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The effect of growth rate and light intensity on the hydrogen isotopic composition of long-chain alkenones produced by *Emiliania huxleyi*

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A potential new tool for paleo-salinity reconstructions uses the hydrogen isotopic composition of long-chain alkenones produced mainly by the coccolithophorid species *Emiliania huxleyi* and *Gephyrocapsa oceanica*. Using culture experiments, it has been shown that the fractionation between D/H composition of the water and C_{37}-alkenones is relatively constant. However, more recent work on *E. huxleyi* and *G. oceanica* provided evidence that δD of alkenones not only reflects the D/H ratio of ambient culture water at the time of algal growth but that the amount of hydrogen isotopic fractionation seems to be dependent on growth rate and salinity itself (Schouten et al., 2006, Biogeosciences 3, 113-119).

In this study we investigated the effect of light controlled growth rate variations on the δD signal of alkenones produced by *E. huxleyi*. We show that the amount of isotopic fractionation was not directly controlled by algal growth rate but strongly dependent on the provided light intensity, which in turn controlled the growth rate. In our presentation we will discuss the implications of this observation for (i) factors affecting hydrogen isotopic fractionation during lipid biosynthesis and (ii) the applicability of the proposed alkenone δD proxy for paleo-reconstructions.