

## The origin, ecology and reef-building contribution of Late Palaeozoic *Palaeoaplysina* in Arctic Canada

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*Palaeoaplysina* is an enigmatic fossil of Upper Carboniferous- Lower Permian strata. This large, plate-like fossil was a major reef builder under tropical to subtropical conditions along the north-western Pangea margin. On south-western Ellesmere Island in the Canadian Arctic, massive reef complexes of the Nansen Formation are dominated by *Palaeoaplysina*. Similar reef build-ups have proven to be successful exploration targets in Russia and Timan-Pechora. However, these organisms are still problematic and some basic questions remain unanswered, including their biologic affiliation, life modes and functions. Determining the growth patterns and influences exerted by *Palaeoaplysina* is crucial for our understanding of the carbonate systems in which they dominated and will further our knowledge of the circumstances in which large reefs suitable for major exploration plays developed. This study also has paleoclimatic and paleoceanographic implications. The paleobiogeographic distribution of *Palaeoaplysina* and its calcifying fabric may provide information with regards to the carbonate saturation at a time of global warming prior to a global crisis, perhaps related to ocean acidification.

The Nansen Formation consists of a series of intraformational shelf cycles, some of which display a transition from tabular reef build-ups to massive stacked complexes. *Palaeoaplysina*-phylloid accumulations make up the dominant component of the upper massive complex. A study of well preserved specimens from Ellesmere Island demonstrates the presence of a bimodal cellular structure, and geochemical studies suggests an aragonitic skeleton, both of which suggested an association with red algae, perhaps related to the ancestral coralline algae *Archaeolithophyllum*.