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Colin P. North and Kitty L. Milliken, Editors
A.J. (Tom) van Loon, Associate Editor for Book Reviews
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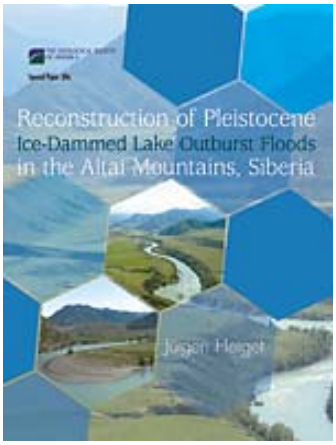
Reconstruction of Pleistocene Ice-Dammed Lake Outburst Floods in the Altai Mountains, Siberia, by Jürgen Herget, 2005. GSA Special Papers 386. Geological Society of America, P.O. Box 9140, Boulder, CO 80301-9140, USA. Paperback, 117 pages. Price USD 65.00 (non-members); USD 52.00 (members). ISBN 0-8137-2386-8.



Giant ice-dammed lake outbursts have occurred several times in the Siberian Altai Mountains (in 2002, Rudy published a detailed review of the Russian works on their geological consequences). The most dramatic jökulhlaup described for the Chuya–Kurai floodstream was in the range of 18 million m^3/s. Such gigantic flood events are characteristic of all areas that experienced deglaciation during the late Quaternary, and therefore this new book is a welcome addition to the existing literature.

The book, which is organized in 6 chapters, 2 appendices and a reference list, starts with a short description of the problems related with the methods that have been developed in the course of time to investigate paleohydroglaciological phenomena. Then follows, in Chapter 2, a brief literature review of similar events recorded in North America and Europe, followed in Chapter 3 by an overview of the geographic distribution of various morphological paleoglaciology-related features of the Altai Mountains.

A critical evaluation of the previously published literature by Herget's Russian colleagues, Butvilovsky (1993) and Rudoy (1998, 2002), develops the main frame for the extension of yet another analysis of both the sedimentological and the morphological features of the Altai Mountains region (Chapter 4). The criticism of the advocates of the non-jökulhlaup models—mainly Okishev (1982)—are also dealt with in detail in this chapter. Herget emphasizes the importance of investigating modern analogues for shedding light on the origin of Quaternary gravel dunes and lake sediments in the Chuja and Katun valleys. The absolute dating of the events that resulted in these deposits is still under much debate. It is not clear either how the outburst events fit into the framework of the region's other major topographic features. This indicates, in combination with the wide range of suggested absolute datings, the lack of detailed sedimentological data.

In Chapter 5, the author attempts to reconstruct in detail the hydrogeologic aspects of the floods. Seven different approaches are applied to estimate their peak discharges. The result is in the range of 10 million m^3/s, which is significantly less than the 18 million m^3/s previously suggested by Rudoy (2002). An interesting aspect in this context is that the peak discharge has been reconstructed, among other approaches, on the basis of the boulder-transport capacity during a jökulhlaup event. Although the extraordinary size of the boulders (up to 11.0 m in diameter) makes such an estimate theoretically inaccurate, a rough estimate of 20 m/s is suggested as a

minimum velocity for a current that is capable of deposition of the giant boulders. This suggests a peak discharge of at least 3 million m^3/s. The distribution and morphology of the regional gravel dunes have also been used to interpret the magnitude of the flood. In contrast to previous studies that suggested giant eddies to form the dunes (Rudoy 2002), Herget suggests the presence of a local topographic high as a divide that redirected the flood during the falling stage of the lake level in the Kuray Basin, thus forming the gravel dunes in the area. Another morphological feature used for paleohydraulic reconstruction consists of the obstacle marks that are recognised around boulders and bedrock hills in the area. A detailed review of the published literature on this topic is presented, as well as a number of regional studies. It is, however, concluded that these features are of limited value for such reconstructions, as there is no information on the exact timing of the formation of the marks during a jökulhlaup event.

Finally, in Chapter 6, an overview is presented of the proposed glacial hydrological reconstruction of the ice-dammed lake in the study area. At least three large-scale outburst events are suggested. The absolute datings are, however, rough. A time range between 40 ka and 13 ka is suggested. While the reason for such a wide range is stated to result from methodological problems, a clear basis for neither the dating range nor the methodological problems is presented.

Summarizing, the book presents a short review of some Russian studies and comprises a compilation of similar studies elsewhere. Therefore, the book only marginally enhances the overall understanding of the issue. In my opinion, too little attention is devoted to the thought-provoking studies presented by Grosswald and colleagues between 1996 and 2000. Having said this, it should be added that the book presents a thorough modified paleohydraulic model for the late Pleistocene glacial floods in the study area.

What made the book enjoyable reading is the author's ability to fit the previously published studies, his first-hand field studies, and the suggested theoretical calculations into a finely interwoven mosaic that presents a logical framework. In addition, I have improved my knowledge about the morphology of the Altai Mountains area, and I have updated my knowledge of the actual models regarding the paleohydrological development of ice-dammed lakes.

Overall, I would highly recommend this book for undergraduate level courses in glacial geology. Alternatively, those who are interested in the Quaternary geology of the study area, will also find much to their benefit.

Amir Mokhtari Fard
Itasca Geomekanik AB
Järvstigen 2
S-170 71 Solna
Sweden
E-mail: amfard@usa.net

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