Link to the **IsoTalk** project webpage :

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Seasonality of Group I alkenone production and in-situ U^K_{37}-Temperature calibrations for mid-latitude Swiss lakes

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Introduction

Alkenones are a commonly used paleothermometer found and preserved in marine and high-latitude lake sediments. In this study, we describe alkenone production seasonality in two Swiss lakes to test the applicability of alkenones as paleothermometer in mid-latitude freshwater lakes.

Greifensee and Lake St. Moritz were monitored for alkenone presence in the water column in spring 2025. Temperature of the water column was measured continuously to establish U^K_{37}-Temperature calibrations.

$$U^K_{37} = \frac{[C_{37:2}Me]-[C_{37:4}Me]}{[C_{37:2}Me]+[C_{37:3a}Me]+[C_{37:3b}Me]+[C_{37:4}Me]}$$

Source: Brassell et al., 1986

Study sites

Lowland lake, 439 masl
No ice cover
Eutrophic



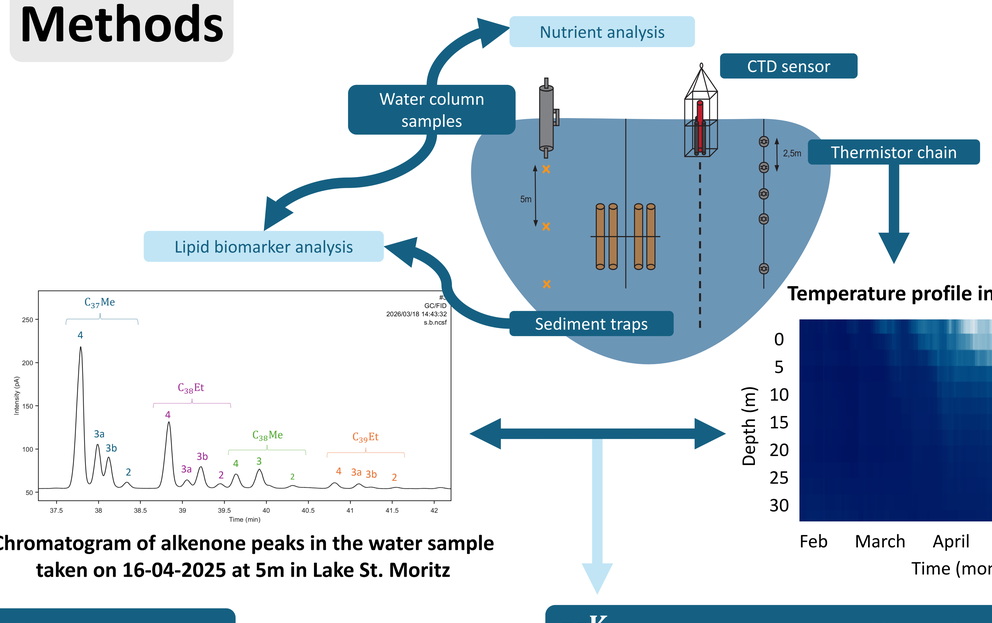
Greifensee

Alpine lake, 1768 masl
Ice cover: Dec-May
Mesotrophic



Lake St. Moritz

Methods

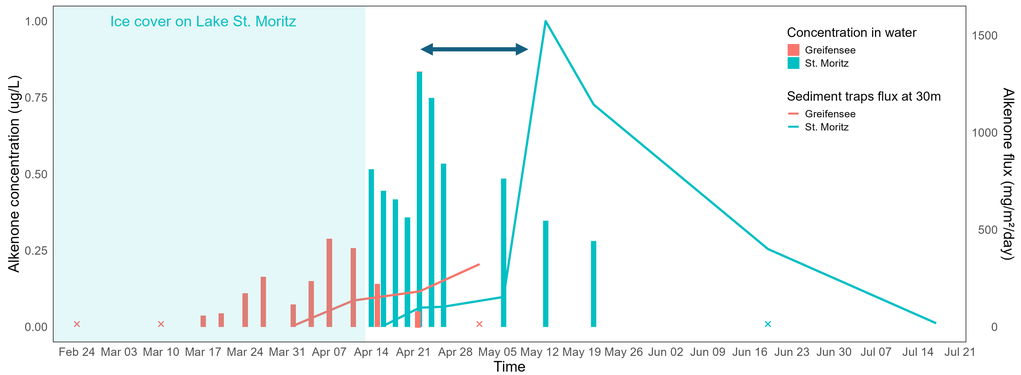


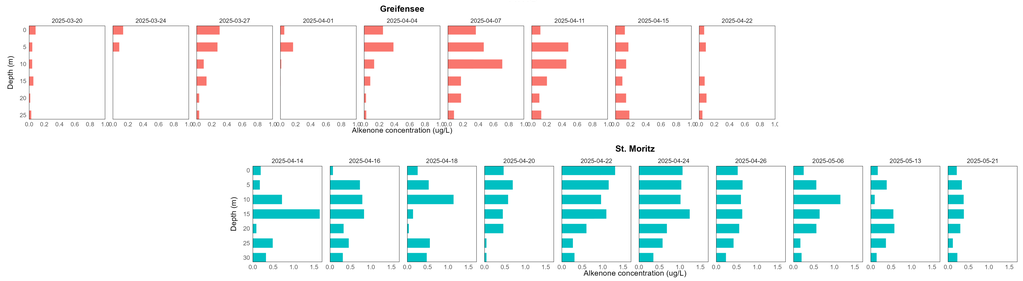
Chromatogram of alkenone peaks in the water sample taken on 16-04-2025 at 5m in Lake St. Moritz

Temperature profile in Greifensee, 2025

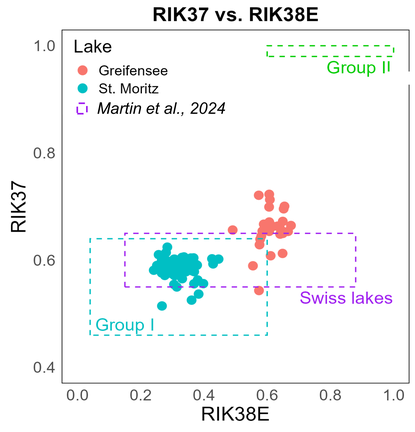
Results

Seasonality of alkenone production





RIK_{37} - RIK_{38E}



RIK_{37} and RIK_{38E} coordinates correlates with the phylogenetic group of the Isochrysidales algae present in the lake. **Lake St. Moritz** values correspond to **Group I** Isochrysidales, **Greifensee** values indicate a potential **mix of Group I and II**.

$$RIK_{37} = \frac{[C_{37:3a}Me]}{[C_{37:3a}Me]+[C_{37:3b}Me]}$$

$$RIK_{38E} = \frac{[C_{38:3a}Et]}{[C_{38:3a}Et]+[C_{38:3b}Et]}$$

Source: Longo et al., 2016

U^K_{37}-Temperature calibrations

- Alkenones are produced from 3 to 9°C in lake St. Moritz and from 5 to 14°C in Greifensee.
- U^K_{37} correlates with temperature in **both lakes**.
- Close calibrations → promising **mid-latitude paleothermometer**

