



## Novel branched glycerol dialkyl glycerol tetraethers: occurrence in the environment and implications for the use of the CBT/MBT proxies.

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Branched glycerol dialkyl glycerol tetraethers (br GDGTs) are bacterial membrane lipids found ubiquitously in peat, soils, lakes and coastal marine sediments. Structural variation in the form of degree of cyclisation and methylation of the alkyl chains, depend on ambient soil pH and temperature (Weijers et al., 2007a). By erosion of soil and transportation by rivers, a palaeoclimate record is deposited in lake and ocean sediments (e.g. Weijers et al. 2007b, Tierney and Russell, 2009). Previously a global calibration was made, based on nine compounds: tetra-, penta-, and hexamethylated br GDGTs with zero to two pentyl moieties (Weijers et al., 2007a).

We have investigated the br GDGT composition in a Siberian peat and detected four isomeric forms on top of the molecules used in the original calibration. The hexamethylated br GDGT, which was previously assumed to be one compound, was shown to consist of four different isomers. The pentamethylated br GDGT, also assumed to be one compound, consists of two isomers.

We have improved the existing chromatographic methodology to better separate the br GDGT components used in MBT/CBT proxies and their isomers. Using a dataset of soil and river samples sampled throughout Siberia, the results show a high relative abundance of the new isomers in rivers and lakes (46-92% of total hexamethylated br GDGT) and soils (0-83% of total hexamethylated br GDGT). The widespread detection of these abundant new compounds implies that previous calibrations based on br GDGTs may need reevaluating. The relative abundance of the new br GDGT isomers correlates well with the CBT-index, suggesting a dependence on pH. However, this relationship is markedly different for soil and aquatic samples. We will discuss the possibility to use the new isomers to identify in-situ produced 'aquatic' br GDGTs in lake sediments.

### References:

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