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A stable oxygen isotope record of weather-timescale variability in the Eocene greenhouse world, using the giant marine gastropod *Campanile giganteum*

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Instrumental climate data are only available for the last few hundred years. To extend this record back in time, climate proxies are used. However, on the geological timescale, the temporal resolution of most paleoclimate records does not provide information about seasonality, let alone events on the weather-timescale. These weather-timescale events are becoming more frequently integrated in models to predict future climate change, but reconstructions of variability with such short timescales in the geological record are extremely rare.

A recent study by de Winter et al. (2020) has revealed that the Eocene giant marine gastropod *Campanile giganteum* (Lamarck, 1804) had growth rates exceeding 600 mm/year along the helix, far exceeding those of most other modern and fossil molluscs. With such high growth rates, these giant gastropods have the unique potential to record weather-timescale variability in the Eocene greenhouse world. Therefore, we generated a high-resolution (mm-scale) $\delta^{18}\text{O}$ record on a well-preserved specimen of *C. giganteum* from the Paris Basin in Fleury-la-Rivière, France, in order to generate a unique ultra-high resolution record of intra-annual, weather-timescale variability in the Eocene. Our preliminary results show a clear seasonal pattern with $\delta^{18}\text{O}$ values ranging between 0.1‰ and -2.5‰, superimposed by weekly variations of up to 0.5‰. This could provide insights in weather patterns in the Eocene greenhouse climate and potentially allow the identification of extreme weather events.

Reference

de Winter N.J., Vellekoop J., Clark A.J., Stassen P., Speijer R.P., Claeys P., (2020) The Giant Marine Gastropod *Campanile Giganteum* (Lamarck, 1804) as a High-Resolution Archive of Seasonality in the Eocene Greenhouse World., *Geochemistry, Geophysics, Geosystems*, 21(4),

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