

Potential application of branched tetraether lipids as palaeo-environmental and palaeoclimatic proxies in lakes and marine systems

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Since their discovery in peat early this century [1], branched glycerol dialkyl glycerol tetraethers (brGDGTs) have attracted many scientists to decipher continental palaeoclimatic data from geological archives such as lake and river fan sediments, peat bogs, loess deposits, and palaeosoils. This all followed after the discovery that the distribution of brGDGTs in soil reflect environmental parameters such as pH and temperature [2] and that fossil brGDGTs transported by rivers to marine sediments can reveal continental climate fluctuations in the past [3].

In the last five years extensive proxy validation studies have been performed on brGDGTs and a variety of problems associated with its use have been noted. These include: (i) unknown biological sources, (ii) inadequate analytical protocols for their analysis, (iii) potential in-situ production in aquatic environments, (iv) effects of other environmental parameters such as aridity, (v) inadequate knowledge on transportation mechanisms, (vi) calibration problems. In this presentation I will critically evaluate the current state of knowledge with respect to the application of brGDGT proxy. This is partially based on culture studies of bacteria and extensive proxy validation studies in the drainage basin of various river systems (Amazon, Yenisei, Rhône, Tagus) and lakes (Lake Challa, Loch Lomond, Lake Lucerne) performed in our laboratory.

[1] Sinninghe Damsté, *et al* 2000. *J. Chem. Soc., Chem. Comm.*, 1683-1684. [2] Weijers *et al* 2007. *Geochim. Cosmochim. Acta* **71**, 703-713. [3] Weijers *et al* 2007. *Science* **315**, 1701-1704.