P01
Western Boundary Currents
Wednesday, July 2 PM
Location: Site B, Room 18
Presiding Chairs:W.E. Johns, A.R. Piola

**TIME [ 1420 ] [ P01/02P/B18-002 ]**

## FLUCTUATIONS IN THE POSITION OF THE PROTO GULF STREAM: EVIDENCE FROM HIGH-RESOLUTION STABLE ISOTOPE RESULTS

**Bridget Susan WADE**(University of Edinburgh)

Dick KROON(Vrije Universiteit)
Heiko PAELIKE ( Stockholm University )

The Gulf Stream is prominent western boundary current in the North Atlantic. However, little is known about the evolution of the Gulf Stream, particularly during times of elevated greenhouse gases and global temperatures. High-resolution (3 k.y.) stable isotope analyses ($\delta^{18}O$, $\delta^{13}C$) were conducted on middle Eocene (ca. 40 - 37 Ma) planktonic foraminifera from the western North Atlantic (Ocean Drilling Program Site 1052). The study exposed a more complicated pattern of climate variability than was formerly anticipated, with large (>1 per mil) and rapid (>10 k.y.) variations in $\delta^{18}O$. The magnitude of change is greater than that seen in open-ocean Pleistocene records but could not have been caused by ice-volume and/or sea-level fluctuations. Instead, the oxygen isotope shifts resulted primarily from large oscillations in sea-surface temperatures with shifts of up to 12$^{o}$C. Climatic modeling results have indicated the presence of a Gulf Stream analogue during the Eocene. The movement of the Gulf Stream would cause sea-surface temperatures to change dramatically over a small area. High frequency instability of sea-surface temperatures may have been attributable to deflections in the position of the Gulf Stream across the Blake Plateau. There is a strong 400 kyr cyclicity evident in the sea-surface temperature record, suggesting that fluctuations in the position of the Gulf Stream were caused by feedbacks within the climate system, in response to orbital changes in solar insolation.