



## Stable isotope and benthic foraminiferal records of the Latest Danian Event at ODP Site 1262 (Walvis Ridge)

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The Latest Danian Event (LDE – aka Top Chron 27n Event) is characterized by a  $>1\text{‰}$  negative benthic foraminiferal CIE in various sections in Egypt, which has been correlated with  $\delta^{13}\text{C}$  shifts of  $\sim 0.7\text{‰}$  in Zumaia (Spain), Wombat Plateau (ODP 761B, Indian Ocean) and Shatsky Rise (ODP 1209, Pacific Ocean) (Bornemann et al., 2009; Westerhold et al., 2011). A concurrent  $\sim 0.5\text{‰}$   $\delta^{18}\text{O}$  excursion suggests a  $2^\circ\text{C}$  bottom water temperature rise during this event at Shatsky Rise, suggesting a hyperthermal nature for this event (Westerhold et al., 2011).

Here we show the first results of benthic foraminiferal faunal and isotope patterns related to the LDE at Walvis Ridge (ODP Site 1262, Southern Atlantic Ocean, paleodepth  $\sim 3000$  m). The high percentage of planktic foraminifera (on average 99.2%) indicates good carbonate preservation. Stable isotope analyses on the benthic foraminifer *Nuttallides truempyi* show a  $\sim 0.9\text{‰}$   $\delta^{13}\text{C}$  shift at  $\sim 62.2$  Ma. Lowest values are measured at  $\sim 62.15$  Ma. A concurrent  $\sim 0.8\text{‰}$   $\delta^{18}\text{O}$  excursion indicates a  $\sim 3^\circ\text{C}$  temperature rise, larger than at Shatsky Rise.

$\delta^{13}\text{C}$  values recover to reach a transient plateau at  $0.75\text{‰}$  during the second Fe peak (from  $\sim 62.1$  to  $62.0$  Ma), coinciding with a second negative  $\delta^{18}\text{O}$  excursion of  $0.7\text{‰}$ . Also the ODP Site 1209 (Shatsky Rise) record shows these double Fe,  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  peaks. This is a feature that the LDE shares with some early Eocene hyperthermals, like ETM-2/H1-H2 and I1-I2, and might point to a common origin as the early Eocene hyperthermals.

The Walvis Ridge samples show a highly diverse assemblage of benthic foraminifera with a relative abundance of 10-15% of *Gyroidinoides* spp. and  $\sim 10\%$  of *Nuttallides* spp., *Siphogenerinoides* spp., *Gavelinella* spp., *Epistominella* spp. and *Cibicidoides* spp. The  $\sim 15\text{cm}$  sample interval dataset seems to show no large changes in relative abundance of these species at the onset of the LDE.

This is different than faunal response to early Eocene hyperthermals, like ETM2. During ETM2 at DSDP Site 401 (Bay of Biscay, NE Atlantic), oligotrophic conditions are inferred because of the absence of opportunistic species (D'haenens et al., 2012). The ETM2 CIE of  $0.76\text{‰}$  at Site 401 is smaller than the LDE CIE at Walvis Ridge ( $0.9\text{‰}$ ), which is in contrast to the seeming lack of benthic foraminiferal turnover at the LDE. However, the CIE during ETM2 is significantly higher at other deep-sea sites ( $1.1$ - $1.6\text{‰}$ ; D'haenens et al., 2014).

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