Environmental response to rapid climatic oscillations in northwest-Europe during Greenland Interstadial 1

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BACKGROUND

INTRODUCTION

Rapid climatic oscillations are recorded in the Greenland oxygen isotope records. During Greenland Interstadial 1 (comparable to Bølling-Allerød) two distinct cold phases, GI-1b and GI-1d, occurred (Lowe et al., 2008).

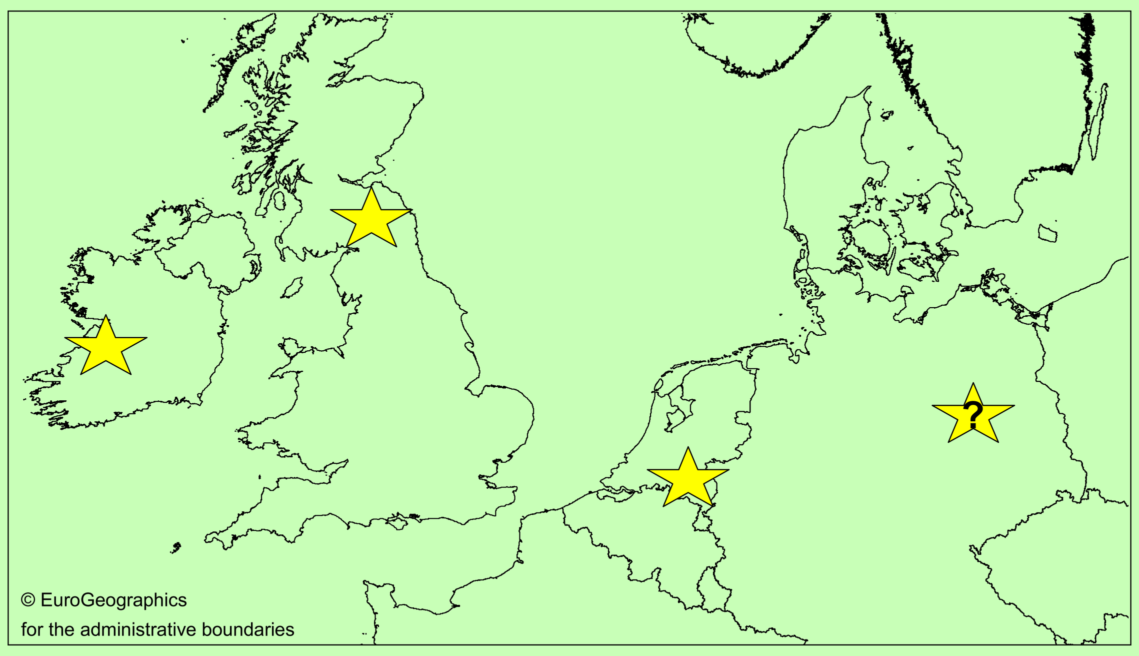
How did this affect the terrestrial environment in northwest-Europe?

METHODS

High-resolution multi-proxy analyses will be carried out on selected calcareous lake deposits along a west-east transect through NW-Europe. The cores will be analyzed for:

- pollen (regional and local vegetation)
- chironomids (quantitative temperature reconstruction)
- oxygen isotopic composition of bulk carbonates (qualitative temperature reconstruction; correlation with Greenland ice core records)

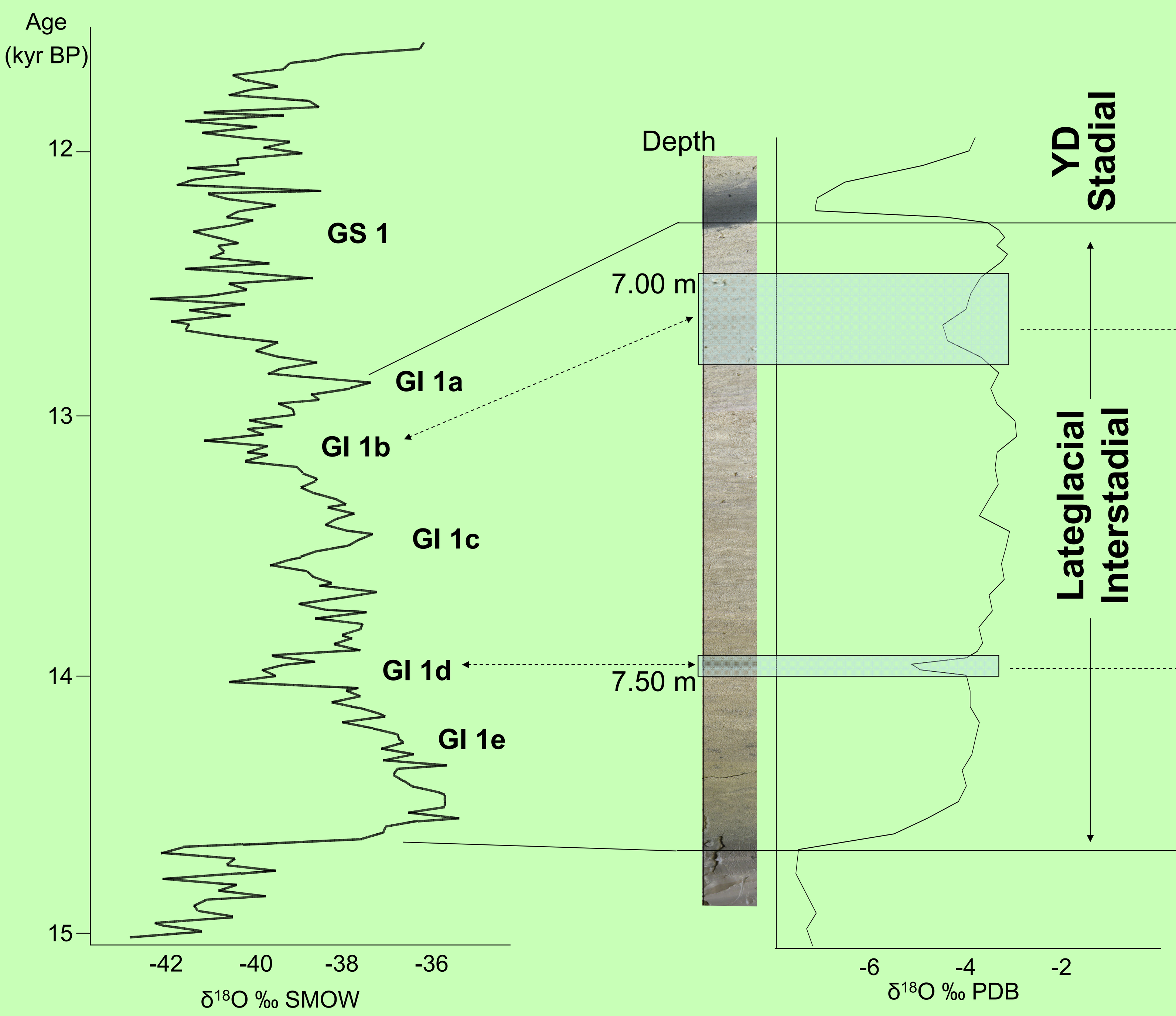
STUDY SITES



Ireland	Britain	the Netherlands	Germany
Fiddaun	Whitrig Bog	Klein Ven	We are still looking for a suitable sampling site in central/east-Germany.
First results from this site are presented here.	Brooks et al. (1997) Mayle et al. (1997)		

FIRST RESULTS FROM IRELAND

Oxygen isotopes NGRIP, Greenland (Lowe et al., 2008)	Oxygen isotopes Fiddaun, Ireland	Chironomids Fiddaun, Ireland (preliminary results)	Pollen Fiddaun, Ireland (preliminary results)



Chironomids (YD Stadial): Dominated by cold-water chironomids (*Sergentia coracina*-type, *Micropsectra radialis*-type, *Corynocera*-type and *Stictochironomus rosenschoeldi*-type)

Pollen (YD Stadial): Herbaceous communities (*Artemisia*, sedges, *Thalictrum*)

Lateglacial Interstadial:

Pollen: Grass and sedge dominated communities

Chironomids: *Brief expansion of cold-water chironomids (S. coracina-type)*

Chironomids: Dominated by warm- and intermediate water chironomids

Pollen: Scrubby vegetation with juniper, birch and crowberry

Chironomids: *Brief expansion of cold-water chironomids (S. coracina-type and M. radialis-type)*

Pollen: *Brief decline juniper and increase herbs*

Pollen: Herbaceous communities with sorrel, willow and crowberry

PRELIMINARY CONCLUSIONS AND FURTHER RESEARCH

- The oxygen isotope and chironomid records from Ireland provide evidence for the occurrence of short-lived cold events that can be correlated to GI-1b and GI-1d.
- The first cold event (GI-1d) led to a brief decline of juniper and an expansion of herbs.
- Higher-resolution pollen analysis for the later part of the Interstadial will show whether GI-1b also led to a change in the vegetation.
- Tephra analysis and AMS ^{14}C dating will be used for building a chronological framework.

Results from other sites along the west-east transect will show the impact of rapid climatic changes during Greenland Interstadial 1 on the environment in northwest-Europe.

References:
- Brooks, S. J., Lowe, J. J. and Mayle, F. E., 1997, The Late Devensian Lateglacial palaeoenvironmental record from Whitrig Bog, SE Scotland. 2. Chironomidae (Insecta: Diptera). Boreas 26, 297-308.
- Lowe, J.J., et al., 2008, Synchronisation of palaeoenvironmental events in the North Atlantic region during the Last Termination: a revised protocol recommended by the INTIMATE group. QSR 27, 6-17.
- Mayle, F. E., Lowc, J. J. and Sheldrick, C., 1997, The Late Devensian Lateglacial palaeoenvironniental record from Whitrig Bog, SE Scotland. 1. Lithostratigraphy. geochemistry and palaeobotany. Boreas 26, 279-295.

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