Recurrent *Braarudosphaera* acmes in the mid-Oligocene subtropical South Atlantic Ocean linked to astronomical forcing of the hydrological cycle.

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A continuous record across the "*Braarudosphaera* chalks" was recovered from mid-Oligocene (~30–27Ma) deep-sea sediments in the subtropical South Atlantic Ocean and has been studied in detail. This stratigraphic section from ODP Site 1264 (Walvis Ridge) documents a succession of several chalky layers that consist almost completely of *Braarudosphaera bigelowii*, which indicates a basin-wide open-ocean acme for this calcareous nannofossil. Sediment cores with multiple *Braarudosphaera*-enriched layers have previously been recovered at drill-sites throughout the South Atlantic Ocean, such as Oligocene sections on the Rio Grande Rise and off the coast of Africa. This peculiar presence of *B. bigelowii*, a nannofossil taxon known to have shallow-water and low-salinity preferences in the modern ocean, suggests that unusual paleoceanographic conditions caused this mid-Oligocene biogeographical anomaly. Our study was concerned with unraveling the causes of the recurrences and the timing and durations of the acmes. We identified seven acme intervals of variable intensity in the *B. bigelowii*/pentaliths abundance record, and some, but not all, of these intervals correspond to prominent chalk layers. Through astronomical tuning, we found a correspondence between the longest lasting acme and a strong minimum in the ~2.4-Myr eccentricity cycle at ~28.5Ma, and between four of the seven acmes and a 405-kyr eccentricity maxima. This remarkable and complex astronomical pacing of the *Braarudosphaera* blooms suggests that the aberrant oceanographic conditions that enabled *B. bigelowii* to outcompete other nannoplankton probably occurred in response to astronomically forced changes of the global mid-Oligocene hydrological cycle.