

Sonja B. Grimm

Resilience and Reorganisation of Social Systems during the  
Weichselian Lateglacial in North-West Europe  
An Evaluation of the Archaeological, Climatic,  
and Environmental Record

# MONOGRAPHIEN

des Römisch-Germanischen Zentralmuseums

Band 128

Römisch-Germanisches  
Zentralmuseum  
Leibniz-Forschungsinstitut  
für Archäologie

R | G | Z | M

Sonja B. Grimm

**RESILIENCE AND REORGANISATION OF  
SOCIAL SYSTEMS DURING  
THE WEICHSELIAN LATEGLACIAL  
IN NORTH-WEST EUROPE**

**AN EVALUATION OF THE ARCHAEOLOGICAL, CLIMATIC,  
AND ENVIRONMENTAL RECORD**

Die vorliegende Arbeit wurde vom Fachbereich 07 – Geschichts- und Kulturwissenschaften der Johannes Gutenberg-Universität Mainz im Jahr 2014 als Dissertation zur Erlangung des akademischen Grades eines Doktors der Philosophie (Dr. phil.) angenommen.

The present work was accepted in 2014 by the department 07 – Historical and Cultural Sciences of the Johannes Gutenberg University Mainz as dissertation to attain the academic degree of a Doctor of Philosophy (Dr. phil.).

Redaktion: Claudia Nickel, Marie Reiter (RGZM)  
Satz: Claudia Nickel (RGZM)  
Umschlaggestaltung: Reinhard Köster, Claudia Nickel (RGZM)

#### **Bibliografische Information der Deutschen Nationalbibliothek**

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

**ISBN 978-3-88467-255-6**  
**ISSN 0171-1474**

© 2019 Verlag des Römisch-Germanischen Zentralmuseums

Das Werk ist urheberrechtlich geschützt. Die dadurch begründeten Rechte, insbesondere die der Übersetzung, des Nachdrucks, der Entnahme von Abbildungen, der Funk- und Fernsehsendung, der Wiedergabe auf fotomechanischem (Fotokopie, Mikrokopie) oder ähnlichem Wege und der Speicherung in Datenverarbeitungsanlagen, Ton- und Bildträgern bleiben, auch bei nur auszugsweiser Verwertung, vorbehalten. Die Vergütungsansprüche des § 54, Abs. 2, UrhG. werden durch die Verwertungsgesellschaft Wort wahrgenommen.

Druck: Memminger MedienCentrum Druckerei und Verlags-AG  
Printed in Germany.

# CONTENTS

Acknowledgements	VII
Introduction	1
Material	7
Climate and chronostratigraphic archives	7
Greenland ice-core records	9
Deep sea records	12
Terrestrial records	16
Environmental archives	30
Landscapes	31
Pollen stratigraphies	40
Databases	49
Radiocarbon database	49
Database of Lateglacial sites from north-western Europe	52
Archaeological sites	53
Archaeological groups	55
The Central Rhineland	75
The western upland zone	170
Northern France	182
Methods	245
Climate and calibration	245
Defining the limits of Greenland oxygen isotope events	245
Correlation of tephrochronology with GICC05	247
Correlation of oxygen isotope records with GICC05	248
Correlation of laminated chronologies with GICC05	249
Modifying the CalPal-2007 <sub>HULU</sub> radiocarbon calibration curve	250
Environment	253
Modelling of the physical geography	253
Qualitative and quantitative assessment of data from the living environment	259
Mapping the data from the environment	264
Archaeology	265
Chronological evaluation of the integrity of the archaeological sites	265
Quantitative assessment of raw material sources	269
Qualitative and quantitative assessment of the lithic assemblages	270
Quantitative assessment of the faunal assemblages	282
Evaluation of the settlement behaviour	286
Mapping of archaeologically relevant variables	288
Systematisation of change and social systems in archaeology	288

Results .....	293
Climate and chronology .....	293
Limits of Lateglacial events in the Greenland oxygen isotope record .....	293
The Lateglacial chronostratigraphy of north-western Europe .....	310
The Lateglacial radiocarbon calibration curve .....	358
Environment and chronology .....	364
Physical development of Lateglacial north-western Europe .....	365
Lateglacial vegetation development in the study areas .....	384
Lateglacial faunal successions in the study areas .....	412
Human behaviour and chronology .....	466
Chronologies of the analysed sites .....	466
Changes in the Lateglacial exploitation strategies .....	481
Changes in the Lateglacial settlement behaviour .....	548
Chronology of changes in Lateglacial North-West Europe .....	559
Discussion .....	565
Studying change .....	565
Revolution or evolution? .....	568
Summary .....	575
Aim of the project .....	575
Case study .....	576
Climate and chronostratigraphy .....	576
Environmental reconstruction .....	579
Behavioural patterns based on the archaeological record .....	581
Chronology of changes in the Lateglacial record .....	587
Explaining reorganisation of social systems in the context of climatic and environmental changes ..	587
Appendix .....	591
Abbreviations and glossary .....	591
References .....	599

Plates 1-14

## ACKNOWLEDGEMENTS

»It takes a village to raise a child.«  
Proverb of unclear African origin

Comparable to a child born by a mother and raised by many, a thesis is usually written by one but accomplished only by the help of many. These »many« I would like to thank in the following part.

First of all my parents, Brigitte and Manfred Grimm, and my whole family have provided me with so much support – financially and emotionally – that I will always be grateful to them. Furthermore, the endurance and cheers of many friends (including some furry ones) also motivated and supported me during the whole process of this project and I feel blessed to have such good friends (and pets).

Scientifically, this Ph. D. project was advised by Prof. Dr. Sabine Gaudzinski-Windheuser who is a rich source of good advice I admittedly could not always take easily. However, one of her phrases served as guideline in this whole project and, presumably, continues in its effect:

»I'm not interested in points or things, their moving and appearing nor the environment –  
I am interested in humans!«\*

Moreover, without the freedom of study she allowed me to enjoy I would not have been able to develop my own grasp at the past. In the grand finale, she pushed me to my limits to write a better thesis than I had considered possible before myself. I'm truly thankful for this instance.

Additionally, Dr. Olaf Jöris accompanied the writing process with many helpful comments. Since my early days at university he introduced me, in particular, to the rich world of natural sciences as well as theoretical approaches in archaeology and as a result influenced my scientific interests significantly. Moreover, he set my records straight whenever necessary.

Dr. Martin Street invested an immense effort proof reading earlier versions. Moreover, from my first year working on this thesis, Martin pushed me gently into the scientific world by taking me to conferences, introducing me to colleagues, encouraging me to write articles, discussing my questions and ideas, and thereby sharing his enormous knowledge about Lateglacial archaeology with me. The present work is in large parts owed to his support and, certainly, his investment cannot be truly appreciated.

Dr. Mara-Julia Weber needs special emphasis because of our fruitful collaborative work on Lateglacial archaeology and, moreover, for her invitation to come to Schleswig for continuing this Ph.D. project at Schloss Gottorf during renovations in Neuwied. Furthermore, within the years since we met on a conference in Cologne 2006 some thousand e-mails were exchanged and hours of discussion on the phone or in person spent, often filled up with information, considerations, and ideas about Lateglacial archaeology of north-western Europe (and beyond). I am very glad to have met such a fantastic colleague and wish to continue the productive collaboration. Moreover, I hope to carry on the human discussion with the true friend I found in her.

A very special thanks is due to Prof. Dr. Berit Valentin Eriksen. Her publications were apparently shaping my own Lateglacial research by a general scientific guidance which compiled detailed studies of lithic artefacts with the results of further archaeological material to understand the behaviour of past hunter-gatherer societies. However, I am particularly grateful for her suggestion of my coming to Schleswig, for pushing me to come to an end, and advising me how to get there. Without her rigorous, sisterly tutoring and kind, midwife-like cheering up, this thesis would not be finished.

\* Said in one of the first discussions on the subject of this Ph.D. project, translated from German by the present author.

An adequate thanks can also hardly be given to Prof. Dr. Michael Baales who I consider as one of my important scientific teachers who accompanied my studying life since my first day on an excavation (by chance this site was Niederbieber) and to whom I probably owe my persistent interest in the Lateglacial as a complex world of natural resources and human interactions.

Dr. Geoff Smith and Dr. Susan Harris boldly proof read what no man had read before! They provided useful comments on earlier versions of the text and converted it into a readable English. In the final phase, Dr. Elaine Turner and Dr. Jarod Hutson joined their English proof reading forces to fight my favour of using definite articles and however's, my dislike of during, at, besides, and other prepositions or the creative use of them as well as my flexible placement of adverbs. Certainly, my English has improved by their comments. I wish to thank them very much for helping me in this ghastly task and, of course, mark all remaining mistakes as my own.

Several graphs and illustrations were improved significantly by good advice from Graeme Carruthers M.A. (Hons) MAAIS PifA for which I'm truly thankful.

Furthermore, for many years my work was embedded in Neuwied/Rhine at MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution (MONREPOS) part of the Römisch-Germanisches Zentralmuseum, Leibniz-Forschungsinstitut für Archäologie (RGZM) that is a member of the Leibniz-Gemeinschaft. I was provided with a wonderful place to study and a library containing a rich corpus of Palaeolithic research. Thus, I appreciate these fundamental and essential aids for my project.

In addition, this large institution offered a wide range of fellow colleagues and by the plurality initiated diverse discussions. These discussions with many other colleagues also helped to broaden my views and at the same time sharpen them. Sometimes, these inputs affected more than only scientific matters.

Clearly, fellow archaeologists at MONREPOS consciously or sub-consciously belonged to these discussion partners and, therefore, I like to name the ones present at MONREPOS during my time there in alphabetic order: Anne-Katrin Ackermann M.A., Sylvie Bergmann M.A., Monica Brassler M.A., Enrico Brühl M.A., Dr. Alejandro García Moreno, Sabine Gayck M.A., Dr. Frank Gelhausen, Alexandra Güth M.A., Wolfgang Heuschen M.A., Johanna Hilpert M.A., Dr. Daniela Holst, Dr. Jörg Holzkämper, Dr. Radu Ioviță, Dr. Antje Justus, Dr. Jan Kegler, Dr. Lutz Kindler, Thomas Laurat M.A., Tim Matthies M.A., Dr. Ludovic Mevel, Dr. Luc Moreau, Frank Moseler M.A., Dr. Laura Niven, Heidi Panthermehl M.A., Matthias Probst M.A., Dr. Karen Rubens, Dr. Katsuhiko Sano, Dr. Martina Sensburg, Dr. Aritz Villaluenga Martinez, Monika Wagner, Dr. Stefan Wenzel, and Dr. Sibylle Wolf.

Moreover, only the staff at MONREPOS made a focused scientific atmosphere possible by overtaking some not so pleasant works and for which they deserve many thanks – here is one of them: DANKE, Gabi, Regina, Rosi, Ute! In particular, the »backbone« of the institution, Gabi Gräser, deserves true appreciation for managing all of us, our smaller and bigger problems, and running the whole house meanwhile.

Among the visiting colleagues I would like to mention Dr. Olivier Bignon, Dr. Julia M. Fahlke, Prof. Dr. Paul Pettitt, Dr. Marta Połtowicz-Bobaka, Dr. Felix Riede, and Dr. Tony Stewart. Their expertises gave further interesting »food for thought« in the process of this project.

In addition, many colleagues kindly provided me with literature and information and, furthermore, some of them were so kind to discuss drafts and ideas with me:

Prof. Dr. Nick Barton, Prof. emer. Dr. Dr. h. c. Gerhard Bosinski, Dr. Anne Bridault, Keri Brown M. Phil., Dr. Chantal Conneller, Dr. Dorothee Drucker, Prof. Dr. Dobrochna Jankowska, Dr. Kevan Edinborough, late Prof. Dr. Klaus Felix Kaiser, Dr. Tim Kerig, Hannes Napierala M.A., Drs. Marcel Niekus, PD Dr. Jörg Orschiedt, Dr. Valéry Sitlivy, Dr. Iwona Sobkowiak-Tabaka, Prof. Dr. Boris Valentin, and Dr. Jürgen Vollbrecht.

Moreover, late Dr. Roger Jacobi accumulated a great wealth of data about the (Lateglacial) archaeology of the British Isles and, therefore, will always be remembered. He transferred his database to Wessex Archae-



ology for further use. Wessex Archaeology, in the persons of Dr. Julie Gardiner and Jens Neuberger, made kindly parts of the PaMeLA (Palaeo-MesoLithic Artefacts) database available to me that I want to appreciate here although time did finally not allow to use this source in this project.

Special thanks are also due to Dr. Bernhard Weninger from Cologne and Dr. Tom Higham from Oxford for always answering kindly my questions about sometimes real basics of  $^{14}\text{C}$  dating. Remaining mistakes in the present study are clearly owed to my ignorance.

In Schloss Gottorf, Schleswig, I was warmly welcome and had a good working atmosphere and schedule which I deeply appreciate. The kind and open help and constant encouragement from so many of the people in Schleswig shall be acknowledged here by mentioning some of them (in alphabetic order): Dr. Klaus Bokelmann, Dr. Aikaterini Glykou, Dipl. Karin Göbel, Dr. Julia Goldhammer, Dr. Daniel Groß, Dr. Sönke Hartz, Dipl. Charlotte Hegge, Dr. Vera Henkelmann, Ditte Skov Jensen, Wolfgang Lage, Dr. Harald Lübke, Dr. John Meadows, Dr. Elena A. Nikulina, Harm Paulsen, Thomas Poelmann, Dr. Ulrich Schmölcke, and Maike Tessars. Some foundations and institutions provided financial or material support to this project:

The RGZM appreciably sponsored a license of the Microsoft Office package and made a licensed version of ArcGIS® 9.3 with a hardware key available for me. Moreover, application courses on GIS programs as well as a technical support not only for GIS questions was generously provided by the RGZM. Previously, ESRI Geoinformatik GmbH Kranzberg supplied me kindly with an ArcView® 9.0 Student Edition (EVA841553897) and 9.2 Student Edition (EVA862660258) within their graduate student programme. My thanks are also due to the Deutsche Forschungsgemeinschaft which founded travel expenses (KON 378/2006 GR 3276/1-1). The Prinz Maximilian zu Wied Foundation e.V. granted me a two year scholarship for which I am grateful. Finally, the Robert Bosch Foundation granted money to the former »Museum für die Archäologie des Eiszeitalters« for the »Denkwerk Projekt« and thereby financed me the opportunity to present findings of Pleistocene archaeology to the public.

To all of thee I hail:

»Hooray! The child has come of age!«