Book review – Buchbesprechungen

E. Matzner (editor): *Biogeochemistry of Forested Catchments in A Changing Environment, A German Case Study*. Ecological Studies, Vol. 172. Springer-Verlag, Berlin, 2004, 498 pages, € 169.95, ISBN 3-540-20973-5

This edited volume describes a series of investigations undertaken by the Bayreuth Institute of Terrestrial Ecosystem Ecology (BITÖK) in Germany. The book includes 25 chapters, and as for most edited volumes, the content, approaches, and details provided in each of the chapters show considerable variation. The first two chapters (Part I) introduce the research approaches and describe the study sites. The general focus is on ecosystem biogeochemistry with a particular emphasis on acidic deposition effects. The study area is in Bavaria (Germany) where two catchments were focal points for this research. The Lehstenbach Catchment is located in the Fichtelgebirge Mountains near the eastern border with the Czech Republic. This catchment has been subject to very high deposition levels of both sulfur (S) and nitrogen (N). The Steinkreuz catchment that has been subject to high atmospheric deposition, but less than that at the Lehstenbach Catchment, lies further to the west in the Steigerwald region. In addition to differences in atmospheric deposition, the two study sites also vary with respect to geology, soils, vegetation, and land-use history. These differences have obvious importance to forest-ecosystem processes and comparing these sites provides useful information, but also the range of differences makes it difficult to isolate the effects of specific factors such as atmospheric deposition. The investigation utilized a wide range of approaches including both small watersheds and plots. Some of the plots were also subject to various experimental manipulations. Part II, entitled "The Changing Environment," describes the historical changes in trace gases, particles (Chapter 3), and climate (Chapter 4) in the Fichtelgebirge Mountains. The description of vegetation (Part III, 14 chapters) includes results of studies on water and CO_2 relationships. The examination of the influence of vegetation on elemental fluxes in relationship to fog deposition, throughfall, and litterfall inputs enhances the overall descriptions of biogeochemical relationships. The two chapters dealing with ozone deposition and the emissions of biogenic volatile organic compounds (BVOC) expand the area of coverage on atmospheric pollutants. The two chapters that describe the radial growth of Norway spruce and the role of phytophagous insects are fairly specialized. Part IV focuses on the soil and riparian zones and includes detailed descriptions of solute concentrations and fluxes with particular emphasis on DOM (dissolved organic matter) dynamics. The potential contributions of SOM (soil organic matter) for carbon (C) storage as well as the contributions of the riparian zones serving as "hot spots" for elemental transformations due to their importance in dissimilatory reduction processes are emphasized. Part V includes two chapters that summarize temporal dynamics of discharge chemistry and mass elemental balances in the Lehstenbach and Steinkreuz catchments. The final section (VI) and its chapter provide a synthesis of results emphasizing biogeochemical patterns of the two study catchments.

This volume is an important contribution to the literature with particular respect to the effects of acidic deposition effects in Central Europe. The BITÖK research team has carried out an impressive set of investigations that have resulted in substantial publications in a number of international journals. Having this compendium of information is useful for those investigators interested in understanding the impact of acidic deposition, including the potential recovery under current conditions of decreasing S deposition not only for this region, but also for other areas of Europe and N America where S deposition is decreasing. This volume also provides detailed information on studies for which results have been provided in either specialized reports and/or in German and hence not as available to the larger international community. The strengths of the volume include the combination of approaches on the same sites including monitoring (at both catchment and plot scales), experiments, and modeling for evaluating biogeochemical processes. Some of the chapters are more peripheral to these analyses than others. There is considerable variation in the approaches among chapters with some describing detailed methodological approaches including the presentation of new data while others focus more on synthesizing published findings. There is some repetition of information especially with respect to site descriptions with most chapters being relatively independent of each other. Also, it is sometimes difficult for the reader to follow the linkages among the various studies with respect to sites and time of the studies. Possibly a single compendium of the locations and dates of the major research efforts would have been helpful. Some greater attention to the comparison of the results of these studies with other sites especially in Europe, but also in other regions of the world would have helped place these findings into a broader context. The book indicates some issues related to accurate estimates of dry deposition and concerns for the accurate measurements of hydrological fluxes. These are important issues in the overall field of catchment biogeochemistry and some clear guidelines on future approaches would have been interesting.

The final chapter gives a synopsis of the overall biogeochemical linkages within the various study sites and indicates which chapters provide more details on specific processes. This synthesis shows that this research has provided important opportunities for evaluating biogeochemical processes using various approaches and also suggests why using these different approaches may result in different conclusions. Such combined analyses include comparisons of uncertainties in water budgets (*e.g.*, stand *versus* watershed estimates) and elemental budgets. For example, different estimates of C sequestration were obtained using eddy correlation *versus* stand measurements. The finding that N sequestration was higher than assumed by some critical load estimates has important policy implications. It is clear that the research direction of this group more recently has begun to focus more on C and N dynamics with particular emphasis on the influence of climatic changes. The potential for making major advances in various research areas is enhanced by the extensive data base and instrumentation infrastructure for these catchments.

Investigators involved with research on forested ecosystems and catchments in Central Europe will undoubtedly benefit by

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having this volume. Investigators throughout the world will also find this compendium particularly useful with respect to acidification effects and recovery. However, the high cost of the volume may make it prohibitively expensive for individual investigators or students to purchase, but they will certainly want access to a library copy. [B787]

MYRON J. MITCHELL, Syracuse (USA)

J. Breuer, V. König, D. Merkel, H.-W. Olfs, B. Steingrobe, A. H. Wissemeier, und **W. Zorn:** *Die Pflanzenanalyse zur Diagnose des Ernährungszustandes von Kulturpflanzen – Anwendung in der Landwirtschaft, Gemüse- und Obstbau.* Agrimedia, Bergen/Damme, 2003, 113 S., 19,90 €, ISBN 3-86037-206-8

Bei der Pflanzenanalyse handelt es sich um ein diagnostisches Instrument zur Ermittlung des Nährstoffversorgungszustands der Pflanzen, das seit gut 40 Jahren verstärkt in Landwirtschaft und Gartenbau eingesetzt wird – allerdings nicht als Alternative zur Bodenuntersuchung, sondern vielmehr als Komplementär- bzw. Kontrollmethode. Sie wird aufgrund zunehmender Anforderungen an eine sowohl ökologisch als auch ökonomisch optimale Düngung mit zunehmender Intensität der Produktion an Bedeutung gewinnen.

Aufgaben und Möglichkeiten der Pflanzenanalyse umfassen drei Bereiche:

- Aufdecken latenter Mangelsituationen und Nährstoffimbalancen,
- Monitoring-Instrument,
- Ursachenforschung bei Pflanzenschäden.

Das von einem Autorenkollektiv zusammengestellte Buch wendet sich in erster Linie an in Beratung und Praxis Tätige, dient aber in gleichem Maße Auszubildenden, Studierenden und Ausbildern als wichtiger Leitfaden. Nach kurzer Einleitung über die Bedeutung der Makro- und Mikronährstoffe und die Grundlagen der Pflanzenanalyse (Kapitel 2) werden im Kapitel 3 allgemeine Richtlinien der Probenahme und der Probenbehandlung sowie verschiedene Untersuchungsmethoden beschrieben. Im Kernkapitel (Kapitel 4) wird die Pflanzenanalyse, aufgeschlüsselt in Landwirtschaft, Gemüsebau und Obstbau, behandelt, wobei pflanzenspezifische Kennzahlen ausreichender Nährstoffgehalte in mehreren übersichtlichen Tabellen aufgeführt werden. Des weiteren enthält Kapitel 4 Angaben über Probenahmetermine und -techniken, Anleitungen zur Bewertung von Analysenergebnissen sowie Ableitungen zu Düngungsempfehlungen. Kapitel 5 widmet sich Möglichkeiten der Diagnose des Ernährungszustandes mit Hilfe visueller, biochemischer und physikalischer Verfahren und schließt den Einsatz von Schnelltests mit ein. Hervorzuheben ist Kapitel 6, in dem der Leser wertvolle Hinweise auf weiterführende Informationsquellen zum Thema Pflanzenanalyse findet. Insgesamt handelt es sich bei dem Buch um ein anwenderfreundliches Nachschlagewerk sowohl für Praxis und Beratung als auch für die Forschung. [B788]

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