Abstract

The review is divided into two major sub-sections, the first focusing on n-alkanes and the second on GDGTs. Considering n-alkanes, the carbon chain length and the predominant evenness or oddness are of particular importance to identify the source organism. However, the high species and interspecies variability in chain length associated with environmental conditions or the differences in the amount of n-alkyl lipid production are problematic. Since n-alkanes are composed of carbons and hydrogens, they can also be studied based on their isotopic composition. Plants discriminate against heavier isotopes of carbon and hydrogen during the formation of organic molecules, resulting in the production of more depleted compounds. Using $\delta^{13}C$, we can determine the water availability over time or the exchange between C3 or C4 vegetation; applicability is limited by the latitude of the site or bacterial production of n alkenes. $\delta^{2}H$ of C_{17} alkane can reveal the evapotranspiration of a lake and/or the $\delta^{2}H$ values of lake water, nevertheless, we need sufficient concentrations of the n-alkane in question, and be sure the source of the hydrogen in the lake water hasn´t been affected in the past.

GDGTs use to be analyzed primarily by their structure, which may change with changes in ambient temperature, i.e. GDGTSs have the potential to be a capable climate-proxy. Using various calculations, we can reconstruct relatively accurately the mean surface temperature of a lake, the mean annual air temperature, or reveal allochthonous inputs of organic material. Again, a possible bias has to be considered, e.g. seasonality in the production of a particular compound or excessive organic matter input from the catchment.