

Polar lakes and rivers – Limnology of Arctic and Antarctic aquatic ecosystems, edited by F. Warwick Vincent & Johanna Laybourn-Parry, 2008. Oxford Biology Collection. Oxford University Press, Great Clarendon Street, Oxford OX2 6DP, GB, [www.oup.com](http://www.oup.com). 320 pages. Paperback, price GBP 37.50, ISBN 978-0-19-921389-4. Hardback, price GBP 70.00, ISBN 978-0-19-921388-7.

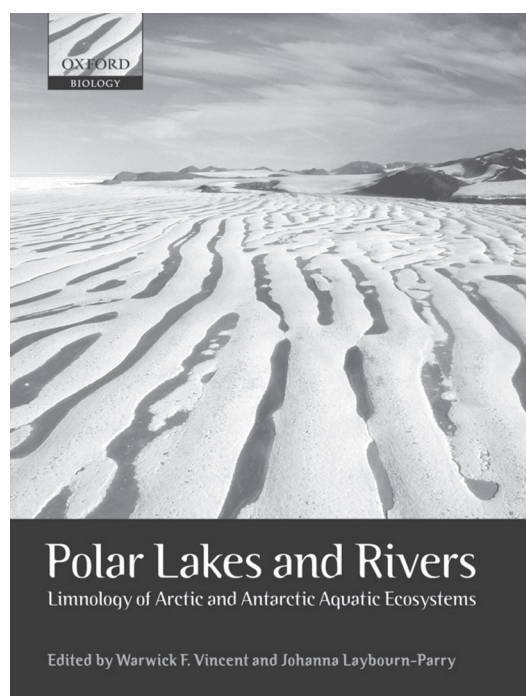
During the short polar summer, the harsh Arctic and Antarctic landscapes are enlivened with the appearance of running and stagnating fresh water. This season witnesses an exceptional activity of water, but their existence, in the liquid phase, is considerably much larger in other parts of the cold environment. The variety of ecosystems in polar lakes and rivers, from wetlands and small creeks on ice-free terrestrial areas to deep down in the subglacial Antarctic reservoirs, is the subject of successive chapters of the book, which is written by outstanding specialists in Arctic and Antarctic studies, representing leading research institutions from the U.S.A., Canada, the U.K., Denmark, Spain, Iceland, Finland, Sweden, Australia and New Zealand. Although the book is published in the Oxford Biology Collection (there is no 'Oxford Earth Science Collection' yet), the ecological framework requires a broad presentation of issues that are important from the point of view of earth scientists.

The initial chapter presents research on lakes and rivers in polar regions in a historical framework, with an overview of the limnological biodiversity in relation to environmental conditions and the influence of the globally changing nature. The next three chapters are devoted to the origin, geomorphology, palaeolimnology and physical characteristics of high-latitude lakes. Examples from both the Arctic and the Antarctic are provided, thus showing both similarities and differences between lake ecosystems in the north and the south, their changes due to hydrological, geological and geomorphological interactions such as water availability, glacier ice and frost occurrence (i.e. thermokarst), land diversification due to glacioisostatic rebound; these examples are also discussed in the context of processes that are worldwide involved in the formation of lakes (tectonics, volcanic activity, meteorite impacts, karst features, etc.).

Palaeolimnological studies, based on the sedimentary record, are presented with due attention to the reconstruction of the natural environment of lakes and their catchment areas, including human impact on biotic and non-biotic elements. Undoubtedly, the research of polar lake deposits, which is carried out more and more frequently with the use of advanced technological methods (radiocarbon AMS, short-lived isotopes, OSL datings, etc.) contributes substantially to the understanding of environmental changes, not only in the polar areas, but also in a global context. The research concerning the physical properties of high-latitude lake environments (underwater radiation, water stratification and mixing, hydrological balance, to mention only a few) that are strongly affected by low temperatures and by the occurrence of an ice or snow cover, is equally essential, not only for the understanding of energy fluxes in polar areas but also for predicting future scenarios of their development and worldwide impact.

The following chapter is the only one that is fully devoted to the physical properties of flowing water (high-latitude rivers and streams, and thus in a limited range with respect to their worldwide role), especially with regard to their function in shaping landscapes and in their environmental impact on the northern oceanic basin; as the authors stress themselves: "11% of the total fresh-water drains into the Arctic Ocean, that represents only 1% of the total ocean". The comparison of the Arctic and Antarctic fluvial ecosystems is, however, made truly clear.

Two issues that are specific for the limnology of polar regions are presented in the chapters 'Ice-based freshwater ecosystems' and 'Antarctic subglacial water: origin, evolution, and ecology'. They refer to situations where glacier ice occurs (cryoconites, supraglacial pools and streams, ice-shelf ponds, subglacial lakes and rivers), but also to water bodies on lake-ice. It might be a matter of discussion, whether ponds originating on sea-ice, not included in the book, form in some cases fresh-water or brackish ecosystems. Recently discovered traces of life in Antarctic subglacial habitats have drawn attention to this environment, resulting



in a wide interest for their physical conditions, summarized here. The biogeochemical processes in high-latitude lakes (carbon and nutrients cycles) discussed in the following chapter, are of great importance for regional and global linkages.

Further on, after several chapters dealing explicitly with biological aspects (phytoplankton, benthic communities, microbes, zooplankton and zoobenthos, fish populations and food-web relationships), the book ends with two chapters that provide a wider perspective, including human impacts on high-latitude lakes and rivers (i.e. physical impacts and chemical contaminations) and a summarizing section about future directions in polar limnology. The latter touches new methods that are developed and that can be used for the polar fresh-water monitoring; it also introduces models of Arctic and Antarctic aquatic ecosystems.

Polar research is multidisciplinary. The growing interest in the role of both biotic and abiotic elements of the polar environment and their interrelations with globally observed changes are very well illustrated as concerns the various aspects of lake and riverine ecosystem adjustments. The book provides a wide scala of illustrations from the Arctic and Antarctic, with will be appealing for both readers with a general interest in environmental

studies and scientists working exclusively in this research field. It is the first attempt to concentrate the various problems of polar limnology in one volume. The book forms part of an endorsed project of the International Polar Year (IPY) 2007–2008, and in its wide range of discussed problems fulfills the IPY objective of

raising awareness and enlarge the knowledge of processes and environmental changes in polar regions.

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