

Alpine Meadow Ecosystems in China and Impacts of Global Changes

By Zhao Xinquan. 2009. Science Press, 16, Donghuangchenggen North Street, Beijing, China, 100035. 337 pages. 88.00 CNY.

The alpine meadow refers to grassland dominated by the cold- and dry-resistant mesic geophytic and hemicryptophytic perennials, distributed mainly between the timberline and ice-snow line of the alpine zone. The alpine meadow is extensively distributed in the eastern Qinghai-Tibet Plateau and its surrounding mountainous area, being one of the most typical and unique types of vegetation in that area. The alpine meadow of Qinghai-Tibet Plateau with an area of about 700 000 km² accounts for nearly 50% of the available area of grassland in Qinghai-Tibet Plateau. In the alpine meadow, the constructive and the subordinate species are mainly the arctic-alpine components and the China-Himalayan components, adapted to conditions of high altitude and cold climate. The constructive synusia are mainly composed of the perennial rhizomatous or bunch grass species with low and short rhizomes or dense clumps, like *Kobresia*, *Carex*, and some non-clonal grass species. The alpine meadow, with its low-stature grass, simple composition, unobvious differentiation of storey, unique energy flow and material cycling, is very different from the intrazonal meadows that are extensively distributed in the low-altitude areas of China.

The process of global changes influences every ecosystem in the world, but the ecosystems in the area of high-altitude and high-latitude are definitely very sensitive to its impacts. This is especially the case for the Qinghai-Tibet Plateau, known as the "roof of the world" or the "Third Pole of the Earth", as it is a special geographical area with unique features of the climate system and ecological traits. For a long time, the Qinghai-Tibet Plateau has been an ideal natural laboratory for carrying out research in many fields of related subjects. The composition of plant species, the structure and function, as well as the dynamics of succession of the alpine meadow in Qinghai-Tibet Plateau, tend to be sensitive to the large-scale process of global changes, thus, the alpine meadow in Qinghai-Tibet Plateau could be regarded as a typical model for studying the impacts of global changes on ecosystems. Practically, such an in-depth and extensive study would be of importance for scientific and sustainable management of the alpine meadow.

In such a background, the book *Alpine Meadow Ecosystems in China and Impacts of Global Changes* was published recently. The book systematically summed up the results of the long-term field investigation, transect research, located and controlled experiments in the alpine meadow ecosystems of Qinghai-Tibet Plateau in response to global climate changes.

The main contents of the book are as follows, Chapter 1: The characteristics of the ecological environment of the alpine meadow area of Qinghai-Tibet Plateau; Chapter 2: The response and adaptation mechanism of the typical species in the alpine meadow of Qinghai-Tibet Plateau to the global climate change; Chapter 3: The relationship between the biological diversity and the functions of the alpine meadow ecosystems in Qinghai-Tibet Plateau in the background of global changes; Chapter 4: The interactions between the productivity of the alpine meadow ecosystems in Qinghai-Tibet Plateau and the processes of global change; Chapter 5: The carbon biogeochemical cycles in the alpine meadow ecosystems in Qinghai-Tibet Plateau; Chapter 6: The analysis on the stability of the alpine meadow ecosystems in Qinghai-Tibet Plateau; Chapter 7: The impacts of global changes on the safety of alpine meadow ecosystems in Qinghai-Tibet Plateau and the ecological countermeasures.

The book should become a good reference for researchers or teachers and students engaged in research on global ecology, grassland ecology and other related fields, and other persons who are interested in this field. Hopefully, the book would also become a reference for the policy makers in charge of state responses to global changes and ecological compensation, and for officers or technicians in charge of international negotiation for carbon trading or in the fields of management.

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ENVIRONMENT

The Link: Uncovering Our Earliest Ancestor

By Colin Tudge (with Josh Young). 2009. Little, Brown and Company (a division of Hachette Book Group, Inc.), P.O. Box 8828, Boston, Massachusetts 02114 USA. 272 pages. 28.99 CAD, Cloth.

Every scientist has a dream of making a big discovery with great impact on his or her field of research. Perhaps no better is this epitomized by a palaeon-

tologist discovering a pristine fossil with possibly grand importance on the evolution of animal life and bearing on our own evolution as human beings. In

this book, Colin Tudge describes such a finding in “Ida”, a forty-seven million year old specimen and the most complete primate fossil ever found. He aims to convey the excitement of this most unusual fossil discovery and describe the importance of the specimen to our understanding of primate evolution. Unearthed by a private fossil collector, the specimen (given the scientific name *Darwinius masillae*) was unveiled to Norwegian palaeontologist Jørn Hurum and later sold under much secrecy to Oslo’s Natural History Museum, where it is currently on display.

The book starts off in prose style, as Tudge tells a story of what might have happened as Ida perished a long time ago in Eocene times, drowning in a lake with unusually fine conditions for specimen preservation. The site is now known as the Messel Pit, a superb location for fossil hunters just 35 km southeast of Frankfurt, Germany. Once the prosaic tale of Ida is told, the book transforms into a more common form of popular science writing, including detailed descriptions of the specimen itself. However, there is only so much you can tell about a fossil specimen. Tudge expands his book by rather nicely weaving in other aspects of interest, including palaeontology, climate history, the rise of mammals, primate evolution, and ultimately our own evolution as humans. The result is a rather nice glimpse into how evolutionary science,

through the addition of a myriad of small puzzle pieces, aims at an overall understanding of the evolution of life on this planet. However, the book feels repetitive at times, and too much emphasis is spent on how fantastic this particular fossil find is. No doubt Ida is a valuable specimen, but as the book was released immediately following the scientific publication describing the find (Franzen et al. 2009), it is simply too early to tell just how valuable; scientific progress is made only via the continuous critical evaluation of new evidence against old, not through self-proclaimed excellence. Critical readers with a background in science will therefore dislike the salesmanship flavour of the *The Link*. Indeed, Jørn Hurum decided to orchestrate the launch of the fossil in a combined scientific and public event. On the other hand, readers with a non-professional interest in science and in palaeontology in general may enjoy the book as a fascinating story, especially as it touches upon our own history.

Literature Cited

Franzen, J. L., P. D. Gingerich, J. Habersetzer, J. H. Hurum, W. von Koenigswald, and B. H. Smith. 2009. Complete primate skeleton from the Middle Eocene of Messel in Germany: morphology and paleobiology. *PLoS One* 4(5): e5723. doi:10.1371/journal.pone.0005723.

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High-Arctic Ecosystem Dynamics in a Changing Climate: Ten Years of Monitoring and Research at Zackenberg Research Station, Northeast Greenland. *Advances in Ecological Research* (Volume 40)

Edited by H. Meltofte, T.R. Christensen, B. Elberling, M. C. Forchhammer and M. Rasch. 2008. Academic Press, Elsevier, 3251 Riverport Lane. Maryland Heights, Missouri 63043. USA. 596 pages. 105 USD.

This book is packed with information and analyzed data. It may even serve as a “textbook on structure and functioning of a high-arctic ecosystem under climate change”. Its 63 contributors keep the promise: great results and findings from diverse disciplines covering 10 years of research in Greenland get delivered to the global audience. The Zackenberg Research Station is one of the few localities where high-detail Arctic research is carried out (together with Abisko, Sweden; Svalbard, Norway; Toolik and Barrow, Alaska; relevant research stations in Canada, Iceland, and Russia either do not really exist or not well published, synthesized and promoted). And so this book is among the first to report long-term findings in one synthesis volume. Ecological research studies where “more than 1500 physical and biological parameters have been measured annually” and covering an entire decade are generally difficult to come by (only to be compared with other famous research stations such as La Selva in Costa Rica (for instance). Due to the huge climate change discussion, this book provides a great overview and many new facts and viewpoints. In addition, it provides a benchmark to show us where the western

countries are standing regarding Arctic science and their effectiveness in monitoring and managing the Arctic which is to be science-based and for sustainability.

During the 10 years of this research, the Arctic warmed already by 2.25 degrees Celsius. With Arctic warming expected to increase up to 8 degrees Celsius, I recommend this book on many accounts: it fits a niche, is very well edited, covers ecosystem components and is a “must have” for people interested in the Arctic, climate change, Greenland, and western science. The introductory and final synthesis chapters alone are great highlights; for instance “the arthropod data set used in this study is probably the most extensive from the entire Arctic”! Another real strength is the use and interpretation of IPCC [Intergovernmental Panel on Climate Change] and (downscaled) climate models. It’s made clear in the book text of 563 pages that large-scale temperature events such as NAO [North Atlantic Oscillations] can explain biological effects (e.g., predation and populations) but they are an inherent part of global climate change, and are thus part of the man-made component.