

## Middle Miocene environmental change: a multi-proxy study from the eastern Atlantic Ocean at the Porcupine Basin (IODP Leg 307)



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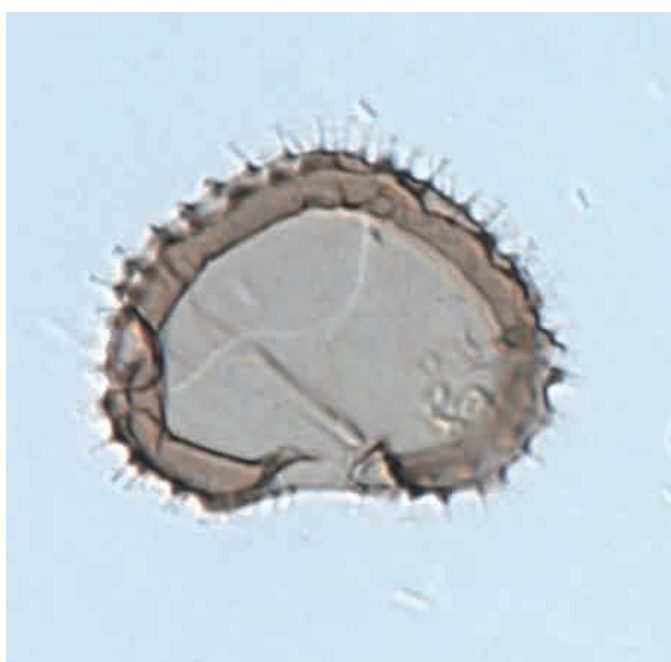
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During the Middle Miocene Climatic Optimum (MMCO; 17-14.5 Ma) the relatively warm climate of the Miocene reached peak values. After the MMCO, the global climate started cooling. This happened through several short-lived cooling events, represented by positive oxygen isotope excursions: the Mi-events. Associated events are East Antarctic Ice Sheet growth and potential Northern Hemisphere ice expansion. The causes and consequences of the Mi-events are not well constrained yet. For this reason we aim to examine the role of the Gulf Stream in the cooling and subsequent warming of the Mi-events, since it is a possible mechanism to amplify or reduce regional changes in North-western Europe.

Integrated Ocean Drilling Program (IODP) Leg 307 recovered a high resolution record from the Middle Miocene of the Porcupine Basin (offshore south-western Ireland), a region under influence of the Gulf Stream. We have extracted well-preserved palynomorphs (mainly organic-walled dinoflagellate cysts (see figure), acritarchs, some pollen) and organic molecules for paleothermometry (e.g. TEX<sub>86</sub> and U<sup>k'</sup><sub>37</sub>) from core 1318B. With these proxies, the development of the Mi-4 event is reconstructed on high resolution, by assessing e.g. temperature, sea level, thermocline depth and productivity. First results indicate a pronounced cooling during Mi-4 as recorded simultaneously in dinoflagellate cyst assemblages, TEX<sub>86</sub> and U<sup>k'</sup><sub>37</sub>. The presented results will focus in detail on the phasing and rates of change in the reconstructed Mi-events.



The heterotrophic dinocyst taxon *Selenopemphix brevispinosa*, indicative of enhanced primary productivity.