



**Aber J. S. and Ber A. (2007) — Glaciotectonism. Developments in Quaternary Science, 6. Elsevier, Amsterdam, 246 pp., subject index. ISBN 978-0-444-52943-5.**

This textbook is the most recent, 6th volume of the Elsevier series *Developments in Quaternary Science*, established in 2003 and edited first by James Rose and now by Jaap J. M. van der Meer. The book is subdivided into 13 chapters, which are supplemented by preface, references and subject index.

The first chapter (*Nature of Glaciotectonism*) gives a short overview of previous studies of glaciotectonism, characterizes relevant INQUA working groups, formulates definition and describes basic glaciotectonic terms and concepts. This chapter contains a very useful subdivision of terms classified according to structural and sedimentological criteria. Of importance are also subdivisions into ductile and brittle structures, as well as a chart of glaciotectonic structures arranged according to their horizontal scales. The final portion deals with glaciotectonic landforms and case histories.

The next chapter is devoted to *Geometric Analysis*, providing a short overview of descriptive and terrain analyses applied to the study of glaciotectonic features. Then follow descriptions of conventional field methods, stereographic projections, subsurface surveying and remote sensing techniques, and the potential of geographic information systems.

Chapter 3 (*Kinematic Analysis*) describes basic rules of structural geology applied to glaciotectonic deformations, characterizes in brief the technique of balanced cross-sections (rarely used in glaciotectonic terrains), and provides an overview of microscopic structures within deformed glaciotectonic materials. There is also description of superimposed deformations. Finally, principles of kineto-stratigraphy and characteristics of glaciodynamic sequences and events are given, being supplemented by relevant definitions.

The following chapter (*Hill-hole Pair*) describes in detail one of the common types of glaciotectonic landscape, comprising discrete hills of ice-thrust material situated at a short distance downglacier from depressions of similar size and shape. Numerous field examples from Alberta, Yukon, Dakota, Denmark and the Norwegian continental shelf are discussed. The authors also took into account anomalous situations, where hills without associated depressions, as in NE Poland or Belarus, and depressions without associated hills, as in central Poland or eastern Alberta, occur.

Another chapter deals with the most typical glaciotectonic landforms, i.e. ice-shoved *composite ridges*, which should not be confused with end moraines. The commonly used term “push moraine” is considered here to represent a subset of small composite ridges, largely composed of imbricated glaciogenic strata. Regional examples come from U.S.A., Canada, Iceland, Denmark and the Netherlands.

Still another chapter concerns a group of more internally complicated landforms, i.e. *cupola hills and drumlins*. The first represent irregular hills composed of ice-thrust masses, but lacking the hill-hole relationship. As far as drumlins are concerned, many of these appear to have a glaciotectonic origin. Detailed descriptions of several of the most prominent case studies follow.

Chapters 7 and 8 discuss numerous examples of *megablocks and rafts* and well as *intrusions, diapirs and wedges* occurring in U.S.A., Canada, Sweden, Norway, Denmark, NE Germany, Poland, Estonia and the Ukraine. An important point is the distinction between glaciotectonic and permafrost wedges.

Chapter 9 explores mutual relationships between glaciotectonism and *basement and deep crustal structures*. Processes related to glacial loading and unloading, resulting in remobilization of basement blocks are discussed, based on examples from the Canadian Shield and northern Appalachians, salt bodies in Ohio, as well as faults of the Fennoscandian Shield, and the Suwałki Lakeland, Warmia, Mazury Lakeland and Ostrzeszów Hills in Poland.

Chapter 10 (*Applied Glaciotectonics*) underlines the importance of glaciotectonic research for mine planning and operation, mineral prospecting and exploration, construction purposes, soils utilization, as well as groundwater protection. Field examples from Alberta, Saskatchewan and Denmark are provided.

The following chapter, one of the most voluminous ones, examines *distribution of glaciotectonism* in the Northern Hemisphere. Glaciotectonic phenomena cluster into three primary zones, the outer, intermediate, and inner ones. The subsequent portions of this chapter discuss regional pattern of glaciotectonism in North America, Europe and Arctic Russia, describing a model of lobate pattern of glaciotectonism.

Chapter 12 synthesizes all aspects of *dynamism of glaciotectonic deformation*, carefully examining fundamental causes of glaciotectonism and providing evidence for the static-kinematic conception for the latter; an idea formulated sixteen years ago by W. Jaroszewski. Then follows a detailed discussion of different mechanisms operating in four zones beneath an ice sheet. The concluding part of this chapter provides a review of different analog scale models applied to ice-push deformation.

The final chapter, discussing *glaciotectonic analogs* indifferent non-glacial settings is a little bit out of place, and should probably be deleted in a new edition of the book. Instead, examples of submarine glaciotectonics should be included, along with case studies of glaciotectonic phenomena from the Southern Hemisphere.

As every textbook this monograph has some other drawbacks, although of minor importance. Apart from infrequent printing errors, moderate quality of printing of some pictures should be listed, along with certain inconsequences between the text and figures. For instance, the Kronowo esker in Poland, portrayed in Figure 8-21, is described as cut by a series of strike-slip faults, whereas the map view suggests normal origin of some of these faults. As far as the subject index is concerned, a few terms, such as communiton till, are referred only to a table without further explanation of precise meaning. In general, however, the pros dominate, and the book may become a classic. I suspect that every library of Earth Sciences departments will not hesitate to include “*Glaciotectonism*” in its purchasing schedule, despite its very high price.

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