The impact of oxic degradation on long chain diol proxies: a laboratory study

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In order to ascertain current climate variability, it is imperative to study and reconstruct past climate using a variety of methods. Recently, focus has been on long chain alkyl diols, which have been reported in a wide range of environments and hold promise for the reconstruction of sea surface temperatures [1] and productivity/upwelling [2]. However the impact of diagenesis on the distribution of these diols is poorly constraint.

Here, the impact of oxic degradation on long chain alkyl diols is being studied by a yearlong aerobic incubation of freeze-dried biomass of the diol synthesizing alga *Nannochloropsis oculata* in sea water.

During the first 35 degradation days, polyunsaturated fatty acids were rapidly degraded, while saturated fatty acids and α- and β-hydroxy fatty acids remained stable. Sterols and phytol decreased slightly in abundance over this period.

The C_{30} 1,15 and C_{32} 1,15 diols were the most abundant diols, with only minor amounts of C_{28} 1,13 and C_{30} 1,13 diols in the initial biomass. A significant increase in diol concentration was apparent over the course of incubation, pointing to a release of diols, possibly from macromolecular material. The long chain diol index, calculated from the relative abundances of C_{28} 1,13, C_{30} 1,13 and C_{30} 1,15 diols [2], remained stable throughout the first 35 degradation days. This suggests an insignificant impact of oxic degradation on long chain diol distributions during short term exposure to oxygen.

[1] Rampen et al. (2012) Geochim. Cosmochim. Acta 84, 204-216.
[2] Rampen et al. (2008) Earth Planet. Sci. Lett. 276, 207-213.