

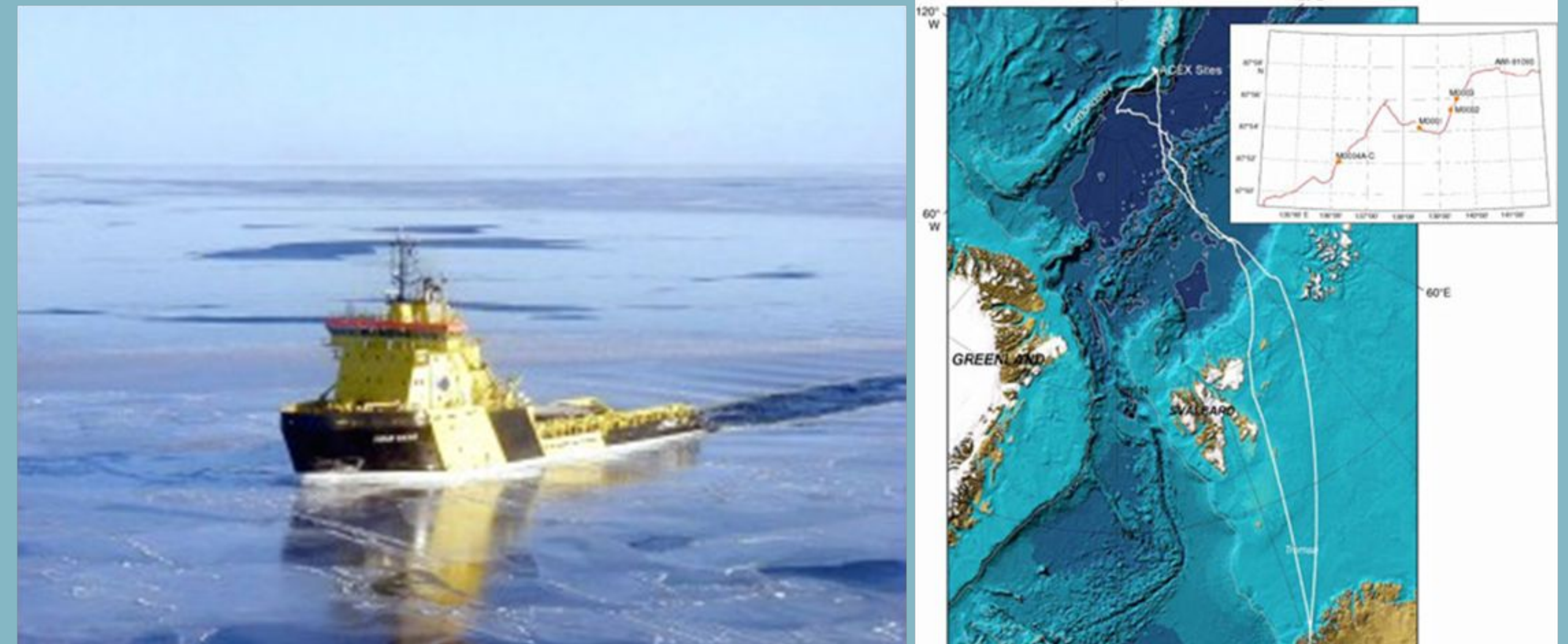
The Azolla Event: Explanatory Presentation

GEOL 204 The Fossil Record

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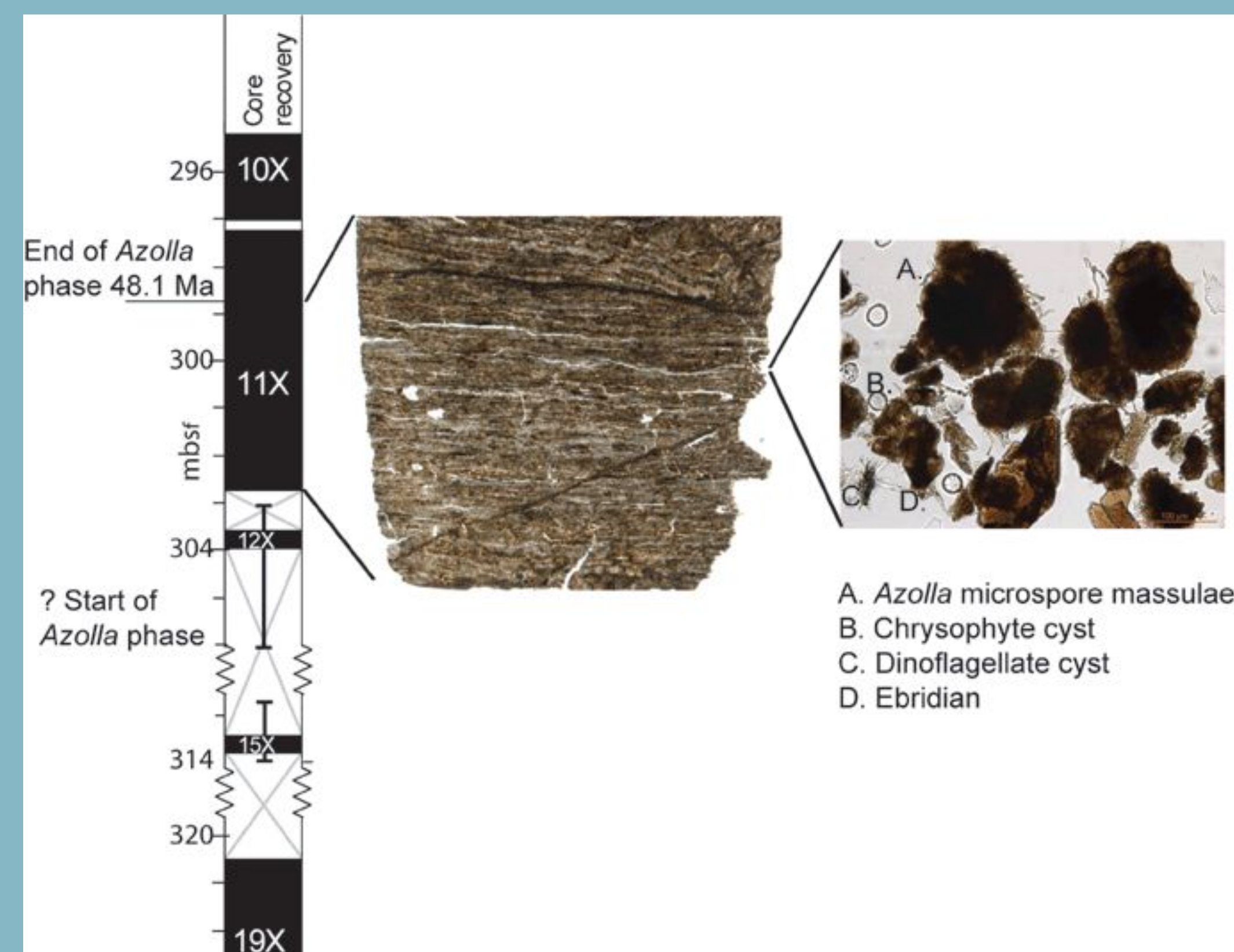
In 2004, the *Vidar Viking* Arctic Coring Expedition (ACEX) drillship ventured to the Lomonosov Ridge to study sediments in order to gain insight to the climate of ancient earth. This is the start of our journey with *Azolla*.



ACEX *Vidar Viking* drillship (left) and Lomonosov Ridge drillsite (Photos courtesy of The Azolla Foundation)

The *Vidar Viking* expedition made a significant discovery: a large presence of *Azolla* fossils in their sediment samples. Analysis of samples (pictured below) showed that *Azolla* was not only present in this area between the Paleocene and Eocene eras but that it was highly prevalent. This time period is now known as the Azolla Event.

Sedimentary rock samples extracted in the Arctic reveal layer upon layers of alternating types of rocks, including fossilized *Azolla* matter. Silicious layers were found, which means that planktonic organisms used to live there. The fossilized *Azolla* suggests an increase in gamma radiation at the time. Temporal analysis of the *Azolla* samples suggested that the event at this site happened during the major decline of CO₂, suggesting a correlation between *Azolla* blooms and the changing climate. This hypothesis is at the heart of the Azolla Event's significance.



Azolla-packed sample taken on the *Vidar Viking* mission (Photo courtesy of Speelman, et al. 2009)

Because of the Azolla event, CO₂ levels dropped significantly. In fact, they dropped about 80%. Earth's greenhouse climate became what it currently is, an icehouse. The average temperature of the arctic dropped from 13 degrees Celsius to 9 degrees Celsius as a result. Further, the Earth also developed ice caps at both poles.

Evaporation was found to be a main causal factor in the Azolla Event. Before the event's beginning, global temperatures were rising and there were strong winds. This increased the density of the ocean. This also caused more rainfall, which caused more freshwater to flood the Earth. These conditions were perfect for the proliferation of *Azolla*.

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