

BOOK REVIEW

Lee Hannah: CLIMATE CHANGE BIOLOGY.- AP Elsevier, Amsterdam etc., 2011, 402 p., ISBN 978-0-12-374182-0.

Ecologists have made lots of predictions over the past few years how changing climate could affect the planet, its biosphere, landscape and ecosystems (Opdam et Washer 2004, Reid 2006). Measurements have confirmed at least some of them: sea level is rising, the ice cover of the Arctic Ocean is shrinking and thinning faster than anyone had expected and biotic communities composed of hundreds species shift their boundaries up to higher altitudes and far from the equator. The author reflects previously published indications that plant and animal communities would need to move poleward 100 to 150 square kilometers or upward 150 meters for each 1° C rise in global temperature. Since most species could not migrate that rapidly and since development would stop them from colonizing many new areas, a great proportion of biodiversity would be lost. The change in the sense of decline in the temperature difference between the poles and the equator would alter the global wind patterns and storm tracks. Areas with low rainfall levels could be exposed to drought, making them uninhabitable. Globally, since warmer air holds more moisture, an increase in the Earth air and sea temperatures would increase the frequency of storms. Increasing sea surface temperatures would increase the number and strength of hurricanes and El Niño events. Therefore, the implications of those phenomena in recent years climate change has become one of the most fascinating challenges within our problems of the environment, policy and economy.

Hannah's textbook represents an innovative work on the emerging discipline of climate change biology and the resulting movement in the distributions of species within coincidence of ecological events. It combines understanding of climate change from evidence of paleoecology, models of human-induced and natural processes and current observations or measurements.

Contents includes six sections subdivided into eighteen chapters. References and Index are the complementary parts rich in number of items.

Section 1 (Introduction) consists of two chapters with the following subjects: The changing climate around us.; What is climate change?; The role of climate in ecology and biogeography.

Section 2 (The impacts of human induced climate change) with three chapters: Changes in species ranges; Changes in timing and process: phenology; Ecosystem impacts.

Section 3 (Lessons from the past) with four chapters: Extinctions and other effects in the past; Terrestrial plant and animal responses; Marine species and ecosystem changes; Freshwater species and ecosystem changes.

Section 4 (Looking to the future) with three chapters: Models of climate and species response; Simulating ecosystem response: dynamic vegetation models; Predictions based on ecological theory; Estimating extinction risk from climate change.

Section 5 (Implication for conservation) with three chapters: Protected areas and connectivity; Marine protected areas; Conservation in farmlands and ranchlands.

Section 6 (Finding solutions: International policy and action) with three chapters: Reducing greenhouse gas emissions, sinks and solutions; Land use and biodiversity implications of energy options; Conclusion: Biodiversity in a greenhouse or a cool planet?

The explicit message of the author says: the combination of increasing habitat loss, already recognized as the largest single threat to species, and climate change, is likely to devastate the ability of species to move and survive. Many scientists agree that climate change could drive more than a quarter of all land animals and plants into extinction, however, new studies are needed. It is clear from the book that the largest collaboration of

scientists to investigate the all interacting issues at the level of the world biomes is the key assumption of possible human adaptation for global change (Kovář et Maděra 2010). When we compare the extent and factual background of knowledge in treated thematic sphere in the frame of approx. one decade (Kovář 1995), the progress is apparent. "Climate Change Biology" is a wonderful textbook, filled with descriptive and dynamic science at the same time in a very approachable way. **Pavel Kovář***

REFERENCES

- Kovář P. (1995):** D.M.Gates: *Climate change and its biological consequences*. Sinauer Associates, Inc., Sunderland, Massachusetts, 1993, 280 pp. Price USD 16.95, ISBN 0-87893-224-0. - Folia Geobot. Phytotax, 30, 537-538.
- Kovář P. et Maděra P. (2010):** *Adapting landscapes and response to global ecological change* (Editorial). Journal of Landscape Ecology, 3(2): 5-6.
- Opdam P. et Washer D. (2004):** *Climate change meets habitat fragmentation: linking landscape and biogeographical scale in research and conservation*. Biological Conservation, 117, 285-297.
- Reid H. (2006):** *Climate Change and Biodiversity in Europe*. Conservation and Society, 4: 84-101.

* Charles University in Prague, Faculty of Science, Benátská 2, 128 01 Prague 2, Czech Republic, e-mail: kovar@natur.cuni.cz