



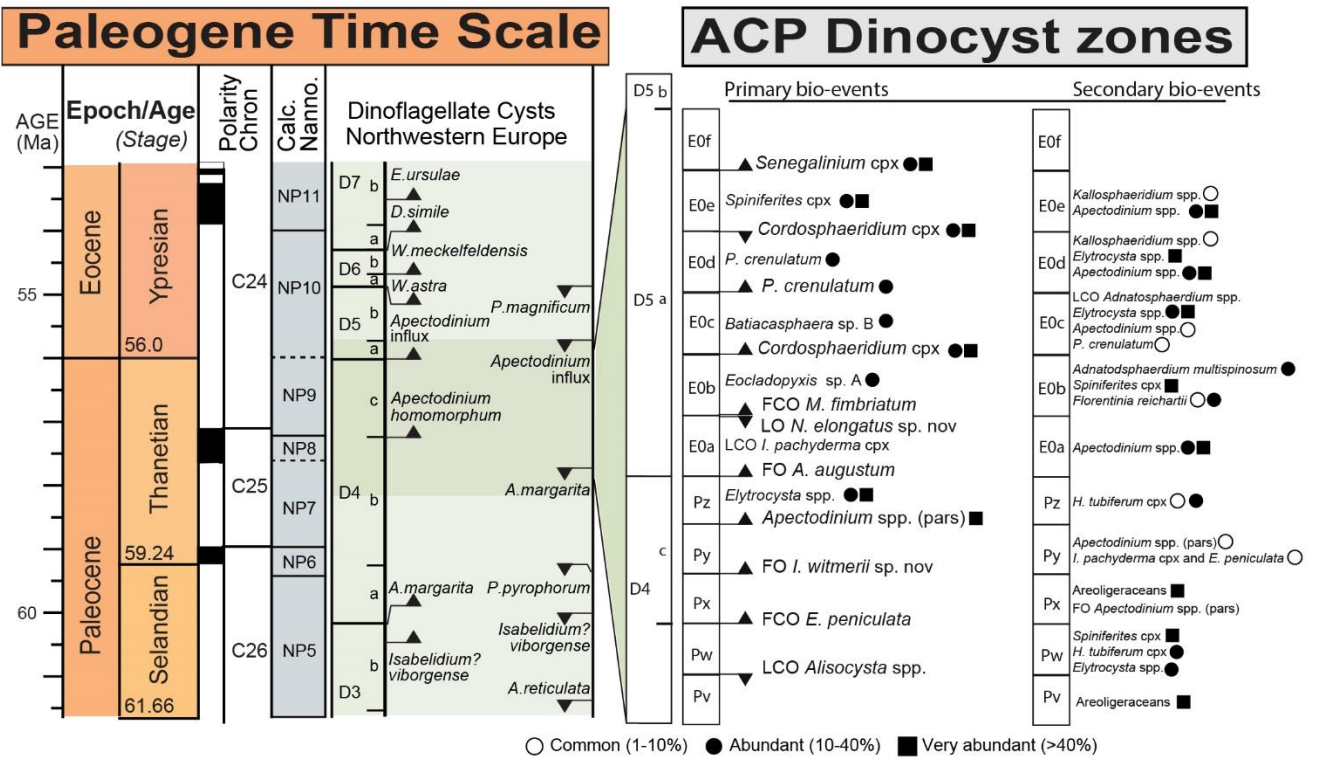
*Supplement of*

## **A high-resolution late Paleocene–early Eocene organic-walled dinoflagellate cyst zonation of the United States Atlantic Coastal Plain**

**Mei Nelissen et al.**

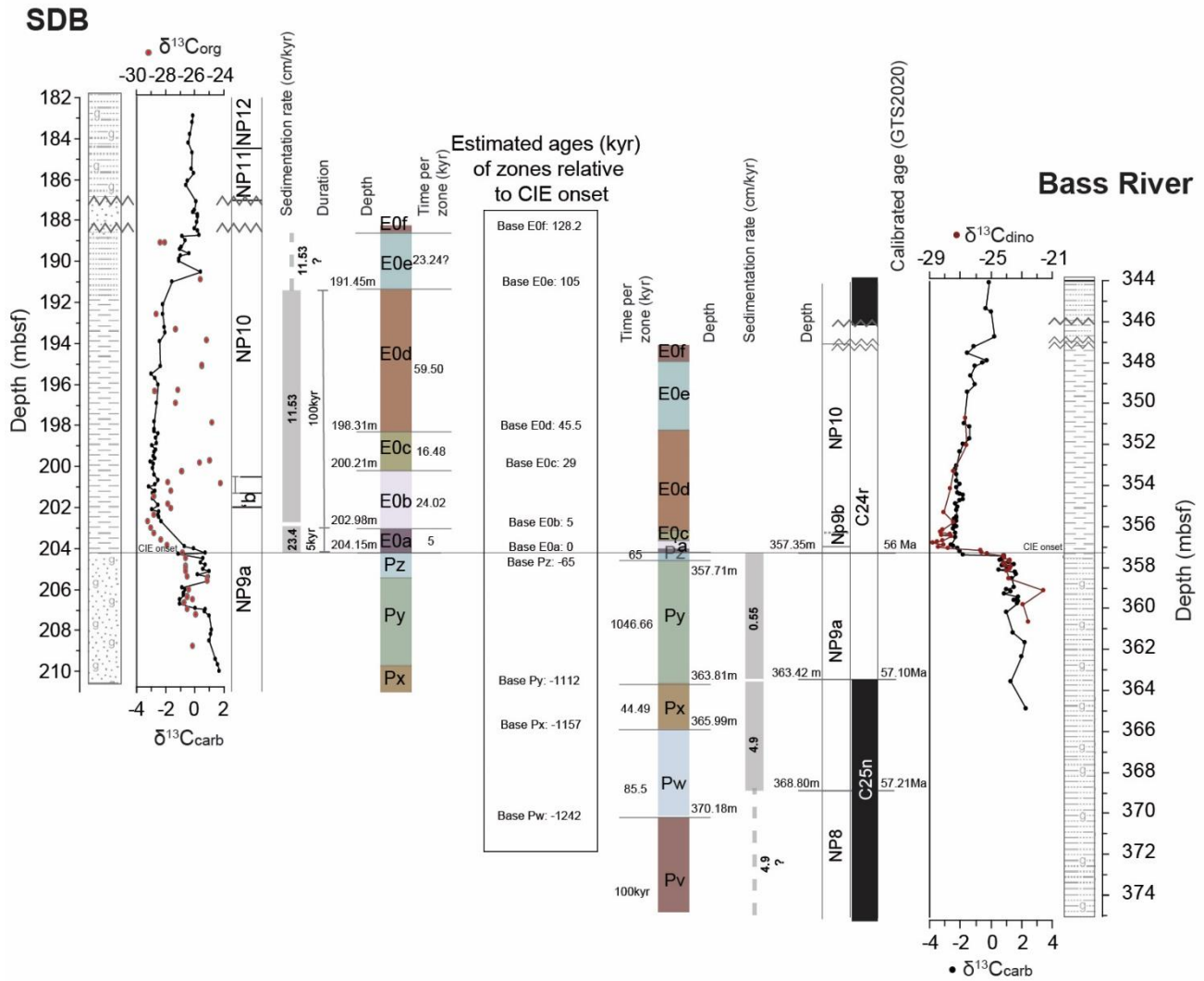
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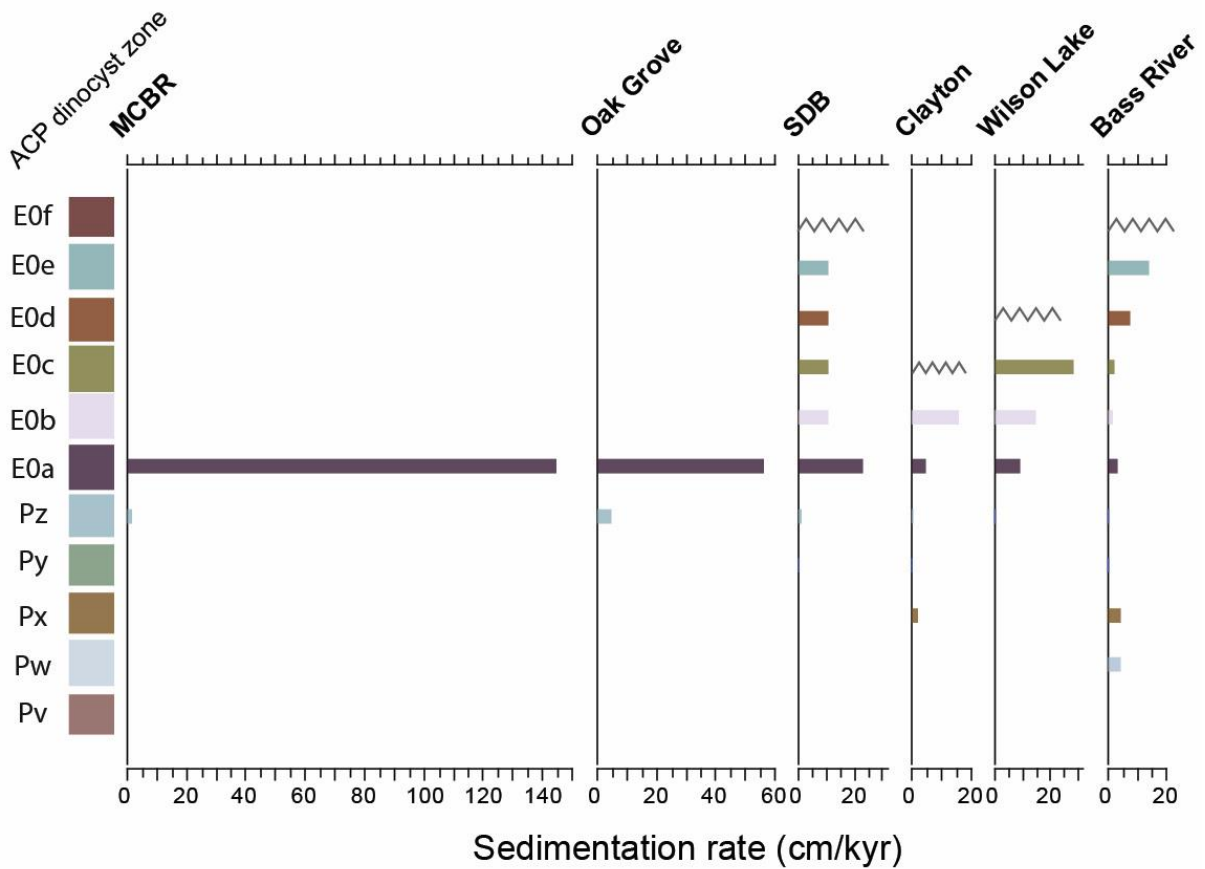


**Figure S1: Integrated US Atlantic Coastal Plain (USCAP) informal dinoflagellate cyst zonation scheme PETM showing primary- and secondary bio-events.** The First/Last Occurrences (FO/LO), First/Last Consistent occurrences (FCO/ LCO) of dinocysts are shown. Eocene ACP zones and late Paleocene zones are labelled from older to younger. Bioevents characteristic for zones are indicated as common (1-10%), abundant (10-40%) or very abundant (>40%) relative abundances of dinocyst of the total dinocyst assemblage. The ACP zones are integrated in the scheme of Gradstein and Ogg, 2020, showing the calcareous nannoplankton (NP) zones from Martini, 1971. Figure adapted from Gradstein and Ogg, 2020. For an overview of taxa and complexes, see remarks in the annotated species list in Section 6.3. All dinocysts data available in the supplementary material.





**Figure S3: overview of calibrated ages and assumptions to constrain sedimentation rates at SDB and Bass River.** From South Dover Bridge (SDB), we show  $\delta^{13}\text{C}_{\text{bulkcarb}}$  (Self-Trail et al., 2012) and  $\delta^{13}\text{C}_{\text{org}}$  data (Lyons et al., 2019), and the NP zones from Self-Trail et al., (2011). From Bass River we show the paleomagnetic data with the Chron C24r/C25n reversal (Cramer et al., 1999),  $\delta^{13}\text{C}_{\text{bulkcarb}}$  (Cramer et al., 1999, John et al., 2008) and  $\delta^{13}\text{C}_{\text{dino}}$  data (Sluijs et al., 2007) and NP zones from Aubry et al., (2000). For the late Paleocene zones in Bass River, we interpolate the depths and ages for the boundary between NP8 and NP9 (57.1Ma, from Gradstein et al., 2012), the magnetic reversal between Chron C25n and C24r (57.1Ma) and the Paleocene-Eocene boundary (56Ma), following Gradstein and Ogg (2020). Note that the age of the NP8/NP9 boundary is not clearly stated in GTST2020. For the CIE duration in SDB, we assumed that the CIE onset lasted 5kyr and a duration of the CIE body of 100kyr. The estimated ages of the bases of the ACP dinocyst zones is provided here as a relative age with respect to the CIE onset. For all calculations we refer to the supplementary data table.



**Figure S4: calculated average sedimentation rates per ACP dinocysts zone.** Sites shown are MCBR (Mattawoman Creek-Billingsley Road), Oak Grove, South Dover Bridge (SDB), Clayton, Wilson Lake and Bass River. Calculations based on the duration of the zones calculated at SDB and Bass River. Calculations for the late Paleocene zones Pv-Pz are based on the ages from Gradstein and Ogg (2020) of the C24r/C25n boundary, and the CIE onset and Gradstein et al., (2012) for the NP8/NP9 boundary, all calculated for Bass River. Calculations for the PETM zones E0a-E0e are based on assumptions regarding the duration of the CIE onset and body phase in the SDB core. These were interpolated to provide some constraint on the duration of each zone and then applied to the other studied sites. These sedimentation rates give an average sedimentation rate per zone. For the calculations and assumptions used here, we refer to the supplementary data set and supplementary Fig. S3. Numbers per zone are provided in Table 3 in the main text.