



Journal of Sedimentary Research

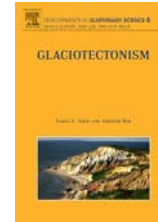
An International Journal of SEPM

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Review accepted 8 August 2007

Glaciotectonism, by James S. Aber & Andrzej Ber, 2007.
Developments in Quaternary Science 6. Elsevier, P.O. Box 211, 1000
AE Amsterdam, The Netherlands. Hardbound, 246 pages. PriceGBP
110.00; USD ~218.00; EUR ~162.00. ISBN 978-0-444-52943-5.



Glaciotectonism is certainly not restricted to the Quaternary. Yet, by far the most analyses of glacioteconic features deal with Quaternary (including recent) units, and therefore it is understandable that this volume has been published in the series *Developments in Quaternary Science*, which has been so far a great success, not in the least by the efforts of the series editor, Jim Rose. This volume is the first under the series editorship of his successor, Jaap van der Meer, and it must be concluded that this is a promising start of the new editor, in spite of an incomprehensible remark in his foreword that “Comparing the first edition of this volume with the present one will reveal ...” As far as I am aware, this is the first edition of a joint work by the two authors!

The book starts with a chapter on the “Nature of glacioteconism”. It is not only an instructive chapter with definitions, terms and concepts, but it also provides an interesting overview of the history of glacioteconic research. I rarely read an introduction that was so well written: where such introductions tend to be fairly dull, this chapter makes it difficult to stop reading, if possible at all. Even for those researchers for whom glacioteconics are just a feature in the margin of their regular work, this must be a great appetizer, truly inviting to know more about this intriguing specialism.

The second chapter, “Geometric analysis”, is—almost by definition—a much more technical piece of work; necessary, but largely dealing with topics that are known from other geological disciplines as well (e.g. the presentation of plane directions by means of the Schmidt stereographic projection). Simultaneously, however, it also provides some relatively new techniques in glacioteconic research, such as the use of seismic sections, as well as the interpretation of satellite photos.

With Chapter 3 (Kinematic analysis), the “real stuff” begins. It deals with the various forms of deformation, from large to micro-scale, which have enabled specialists to develop, already some decades ago, an own approach to the stratigraphy for the—often extremely complex—deformed units, called “kineto-stratigraphy.”

On the basis of the fairly theoretical expertise that the reader must have obtained from the previous chapters, he then can start reading four field-related chapters, which deal with specific landforms that owe their morphology to glacioteconics. Each of these chapters (“Hill-hole pair”, “Composite ridges”, “Cupola hills and drumlins”, and “Megablocks and rafts”) analyses a landform that is more complex than the previous one, thus – didactically very justified – taking the reader by the hand in a way that makes it possible, even for non-specialists, to understand how an analytical approach of forms and processes may eventually reveal the genesis of what seems at first sight an incomprehensible chaos. It is interesting in this context that examples from eastern Europe – a region that has long be more or less isolated from western literature because of both financial and social restrictions posed by the then communistic regime, and that consequently has developed sometimes different, and not rarely most interesting, hypotheses and models – become well exposed in these chapters, obviously thanks to the input by Andrzej Ber.

These non-western contributions to research in glaciotectonism have long not been recognized in the West, but now, finally, get the attention that they deserve. Chapter 7, about megablocks and rafts, is an excellent example of how combination of data and hypotheses from East and West can jointly result in surprising findings.

The Chapters 8 (Intrusions, diapirs and wedges) and 9 (Basement and deep crustal structures) deal with glaciotectonics-related deformations at a wide variety of scales, in a wide variety of forms, and from a wide variety of places. For those who are interested in soft-sediment deformations, particularly Chapter 8 contains exciting information. The data presented in Chapter 9 will certainly surprise those who are not directly involved in this type of research. Who would think that some basement and deep crustal structures represent a significant category of glaciotectonism? The features involved include “basement faults and seismic zones wherein the crust responded differentially as discrete blocks to stress induced by glacial loading and unloading of the lithosphere.” Examples from the Canadian shield and northern Appalachians, northern Scandinavia, the Finger Lakes region in New York, and—again, and in fairly much detail—Poland illustrate the deep effects of glaciotectonism convincingly.

Fairly surprisingly, the thus far logical structure of the book then is interrupted by a chapter (10) about Applied glaciotectonics. In my opinion, it would have been much more logical (and educative) first to deal with the items in the next two chapters (Distribution of glaciotectonism; Dynamism of glaciotectonic deformation). Anyway, the authors make clear that glaciotectonism has many applied aspects, ranging from the depression that may left at the source of thrusting, thus giving access to mineral resources, to the opposite: the removal of mineral resources, as illustrated by an example from Canada where glaciotectonism has removed coal from some surficial coal occurrences over areas up to a square kilometer. Apart from that, glaciotectonic disturbances may facilitate failure of slopes in open-cast mines, it may cause large-scale slides in areas with steep slopes, and mapping of areas with a Quaternary cover (but sometimes also with Tertiary unconsolidated sediments underneath) may become extremely complicated. Many examples from practice illustrate these and other aspects of applied glaciotectonics.

Chapter 11, as mentioned above dealing with the Distribution of glaciotectonism, follows the commonly applied model for the continent-scale distribution of glaciotectonic phenomena, viz. with the distinction of an outer, an intermediate, and an inner zone. This subdivision is demonstrated for the Wisconsin Laurentide ice sheet in North America and the Weichselian Fennoscandian ice sheet in northern Europe. Obviously, the distribution of glaciotectonic features should be considered not only at a continental scale, but also regionally. Doing so, it appears that most features occur in the (continental) outer zone, where they give rise to the wide variety of landforms and structures that have been dealt with in earlier chapters. Particularly the section on models for the lobate pattern of glaciotectonism is instructive in this respect. The more or less theoretical approach followed in the beginning of this data-loaded chapter is followed by ample examples from all over the world.

It seems only logical to me that, after the chapters that contain so many descriptive parts (although analyses of all types are certainly not forgotten), attention is paid to the underlying dynamic processes. The authors once more show in this chapter how capable they are in explaining complex items in an essentially simple way. As an example, I want to quote what they say about the conditions of glaciotectonism (p. 191): “Glaciotectonic deformation takes place when the stress (= pressure) transferred from the glacier exceeds the strength of the material subjected to the stress. A glacier imposes two kinds of stress on its bed: 1) vertical stress due to static weight of the ice column (= glaciostatic pressure), and 2) drag or shear stress due to movement of the ice over its bed (= glaciodynamic stress). The combination of these leads to what Jaroszewski (1991, 1994) called the static-kinematic conception for glaciotectonism.” Isn't that a wonderful, in principle complete, and for each earth scientist understandable explanation of the complex phenomenon of glaciotectonism? The chapter is, as most of the book, full with such didactically admirable descriptions, and the dynamics underlying the process thus become easily understood.

Unfortunately, the last chapter (13), dealing with Glaciotectonic analogs, is, in my opinion, not well in place. It may be true that the comparison of glaciotectonics with other forms of

structural and tectonic deformation has been emphasized as useful by several geologists (Banham, Berthelsen, Pedersen), but I think that it is here somewhat overdone. Mudlump formation in the Mississippi delta, thin-skinned thrusting, gravity sliding, and processes at convergent plate boundaries are presented as non-glacial analogues for glaciotectionism, but I think that these examples are confusing rather than enlightening. If a (true) new edition of this volume is ever to be published (and this work certainly deserves so), I would strongly suggest to delete this chapter. A separate chapter devoted exclusively to submarine glaciotectionics would, in my opinion, be much more interesting. And, as I mentioned earlier, I think that the chapter about applied glaciotectionism should be the final chapter

In summary, the book met the expectations that I had on the basis of the earlier volumes in this series. It even surpassed my expectations. The text is concise but complete (as far as reasonably possible), in most places easy to read, and the line drawings and photos are of good quality and illustrative. A bit annoying is that so many photos mention in their caption that they were taken by James Aber. That could, in my opinion, be omitted; the source should be acknowledged only if other than the authors themselves. The indication of the year that the photos were taken is, however, a great initiative considering the quick changes in the exposures of Quaternary sediments.

Does the book have any shortcomings? I think so. It is, for instance, not very well understandable that hardly any reference is made to earlier books on this topic. Further, the Subject and Geographic Index is much more a geographic index than a subject index; I would certainly have preferred it the other way around. In addition, the subject index is not always truly helpful. For example, the term “communiton til” (to be found in the index as “till, communiton”; I don’t like this, but that is very personal) refers only to a table in which it is stated that this term (together with “deformation till”) is to be preferred for glaciotectionically deformed sediments according to sedimentological criteria. What the term precisely means is not explained, and the term is not mentioned elsewhere in the book either. Including the term in the subject index is thus not of any help.

There are, obviously, many more small shortcomings. They are, however, more than compensated by the positive aspects. The 20-page reference list, for instance, with its about 600 entries, provides not only a wonderful source of information, but is also up-to-date (latest reference: 2006). Perhaps even more important is that somewhat over 10% of the reference list consists of works from (or about) eastern Europe and Asia. This opens quite a new field of data for the great majority of western earth scientists.

Taken the pros and cons together, I can only deduce that the cons are minor and the pros dominate. This book is a worthy successor of the earlier volumes in this book series. Considering its size, it is not a cheap book, but it is value for money for anyone, beginning earth scientist or experienced specialist, who works in the complex field of glaciotectionism. I would not be amazed if this book will become a classic.

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