

Gunflint Chert

(Explanatory Display)

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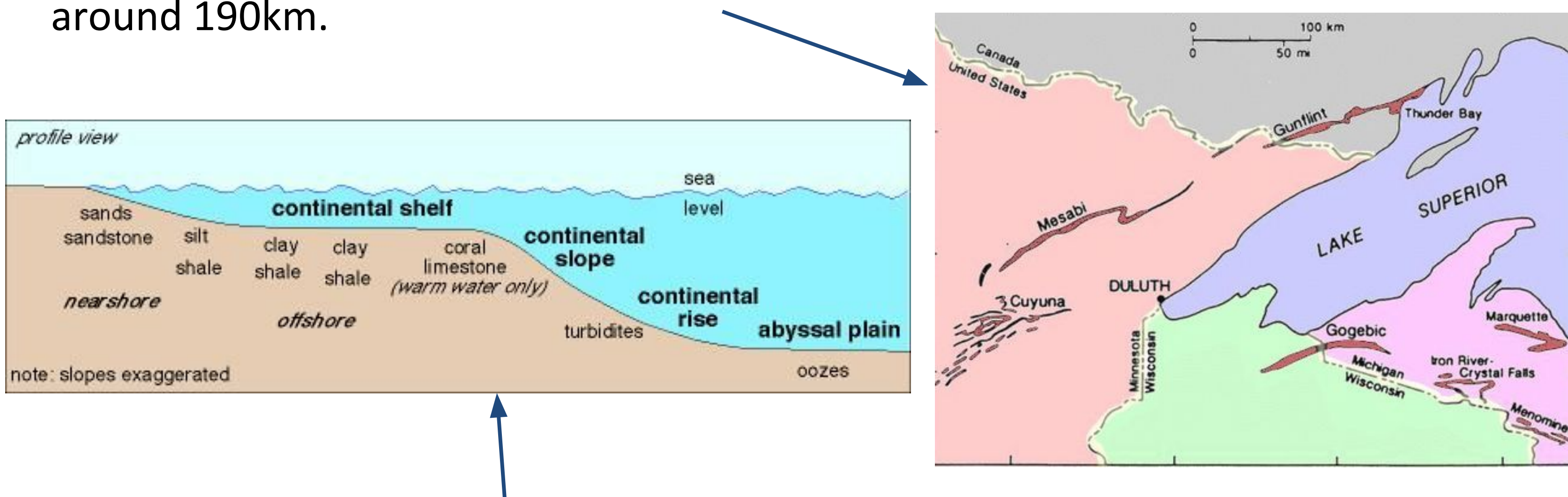
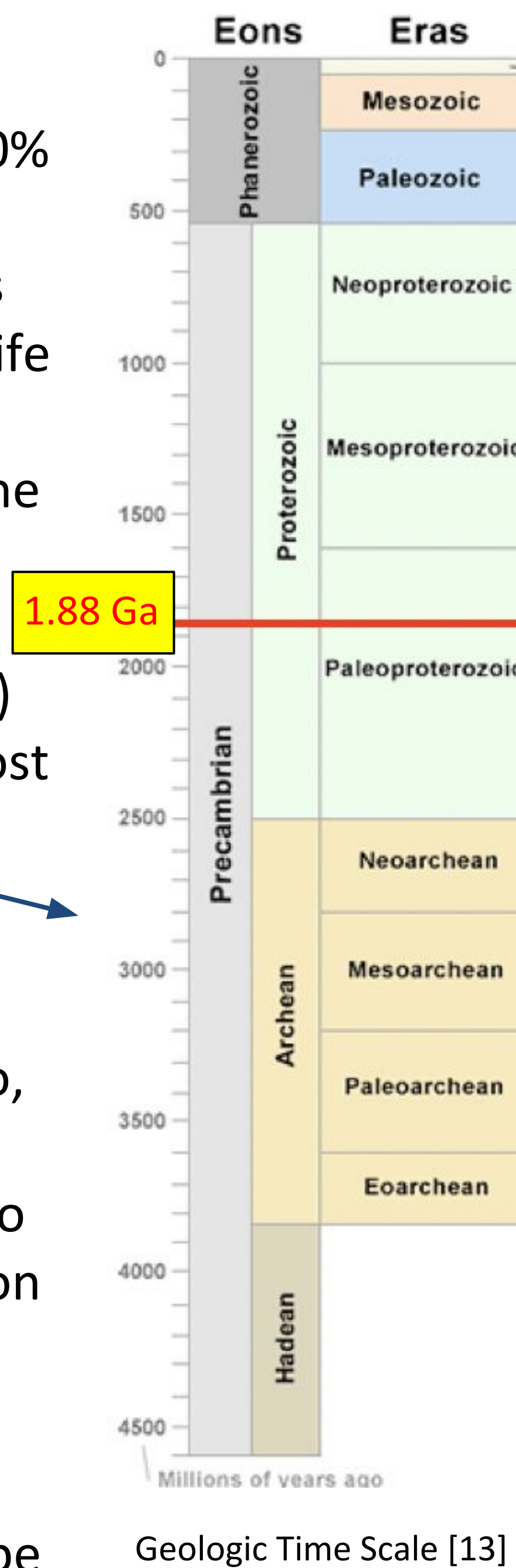
Why is Gunflint Chert Important?

The Precambrian time (ca. 4.55–0.54 Ga) makes up almost 90% of Earth’s history, and it contains most of the significant evolutionary transformations of the past. Precambrian fossils are necessary for understanding the emergence of complex life in terms of pattern, rate, and process. The preservational windows in the 1.88-Ga Gunflint chert allow us to highlight the crucial role played by the fossil record in understanding early biodiversity. Throughout the last 60 years, attention has focused essentially “on microcrystalline quartz (called ‘chert’) for high-quality preservation of cellular organic materials, most famously within the 1.88-Ga Gunflint chert.” [12]

What is the Gunflint Chert and where is it located?

Found through Northern Minnesota to Northwestern Ontario, Canada. The area is a iron ore deposit containing iron formations that is now known to contain fossils dating back to the Middle Precambrian era, dating back to about 2000 million years ago. [7]

The entire deposit is found through the Gunflint and Mesabi Range. Preservation is known to be best in the Schreiber locality, while the entire stretch of preservation is known to be around 190km.



The geologic age and paleoenvironment represented by the site
A study using radiometric dating, specifically uranium-lead dating, was conducted on zircon excavated from undisturbed volcano matter to find a more accurate timeline of the Gunflint Chert Formation. The result came out to be 1878.3 ± 1.3 million years old. [8] The local paleoenvironment was on a continental shelf, which can be seen due to the stromatolite, which is produced by cyanobacteria. The banded iron formations(BIFs) are caused from the great oxygenation event, which caused iron to form into iron oxide, which creates the bands of iron and chert. [1]

What makes the Gunflint Chert a phenomenal Lagerstätte is that it holds a plethora of microfossils preserved within fossilized stromatolites. Stromatolites are a type of sedimentary rock that were formed by the gradual growth of layers upon layers of cyanobacteria, which is a photosynthesizing prokaryotic cell representing some of the earliest forms of life on Earth. (5) These rocks in the Gunflint Chert were excellent indicators of geologic history, holding thousands of tiny microfossils ranging in different shapes like stars, spheres, and filaments. The layers created by these microfossils are called *Banded Iron Formations* (BIFs), and alternate between a red and gray color in appearance. The stromatolites found in the Gunflint Chert were only common within a limited interval in the geologic record, falling within the Precambrian, and at the time this formation was found, they were the oldest known microfossils discovered, as well as the most diverse communities of fossils of the Precambrian. (4)

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