CPC Soil Moisture. Mapping the results of the analyses has allowed us to identify the most important climatic parameters which influence the radial growth of conifer trees in the northern and central parts of European Russia. It is obvious that all conifers growing to the north of 60°N react positively to summer temperature (minimum, maximum, mean temperatures of the warm season and individual months). To the south, at the latitude of 54°-56° N the signal is changing and the ring width depends on the combination of two parameters – warmth and humidity (drought index PDSI, precipitation, relative humidity of vegetation season). This border coincides with the modern border of broadleaved and boreal forests. Climatic parameters that form "pointer years" were also defined for all the chronologies of living trees. Currently we are in progress of constructing and updating six long chronologies that contain samples from archaeological and architectural wood. Two of them – "Vologda region" (60°N 39°E; 1085-2009 AD) and "Solovki islands" (65°N 36°E; 1187-2008 AD) chronologies – are already suitable for paleoclimatic analysis. "Solovki islands" chronology showed the highest correlations with the reconstruction of summer temperatures for Kola Peninsula and total solar irradiance reconstruction, while "Vologda region" chronology better correlates with the reconstruction of Northern Hemisphere annual temperature. Comparison of "pointer years" in the chronologies with historical data about extreme climatic events showed that 25% of all the events fall into "pointer years", and vice versa, 33% of negative pointer years fall into historical data. All these results demonstrate good paleoclimatic potential of tree ring width chronologies in European Russia.

Poster

Developing a chrysophyte-based cold-season temperature transfer function and a calibration-in-time model to reconstruct environmental variables in Polish lakes

Iván Hernández-Almeida[1], Christian Kamenik[1], Wojciech Tylmann[2], Martin Grosjean[1]

[1]Oeschger Centre and Institute of Geography, University of Bern, Erlachstrasse 9A, 3012 Bern, Switzerland, [2]Department of Geomorphology & Quaternary Geology, Institute of Geography, University of Gdansk, Bazynskiego 4, 80-952 Gdansk, Poland

Transfer Functions based on modern training sets (calibration-in-space) are well established and powerful tools in quantitative paleolimnology when they are applied to subfossil assemblages to quantitatively reconstruct environmental variables such as temperature. However it is increasingly recognized that the selection of lakes and the design of the Transfer Function is most critical and may bias the results.
Here we show how we selected 50 lakes out of a data base with physical and chemical parameters of 2913 lakes in northern Poland to develop a Training Set for quantitative environment/proxy relationships and, ultimately to reconstruct quantitative seasonally resolved temperatures from multiple biological and inorganic lake sediment proxies. In this context, Poland in unique in three aspects: (i) Poland is one of the most important sites to study European temperatures since it explains up to 86% of the variance of winter temperatures; (ii) several lakes in Poland contain continuous Holocene-long annually laminated sediment sequences that allow for chronologically highly accurate climate reconstructions, and (iii) an inventory of 2913 Polish lakes exist in a data base of physical (longitude, latitude, altitude, morphology and water depth, temperature etc.) and chemical (electric conductivity, pH, nutrients, major anions and cations) parameters. With this data base multiple environmental gradients can be assessed in the multi-parameter space. The ultimate goal of the Transfer Function is to reconstruct seasonally resolved temperatures and precipitation from Chrysophyte stomatocysts, chironomids, diatoms, BSi, total organic carbon (TOC), N and stable C and O isotopes in Lake Żabińskie in NE Poland (54°07'54.5"N; 21°59'01.1"E; 40.1 ha and 43.5 m depth) for the past 1000 years (Project CLIMPOL: 'Climate of northern Poland during the last 1000 years: Constraining the future with the past'). However, the Training Set was designed in a way that the 50 chosen lakes are representative (mean and variance for environmental variables) for most of the lakes in lowland Poland. Using univariate and multivariate outlier detection techniques, we removed lakes that showed extreme values (morphology, physical and chemical parameters), and/or lakes close to big cities and the coast. From the remaining 1247 lakes we selected 50 lakes for the final training set using stratified balanced sampling with ten equidistant blocks along longitude (in Poland a proxy for the temperature gradient) and environmental variables (pH, log10-transformed surface area, lake volume, maximum and mean depth, shore-line development, exposure, conductivity, chemical oxygen demand, calcium, sulphate and chloride). The 50 selected lakes are all below 250 m.a.s.l. and span a MAT range of 6-8.5°C and precipitation range between 550-650 mm yr^{-1}. These 50 lakes were equipped with sediment traps and thermistors, and are monitored quarterly for physical and chemical properties of the water column.
Besides developing transfer function for calibration-in-space, we also aim to obtain quantitative climate reconstructions by calibrating biogeochemical proxies from Lake Żabińskie (BSi, TOC and N) to meteorological data (temperature and/or precipitation) covering the last century (calibration-in-time) using inverse linear regression, although its applicability will be further tested on longer temporal scales.

Poster

Developing and validating diatom-based water chemistry models for Ugandan crater lakes: assessing the advantages and disadvantages of regional vs. pan-African calibration datasets

Keely Mills[1], David B. Ryves[2]

[1]Collaborative Research Network, University of Ballarat, Ballarat, Australia, [2]Department of Geography, Loughborough University, Loughborough, United Kingdom

Diatom surface sediment samples and corresponding water chemistry were collected from 56 lakes across