# Long-chain diols of the Canadian Prairies – Occurrence and relationship with environmental parameters

M. M. ZWICK[1]*, P.R. LEAVIT[2], H.A. HAIG[2], B. CAVAZZIN[1], AND J. TONEY[1]

[1]University of Glasgow, G12 8QQ Glasgow, UK, (*correspondence: m.zwick.1@research.gla.ac.uk)
[2]University of Regina, SK, Canada S4S 0A2

## The need for quantitative temperature proxies

The Canadian Prairies (CP) in Saskatchewan are characterised by strong seasonality, exceedance of evaporation over precipitation, and extreme hydrological events (e.g. droughts, floods). Despite these disruptive and costly events, this region relies heavily on agriculture [1]. Understanding and quantifiying the underlying drivers of meterological events is imperative to accurately predict future climate, and mitigate agricultural damages. Quantitative temperature reconstructions using long-chain diols (LCD) have great potential to provide a valuable proxy to understand climate process in this region.

Previous studies have shown a robust relationship between specific diol isomers and SST in marine systems [2]. Subsequent analysis of lake surface samples and culture experiments with eustigmatophytes [3] indicate that relationships between LCD and environmental variables are more complex in lacustrine systems. A robust application of LCD as a paleothermometer requires a better understanding of eustigmatophyte occurrence, seasonality, depth preference and regional/site-specific reaction to temperature change.

Here, we present analyses of sedimentary LCDs in 106 prairie lakes with comparison to a diverse database of environmental parameters spanning two decades. The occurrence of LCDs was limited to sites with a summer salinity of below 14 g/L. Principal Component Analyses and correlation matrices indicate that fractional abundances of the 1,15 $C_{32}$ isomer provide a better relationship in prairie lakes than the previously suggested Long-chain Diol Index (LDI) [3].

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