



The Biomarker Inventory, Trace, and Source of Heinrich Events and Heinrich-type Layers (MIS 8-16) in the North Atlantic

Jens Hefter (1), B. David. A. Naafs (1), Jaap S. Sinninghe-Damsté (2), and Ruediger Stein (1)

(1) Alfred Wegener Institute, Geosciences, Bremerhaven, Germany (jens.Hfter@awi.de), (2) Royal Netherlands Institute for Sea Research (NIOZ), Den Burg, The Netherlands

Multiple cores from different locations in the North Atlantic were recovered during IODP Expeditions 303/306. We have investigated the biomarker distributions of identified Heinrich layers (HL) and ambient glacial/interglacial samples from Site U1305, located in the Labrador Sea in proximity to the former major iceberg discharge pathway derived via the Hudson Strait from the Laurentide-Ice-Shield (LIS).

A unique association of a multitude of “petrogenic” compounds such as benzohopanes, D-ring monoaromatic 8,14-secohopanes, rearranged diasterenes, mono- and triaromatic steranes, isorenieratene-derivatives as well as characteristic pristane/n-C₁₇ and pristane/phytane ratios ideally allows to distinguish organic matter from HL compared to adjacent samples. They therefore are regarded and can be used as organic-geochemical tracers not only for the occurrence of Heinrich Events of the last glacial cycle but also for older Heinrich-like events.

We present a biomarker based high resolution record of such events during a time interval from about 320-460 kyr at Site U1313 (MIS 10-12) and an extended record (MIS 8-16) of Heinrich-type events from Site U1308, i.e. from positions near the Mid-Atlantic Ridge and distal to the LIS.

In addition, the HL-specific biomarker association provides circumstantial evidence to derive from a relatively immature, Paleozoic marine rock deposited under occasional photic zone anoxic conditions, that is today located on the Laurentide/Canadian shield. Reinvestigation of available geologic and organic-geochemical data allowed narrowing down this assumed source to an Ordovician oil shale close to Hudson Strait, that indeed bears a striking resemblance in terms of biomarker distributions when compared to the specific association of compounds from samples of Heinrich Events.