

## **Differences in the Marine Stratigraphic Record of the Northern and Southern Hemispheres**

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The interaction of precession-scale sediment yield cycles and glacially-controlled eustatic cycles may cause systematic differences in the marine stratigraphy of the Northern and Southern Hemispheres. Variations between the hemispheres should be evident in bed thickness, bed distribution, and lithology.

At precession-scale (~20 kyr), insolation cycles of the Northern and Southern Hemisphere are 180° out of phase. This can cause similar climatic successions in opposing hemispheres, and their related sediment yield cycles, to be 180° out of phase as well. Under conditions of a unipolar icecap, the common glacial condition prior to the Plio-Pleistocene, precession-scale eustasy will tend to track the insolation cycle of the glaciated hemisphere. As a result, similar climatic successions in opposing hemispheres can produce yield cycles with distinctly different phase relationships to glacioeustasy. This asymmetry should not exist in an ice-free world. If this hypothesis is correct, it will significantly improve stratigraphic interpretations, leading to more accurate resource exploration techniques and a more complete understanding of paleoclimate. Recognizing the different stratigraphic patterns created by this effect will indicate the occurrence of an icecap and establish the means to resolve whether glaciation, or a more local forcing agent, caused a particular interpreted sea level change.

This presentation will discuss the foundations for the hypothesis, the results of a statistical analysis of the synthetic stratigraphy of a tropical monsoonal area to demonstrate the concept, and an initial analysis of data from the Gulf of Mexico to indicate the onset of North American glaciation.