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Cenomanian/Turonian benthic foraminiferal faunas of the Demerara Rise depth transect (ODP Leg 207)

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This study is based on Cenomanian to early Turonian sediments of Ocean Drilling Program (ODP) Sites 1258, 1259, 1260, and 1261 from Demerara Rise (Leg 207, western tropical Atlantic, off Suriname) that are oriented along a paleodepth transect. Studied sediments include the Cenomanian/Turonian Boundary Event (CTBE) or Oceanic Anoxic Event 2 (OAE 2) and consist of laminated black shales with TOC values between 5 and 10% below and above OAE 2 and up to 29% within the OAE 2 interval. Benthic foraminiferal assemblages in this eutrophic environment are generally characterized by low diversities and strong fluctuations of abundances, indicating oxygen depletion and high organic matter fluxes. Dominant taxa at all sites are *Bolivina anambra*, *Gavelinella dakotensis*, *Tappanina* sp., *Praebulimina prolixa*, and *Neobulimina albertensis*. Based on the stable carbon isotope excursion paralleling OAE 2 we subdivided the studied successions into three intervals:

- 1) the interval below the OAE 2;
- 2) the carbon isotope excursion reflecting the OAE 2; and
- 3) the interval above the OAE 2.

In the bathymetrically shallower Sites 1260 and 1261 benthic foraminiferal faunas indicate anoxic to sometimes slightly dysoxic bottom-waters conditions below the OAE 2. The bathymetrically deepest Site 1258, in contrast, reflects more oxygenated bottom waters with an almost continuous occurrence of benthic foraminifera. It is therefore suggested that the shallower sites were located amidst the oxygen minimum zone (OMZ), whereas the sediments of Site 1258 were deposited below the OMZ. During OAE 2 anoxic conditions prevail at the shallower sites. At Site 1258 benthic foraminifera indicate severe dysoxic but not anoxic conditions. This pattern is proposed to reflect a strengthening of the OMZ possibly related to increasing primary production during OAE 2. A short-termed repopulation event of benthic foraminifera located in the lower third of the OAE 2 was observed at all sites, reflecting a brief

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bottom-water oxygenation event within the OAE 2. This event parallels a surface-water cooling and is probably equivalent to the “Plenus Cool Event” in Europe and the “benthic zone” in the Western Interior. The benthic foraminifera of a ~0.5 Ma interval following the OAE 2 still indicate oxygen depletion of bottom waters. Subsequently, however, a strong increase in benthic foraminiferal abundance and diversity reflects a better oxygenation of the bottom-water masses, probably related to a weakening of the OMZ.