

# SELECTED PROJECTS FOCUSED ON PALAEORECONSTRUCTIONS FOR POLISH TERRITORY



D.J. Michczyńska, N. Piotrowska

GADAM Centre of Excellence, Institute of Physics, Silesian University of Technology, Krzywoustego 2, 44-100 Gliwice, Poland, e-mails: danuta.michczynska@polsl.pl and natalia.piotrowska@polsl.pl

R. Dobrowolski, H. Hercman, M. Łanczont, B. Fiałkiewicz-Kozieł, T. Madejska, W. Margielewski, A. Michczyński, P. Moska, A. Nadachowski, J. Rutkowski, W. Tylmann, J. Urban

## How to Put Together Pieces of Information About Climate Changes? = How to Put Together a Jigsaw? An example of terrestrial data from Poland

### Instruction:

1. Spread puzzle pieces out, face up, on a large table or puzzle mat
2. Separate the edge and corner pieces and put the border together using the box lid picture as a guideline
3. Divide the remaining "inner" pieces and organize in groups with similar colors or letters
4. Start placing similar pieces together until they fit and begin to form clusters - small parts of the larger picture
5. Connect clusters together once you can and keep looking at the box lid picture to find the locations of the groups of pieces
6. Finish the puzzle, connecting all pieces together



1. Spread puzzle pieces out, face up = Conduct your own research, create databases, participate in conferences, read scientific papers, On a higher degree: "Puzzle mat" = big initiatives, like INTIMATE Action On a national degree: "Puzzle mat" = eg. Internet database for collecting information about palaeoreconstructions for Poland
2. The edge and corner pieces = data for reference sites (eg. Lake Gościąg) The box lid picture – absent. There is only a picture of some similar jigsaw = the ice core data
3. The border = reconstructions for whole Poland (eg. Isopollen Maps)
4. Organize in groups = organize working groups Similar colors or letters = eg. reconstructions for one type of proxy data or sedimentation environment
4. Begin to form clusters = look for correlation between different proxy data on local scale (small geographic region)
5. Connect clusters together once you can = connect similar data by the absolute time scale Keep looking at the box lid picture to find the locations of the groups of pieces = keep looking at ice core data to find similarities and correlations, leads and lags
6. Finish the puzzle – the completion of work is still distant; moreover there are some missing puzzles

### GOAL

To receive the picture of the climate changes in the past as full as possible there is a need for creation the common ground for transfer of information. Such common ground should be independent from conferences, workshops and other scientific meeting, and could be provided by a specified web site (eg. the INTIMATE or national web sites).

### TOOL

The web-based database accessible for public would allow for the review and analysis of the state-of-the-art in climate reconstructions. It would be also the valuable tool to fill up knowledge gaps in the distribution of past climate data, to facilitate new scientific collaboration, as well as to increase citation index. Until now the information about 12 ongoing projects has been gathered, which constitutes the first step towards creation of scientific network of Polish projects and research institutions. Presented projects are linked by participating scientists, or simply by existing transfer of information.

### Carbonate-biogenic sequences of spring-fed fens in Poland as indicator of the Late Glacial and Holocene environmental changes

Coordinator: Radosław Dobrowolski  
10 Sites: Bobolice, Ogartowo, Spurgle, Kuźnica, Radzików, Wardzyń, Zawadówka, Pawłów, Laski, Komarów  
Main research tasks:  
- reconstruction of temporal and spatial variability of environmental (hydrological and climatic) conditions in Poland in the last ~12000 years, based on multi-proxy data from spring-fed fens deposits (peats-tufa sequences);  
- reconstruction of changes of sedimentation conditions during the formation and functioning of the examined spring-fed fens;  
- identification of main environmental factors causing the changes of water supply conditions;  
- reconstruction of main evolution stages of the examined objects (stratigraphic, palaeoecologic and palaeoclimatic);  
- determination of the time of permafrost degradation and activation of ascending water supply

### Multi-proxy study of atmospheric pollution and paleoenvironmental change in two mountain peatlands in south-western Poland

Coordinator: Barbara Fiałkiewicz-Kozieł  
Duration: 2011-2014  
2 Sites: Jągnięcy Potok, Na Równi pod Śnieżką  
Main research tasks:  
- To assess the relationship between paleoenvironmental changes in a peat bog and the history of human activity using stable lead and copper isotopes, high-resolution elemental geochemistry with special attention on Pb, Cu, U concentration, mineralogy, testate amoebae, macrofossils, radionuclides, palynological analyses and <sup>14</sup>C and <sup>210</sup>Pb age-dating on peat cores from western Poland.  
- To distinguish the local, regional and/or global influences of human in that region  
- To determine the predominant pollution source areas by comparing the isotopic compositions of peat layers with regional natural (granites, basalts, sandstones) and anthropogenic sources (coal, ores).

### Establishing the chronology of Late Pleistocene loess formation in Poland on the basis of high resolution luminescence dating and litho-pedological studies of selected loess-soil sequences

Coordinator: Dr Piotr Moska, piotr.moska@polsl.pl  
Duration: 21.12.2011 – 21.12.2014  
Time range of the project: from 10 ka to about 200 ka  
Area: Lublin, Sandomierz, and Cracow Uplands and loess deposits in the forelands and foothills of the Carpathians and Sudetes.  
Main research tasks:  
- Clarification of the position of stratigraphic boundaries for the Polish territory based on key loess profiles, for the last 150 ka  
- Examination of regional differentiation of loess deposits from the eastern and western Poland.  
- Comparison of the OSL and radiocarbon methods for the last 60 ka

### Phases of initiation and development of mass movements in the Polish Flysch Carpathians in the Late Glacial and the Holocene, on the basis of research of speleothems and deposits in the crevice type (non karst) caves

Coordinators:  
Włodzimierz Margielewski [margielewski@iop.krakow.pl](mailto:margielewski@iop.krakow.pl);  
Jan Urban [urban@iop.krakow.pl](mailto:urban@iop.krakow.pl)  
Duration: 2010-2013  
Area: Outer (Flysch) Carpathians, southern part of Poland; geographical position: N49°30'-50°00'; E18°40'-22°00'  
Aims of project: estimation of the age of crevice type caves as first stage of mass movements development, determination of landslide phases, detailed mineralogical analyses of speleothems formed of various minerals (calcite, gypsum, opal, clay minerals), assessment the rate of speleothems growing, analysis of the changes of palaeoclimate using stable isotopes; tectonic analyses of the caves.

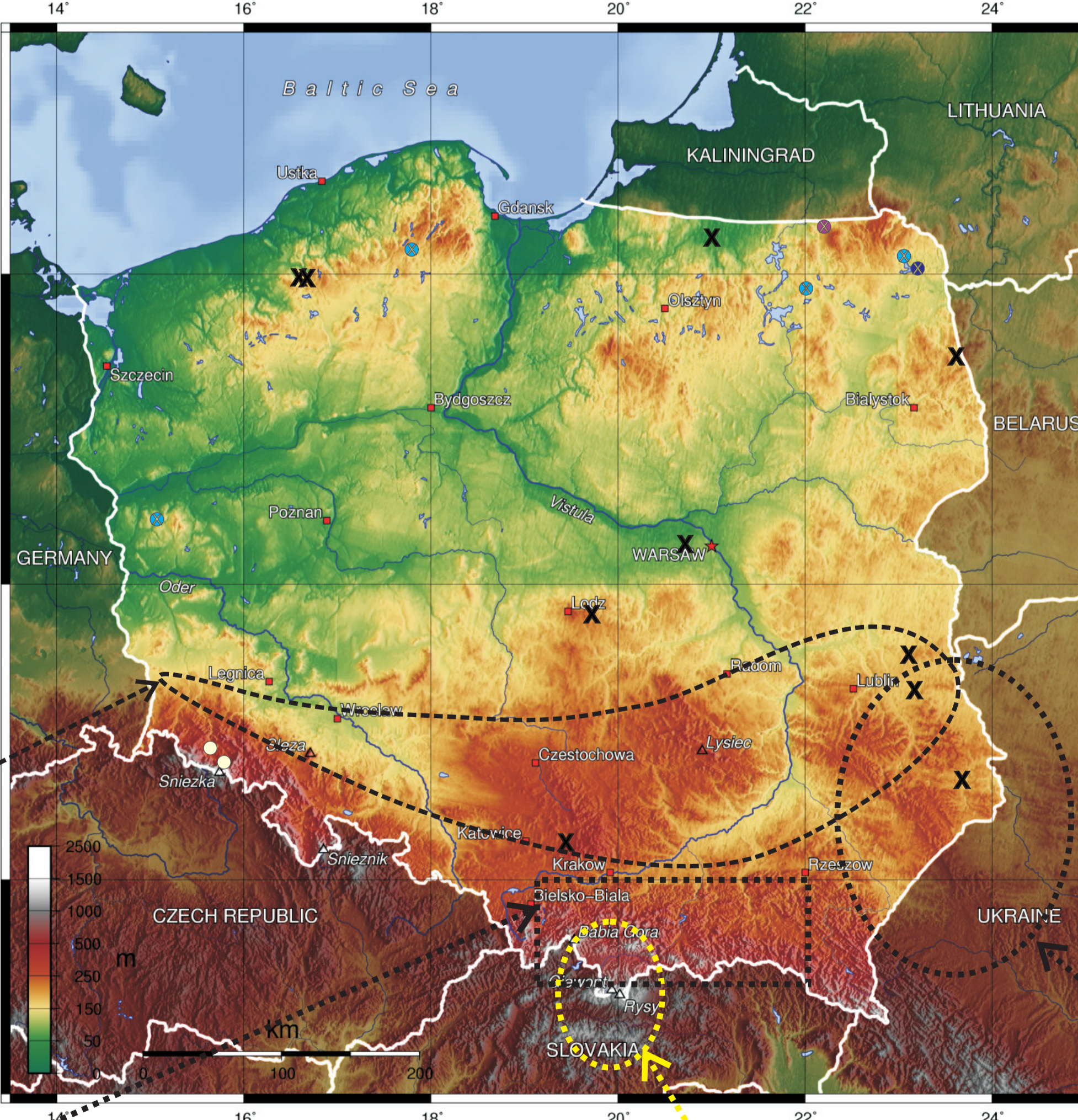
### Application of statistical methods to reconstruction of climate change on Polish territory in the Late Glacial and Holocene

Coordinator: Danuta J. Michczyńska, [danuta.michczynska@polsl.pl](mailto:danuta.michczynska@polsl.pl)  
Duration: May 2011-May 2014  
Area: whole Poland  
Main research tasks:  
- To determine position of chronostratigraphic boundaries for the time period past 16,000 years on absolute time scale  
- To examine regional differences in the analyzed phases and the values of chronostratigraphic boundaries

### Mammal fauna of Poland in Late Pleistocene and the first half of the Holocene – processes of extinction and colonization

Coordinator: Adam Nadachowski, [nadachowski@isez.pan.krakow.pl](mailto:nadachowski@isez.pan.krakow.pl)  
Duration: 2007-2010  
Time range of the project: Range of radiocarbon method  
Area: Poland  
Aim: Reconstruction of patterns of megafaunal extinction in Poland in the changing environment of Late Pleistocene and early Holocene and re-colonization of temperate fauna Establishing a reliable chronology for extinct megafaunal species on the basis of direct dates (AMS <sup>14</sup>C)

New initiative: there was established a consortium of the Centre for Research on Fauna of the Pleistocene of Europe (CBFPE)



### Reconstruction of palaeoclimatic conditions of Late Vistulian and Holocene on a base of high-resolution analysis of stable isotopes and trace elements composition in carbonate deposits in the N-S cross-section through southern Poland and Slovakia

Coordinator: Helena Hercman, [hhercman@twarda.pan.pl](mailto:hhercman@twarda.pan.pl)  
Duration: V.2011 – XI.2013  
Differences in climatic conditions recorded in the speleothems of the Tatras and Low Tatras are visible in the variation in the isotopic composition of oxygen and carbon. The results of the project tend to place several questions: (1) whether the differences are merely the result of local (eg. differences in the composition of rocks above the cave, circulation paths, etc.) or a reflection of global processes? (2) whether the differences are the result of differences in the global palaeoclimatic factors (temperature, humidity) or reflect changes in the sources of precipitation (change of air circulation paths) and (3) whether the changes seen in the youngest speleothems are only the natural factors records, or are the result of human impact?

### NORPOLAR (Northern Polish Lake Research)

[www.norpolar.ug.edu.pl](http://www.norpolar.ug.edu.pl)  
Coordinators: dr Wojciech Tylmann, Prof. Bernd Zolitschka  
Duration: 2007-2011  
Sites: 4 Lakes: Lubińskie, Suminko, Łazduny and Szurpily  
Main research tasks:  
- establishing absolute and multiple-dated chronologies for all four records,  
- linking paleodata with instrumental and monitoring data to improve our understanding of pathways from forcing factors via processes to proxy records,  
- providing high-resolution data sets of paleoredox conditions, paleoproductivity, lake water balance, lacustrine carbon cycling and soil erosion,  
- providing regional data sets of reconstructed climate parameters to be used in combination with the output of downscaled or regional climate models.

### Modelling of calendar timescales for laminated lake sediments in Northern Poland as a basis for high-resolution palaeoenvironmental reconstructions

Coordinator: dr Natalia Piotrowska  
Main research tasks:  
- construction of calendar timescales for NORPOLAR lake sediments on the basis of <sup>14</sup>C and <sup>210</sup>Pb dating and <sup>137</sup>Cs measurements, with additional information from varve chronology

### CLIMPOL Climate of northern Poland during the last 1000 years: Constraining the future with the past

Coordinators: Wojciech Tylmann, Martin Grosjean  
Duration: 2011-2015  
Sites: 50 lakes and Lake Żabińskie  
Main research tasks:  
Data set with 1000-years long, seasonally resolved quantitative temperature series for northern Poland.

### Non-contractual multidisciplinary research on Lake Wigry area

Coordinator: Prof. Jacek Rutkowski  
Cooperation with Wigry National Park, dr Lech Krzysztofiak  
Duration: 1904-?  
Site: Lake Wigry and surroundings  
Main research tasks:  
- To investigate Lake Wigry area origin and development  
- To record and understand factors influencing contemporary lake sedimentation processes  
- To reconstruct past environmental changes recorded in Lake Wigry sediments  
- To train students towards working in multidisciplinary research teams

### Palaeolithic ecumene of the pery- and meta-Carpathian region- a study of environment changes of Western Ukraine and South-Eastern Poland in Pleistocene and their influence on primeval settlement and migration pattern (basing on loess and cave sites)

Coordinator: Prof. Maria Łanczont, [laneczont@poczta.umcs.lublin.pl](mailto:laneczont@poczta.umcs.lublin.pl)  
Duration: 2010-2013  
Main research tasks:  
- Characteristics of living environment of Palaeolithic hunters in different Mid- and Upper-Palaeolithic settlement periods and tracing relationships of cultural units with various biotopes. Developing a model of human activity in the biotopes of peri- and metha-Carpathians zone in the Pleistocene.  
- Reconstruction of migration routes and their directions of mid-Palaeolithic groups, and changes of settlement boundaries of cultures in the Polish and Ukrainian pery- and metha-Carpathians zone.  
- Reconstruction of paleo-landscapes of the study area, in spatial and temporal term