interestingly, some field views show that the microbialites are densely packed and range vertically from planar wrinkly laminated to columnar and domal stromatolites. In this context, we hypothesize that these microbialites would have formed an early ecosystem that may have given rise to very ancient biomineralized animals[9]. In addition, we are further conducting detailed chemostratigraphic analyses ($\delta^{13}C_{carb}$, trace element geochemistry) with the aim of comparing and contrasting its depositional setting with the Shuram excursion and the earliest fossil evidence of biomineralized animals at that time.

References:

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