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What drives clay-carbonate cyclicity in marine sediments? A case study in the South Atlantic from the late Cretaceous to early Paleogene

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Cyclicity in sediments tuned to orbital frequencies has been classically used to assess distribution of time through sedimentary sequences. However the physical processes driving cyclicity in sediments remains unclear. In this study we compare extraterrestrial 3He based sedimentation rates in two late Cretaceous-early Paleogene sites in the South Atlantic to investigate physical processes driving carbonate-clay cyclicity in marine sediments We sampled two 1.5m long segments of Maastrichtian age from the Walvis Ridge (site 528) and the Rio De Grande ridge (site 516F) and a third segment of early Paleogene from the Rio De Grande Rise (516F). The 3He based sedimentation rates show that sediment distribution by bottom currents play important roles in generating clay-carbonate couplets. Furthermore clay-carbonate couplets arise from different processes at the two sites. Identification of physical processes that drive carbonate-clay sequences have important implications for sub-orbital time scales critical for interpreting pace of major climate change and recovery of ecosystem from biotic crises, such as the end cretaceous mass extinction event.