

PRECAMBRIAN MICROBIAL REEFS: TEMPLATE FOR THE PHANEROZOIC REEF ECOSYSTEM

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Modern reefs exhibit complex organic and inorganic interactions that collectively build a living carbonate structure with relief above the sea floor. Studies of 520 Ma (million-year-old) Cambrian reefs show that even the oldest Phanerozoic reefs exhibited many of the same interactions as modern reefs, implying a pre-Cambrian origin for these interactions.

Northern Canada contains a superb record of Precambrian reefs, with reefs ranging from small mounds a few meters across to massive structures several hundred meters high and several kilometres in diameter. Archean (3000 Ma), Mesoproterozoic (1200 Ma), Tonian (850 Ma), Marinoan (635 Ma), and Ediacaran (545 Ma) reefs show increasing complexity and ability to respond to changing environmental conditions. These Marinoan and Ediacaran reefs of NW Canada are strikingly similar in size and composition to coeval reefs in northern and southern Namibia respectively, confirming that these increases in reef complexity represented global trends in reef evolution. This implies that Precambrian stromatolite reefs represented a template that evolved into the Phanerozoic reef ecosystem.



Tonian (850 million-year old) microbial reef from the Mackenzie Mountains, NW Canada. Note the central castellated reef core surrounded by an apron of boulder-sized talus blocks. The reef is 300 m high.