Book Review

Ted Munn (ed): Encyclopedia of global environmental change (Egec)

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Without Abstract

This monumental editorial project has been designed and coordinated by Robert Edward (Ted) Munn (born in 1919) who after his retirement from 35 years of public service in the Canadian Meteorological Service in 1977, started a new carrier as an Associate at the Institute for Environmental Studies at the University of Toronto (1977–1985, 1989–present), as the leader of the environment programme at IIASA (1985–1989) in Laxenburg (Austria) in which he focused on long-term global change and global environmental issues, contributing to many interdisciplinary scientific syntheses, such as *The world environment 1972–1992*. He has published or edited 20 books, authored more than 200 papers and received numerous international awards.

The *Encyclopedia of global environmental change* (Egec) consists of five theme-oriented volumes, each edited by a distinguished scientist or former international official. Volume 1, on *The earth system: physical and chemical dimensions of global environmental change*, was co-edited by Michael C. Mac Cracken (Lawrence Livermore National Laboratory) and John S. Perry (US National Research Council). Volume 2 focuses on *The earth system: biological and ecological dimensions of global environmental change*, and was co-edited by Harold A. Mooney (Stanford University) and Joseph Canadell (GCTE/IGBP, CSIOR Sustainable Ecosystems, Australia). Volume 3, edited by Ian Douglas (University of Manchester), turns to the *Causes and consequences of global environmental change*, while Volume 4 on *Responding to global environmental change* was edited by Mostafa K. Tolba (International Center for Environment and Development, Egypt, a former Secretary General of UNEP). Finally, Volume 5, on *Social and economic dimensions of global environmental change*, was edited by Peter Timmerman (IFIAS, Canada).

These five volumes feature more than 500 articles, 100 biographies, 150 definitions and 100 acronyms, written by over 600 international contributors drawn from primarily English-speaking countries (North America, Australia, the UK and Europe). The editor in chief and the five volume editors were advised by an international advisory board of 16 distinguished scientists from Australia (1), Brazil (1), France (1), Germany (2), Hong Kong (1), Kenya (1), Russia (1), Switzerland (2), the UK (2), the USA (3) and from the World Bank (1); among them the Nobel Laureate Paul Crutzen (Max Planck Institute for Chemistry, Mainz) and Eckart Ehlers (IHDP/IGU, University of Bonn).

Ted Munn, in the overall preface, places this encyclopaedia in the "tradition of the human aspiration towards the compilation of global knowledge". He outlines both the evolution of the scientific concept of the environment since the 1960s, and of global environmental change since the 1970s and 1980s, which has focused on "human-induced perturbations in the environment" that encompass "a full range of globally significant issues relating to both natural and human-induced changes in the Earth's environment, as well as their socio-economic drivers" which have attracted many disciplines, from the biological sciences (e.g. IGBP or the International Geosphere-Biosphere Programme), and also increasingly from the social sciences, focusing on human, social, economic and cultural systems. According to Munn, "changes greater than humankind has experienced in its history are in progress and are likely to accelerate". Dealing with future environmental trajectories requires more than a prediction of a single future path. It requires us to "map a broad range of future environmental trajectories" using scenario-building exercises that confirm "that the changes of the twenty-first century could be far greater than those experienced in the last several millennia".

The major focus of the *Encyclopedia of global environmental change* (Egec) is that the interlocking biogeophysical and socio-economic systems (e.g. many global environmental issues such as ozone depletion, climate change) are inter-related through the global biogeochemical cycle. Thus, the management of the human responses to this "enormously varied but at least moderately coupled world system in an era of increasing global change through the diverse array of local, national and international organizations" has become a major challenge that requires the development of predictive models (or a range of scenarios) "describing future behavior of this total socioeconomic–cultural–environmental system". Such a discussion of future change requires a consideration of risks that are able to deal with unpredictable surprises (as, for example, the two World Wars in the twentieth century). Thus, the human dimensions of global environmental change (e.g. deforestation or urbanisation) deal both with the contribution and the adaptation of societies to these changes. They pose many questions for social, cultural, economic, ethical, and even religious issues, e.g. on our motivation for saving, but also our role and responsibility with regard to the environment, which are specifically addressed in the fifth volume. Munn refers to Edward O. Wilson, who noted a growing *consilience* (the interlocking of causal explanations across disciplines) in which the "interfaces between disciplines become as important as the disciplines themselves" that will "touch the borders of the social sciences and humanities". Against this scientific and political background, this new encyclopaedia has tried to provide research synthesis that combines both the perspectives of the natural and social sciences. In the view of its editor, this encyclopaedia "is a comprehensive and integrated reference in the broad area of global environmental change that will be conveniently accessible and productively used by students, managers, administrators, legislators, and concerned citizens".

This compendium addresses these key questions:

> The emphasis is upon the dynamics of the various processes discussed – How and why did they change? A second recurrent theme is the interconnection of processes and changes – What produces change? What is impacted by change? Finally, we attempt to deal even-handedly with natural and human-induced change, and with impacts on both the natural world and human society.

In order to offer coherence, each volume includes several extended essays on the fields covered in each volume, offering a road map to the other detailed articles. The articles on substantial areas are all original contributions by scientists around the world that "represent authoritative and up-to-date summaries of the state of current knowledge, direct from the

producers of this knowledge". In order to enhance the readability of the texts to the non-specialist, all scientific essays have a few paragraphs introducing the topic and most essays are written at the level of journals such as *Ambio* or *Scientific American*.

As it is impossible to do justice to all the authors and topics, this review concentrates on these key questions: have the goals outlined by the editor-in-chief of Egec been accomplished? To do so the reviewer – as an international relations specialist – has focused on his primary areas of interest and competence, derived from his own writings and editorial work, on the broad topics of population growth, urbanisation, climate change, desertification, the hydrological cycle and the water demand for drinking and food production. What can we learn from these global processes and interdisciplinary linkages, for instance for the Mediterranean region, where both common and opposing trends meet that may pose, during the twenty-first century, major challenges for international politics and security due to foreseeable human catastrophes that may lead to a new form of environmental and distress migration at Europe's southern boundaries?

Volume 1. Michael C. Mac Cracken; John S. Perry (eds): *The Earth system: physical and chemical dimensions of global environmental change*, 774 pp

The first volume, dealing with the physical and chemical dimensions of the Earth system, starts with ten introductory essays on its processes, models and history, earth observing systems, model simulations of historical and present climates, and projections of climate change on the depletion of the ozone layer and on intergovernmental (WMO, UNESCO, IPCC, UNFCCC) and non-governmental (e.g. ICSU) international organisations and programmes (e.g. SCOPE, IGBP, IDBDR, SCOR) in the Earth sciences, many of which are introduced in other volumes in detail. These essays are well-written, up-to-date and comprehensive and they present to students and experts alike from other areas a good survey of the state of the art in language that can be understood by any reader with a good science background.

The major focus of this volume is on atmospheric issues, on climate, climatology and climate change, on climate-related research programmes (e.g. ACSYS, AMIP, ARM, CLIVAR, GARP, GAW, GOALS, IGY, IGY, SPARC, TOGA, TRMM, UARS, WCC, WCP, WCRP), on the oceans, the non-vegetated land surfaces and on the cryosphere and on selected and outstanding climate specialists (e.g. Arrhenius, Bolin, Crutzen, Houghton, Lamb, Molina, Munn, Richardson, Rowland, Wegener). Other important aspects of the earth system (e.g. soil, water) are only treated in relation to soil moisture, deserts, the hydrologic cycle, hydrology and the International Association of Hydrological Sciences (IAHS). In all five volumes, energy issues warrant only two articles on "energy balance and climate" and on "energy balance climate models". A special emphasis is on historical trends of key environmental indicators focusing on the twentieth century.

It remains dubious why only one research institute [International Research Institute for Climate Prediction (IRI), associated with Columbia University in New York] is listed and all the major research centres in the natural sciences in Europe (e.g. Cicero, Hadley, Max Planck,

Wuppertal and Potsdam Institutes) and elsewhere are ignored. A list of addresses of major research institutes with website addresses could have been an additional tool to facilitate permanent access to scientific information. Most of the authors come from the USA and Canada, only a few from Europe, and hardly any scientist was included who is working at Third World institutions.

Volume 2. Harold A. Mooney. Joseph Canadell (eds): *The Earth system: biological and ecological dimensions of global environmental change*, 626 pp

The ten introductory essays of the second volume deal with the biological and ecological dimensions of global environmental change, with biological invasions and functional biodiversity, with the impacts of global environmental change on animals, plants and on terrestrial and freshwater ecosystems as well as of climate change for natural systems, with the dispersal and migration of plants and the sedimentary records of long-term ecological change and with the IGBO core projects most of them are being presented in detail in this volume.

The more than 100 contributions deal with the main themes including forests (both boreal and tropical), grasslands, mangroves and marine systems. The volume also includes articles on the most important biogeochemical cycles, carbon dioxide enrichment of vegetation, paleotrends with regard to ecological processes and indicators, ecological models, monitoring techniques, monitoring systems and the ecological dimensions of the main global change research programmes. The volume includes many definitions, e.g. of biomes, the biosphere, environment, forests, gaia, habitat and some 20 biographies (e.g. of Charles Darwin, Paul Ehrlich, Alexander von Humboldt and E.O. Wilson).

The co-editors, Mooney and Canadell, argue that during the past 15 years the rapid evolution of the science of global change "has provided major insights on the functioning of the biosphere and its interaction with the physical environment" due to the recognition of major changes of key drivers, such as increased atmospheric CO_2 and average global temperature. The volume deals with the fundamental science underpinning the "understanding of quantities and processes that control the basic biogeochemical cycles such as carbon, nitrogen, and phosphorus, and the associated changes in ecosystem physiology and structure under current and predicted human-driven global environmental change".

The editors claim that this volume offers the building blocks that will permit us to "(i) integrate the biospheric processes and quantities with the Earth's physical system into one single Earth system, (ii) detect changes in the world's ecosystems' function and structure, ... (iii) develop the capability to predict impacts on the biosphere brought about by global environmental changes over the next few decades to century". Based on this scientific information (vols 1 and 2), the technical capabilities (vol 3) and policy tools (vols 4 and 5) should be developed to mitigate and adapt undesirable changes.

Volume 3. Ian Douglas (ed): *Causes and consequences of global environmental change*, 753 pp

Human beings and human activity are both a major cause and victims of global environmental change. The eleven introductory essays focus on human disturbance of the earth system, with global population, land cover and land-use trends, anthropogenic and industrial metabolism, with water use, contaminated land, environmental change and human health and environmental changes driven by civil conflict and war. According to the volume editor, Ian Douglas, human actions must "be seen as part of a whole Earth system that is changing and producing feedbacks and responses" as population growth, land use and land cover change, and urban and industrial metabolism and the interlinked themes such as agriculture-driven change; biomass burning effects; emissions of CFC, carbon, methane, nitrogen and sulphur; deforestation and logging; demographic change; exploitation of water; use of fossil and non-fossil fuels; soil evolution and land degradation; over-fishing and aquaculture; transportation, urbanisation, tourism and waste disposal as well as ocean dumping.

Global environmental change has already challenged many planning assumptions for many engineering efforts, e.g. dams, pipelines or flood defences. Ecology helps to unravel interactions, feedbacks and causes and to develop holistic thinking by extending the focus from plants to "the study of interactions amongst people, other organisms and their environment" including social processes – what is often called human ecology. The analysis of this interplay requires an integrated science that looks at the world as it really is. This volume contributes to the human knowledge needed for this integrated science.

While many of the high-quality articles focus on interlinkages of cause and effect between two fields, e.g. aquaculture and environment, impacts of cattle grazing on land-cover, global impacts of tropical deforestation, effects of climate change on life cycles of salmon, environmental challenge of population movement, shifting cultivation and land degradation, tourism as a global driving force for environmental change, impact of climate change on viral disease, climate impacts on weather extremes in the USA, the volume does not succeed in contributing to an "integrated science". What is missing in this volume are articles on methods (modelling, scenarios, etc.) and approaches (e.g. Schellnhuber's *Earth system analysis*) that address a multitude of human factors or drivers of global environmental change (e.g. population growth, urbanisation, food and water needs and agriculture). However, it is doubtful whether this may be achieved at the global level and how relevant abstract global analyses may be for use in policy guidance at the regional or national level.

While this book addresses in one introductory essay the environmental changes caused by wars (Vietnam, Gulf, the former Yugoslavia) the opposite question is not addressed to which extend the environmental change has or may contribute to conflicts in the future. The case study: "Oil fires: Kuwait" by Tahir Husain (Canada) focuses on one aspect of that war, but the environmental impact on the use of enriched uranium and on the causes of the severe illness of many soldiers fighting in the Western coalition are not addressed. In the review article by Ian Douglas (Manchester University, UK) on the environmental impact of wars, the four references are insufficient and not representative at all of the level of research in the social sciences, e.g. by natural scientists such as Arthur Westing, whose pioneer work is ignored in both contributions.

While the article by Skeldon (University of Sussex, UK) on the environmental challenge of population movements offers a historical review of the migrations out of Eurasia, of the rural to urban migrations since 1800, of the forced and refugee migration and of the new migrations of the 1990s; the environmental causes, e.g. the role of climate change and desertification as drivers of a distress migration (e.g. in the Sahel or in Bangladesh) are not addressed. Thus, from a social-science perspective, several articles do not fully reflect the state of the art and the proclaimed goal of the interdisciplinary linkages has only partly been achieved.

Volume 4. Mostafa K. Tolba (ed): *Responding to global environmental change*, 567 pp

The fourth volume has been edited by Mostafa K. Tolba, the former secretary general of the United Nations Environmental Programme (UNEP) and present director of the international Center for Environment and Development in Egypt. This volume deals with human responses to global environmental change by governmental and international bodies, by engineers in search of technical solutions, by business and industry, by the scientific community and by various sectoral interests (fishing, forests, tourism).

The twelve introductory essays offer an overview of the environmental responses, trends in environmental management, public-driven, scientific, policy and industrial responses to global environmental change (including public health and ozone depletion), on emerging environmental issues, on adaptation strategies and sustainable energy policies, on dematerialization and sustainable development, on eco-efficiency and the monitoring as an adaptive ecosystem approach. The about 100 shorter articles cover, among others, strategies for adapting to global change, international environmental conventions and regimes, tools for longer-term environmental policies (tradeable emission permits, environmental assessment methods, environmental dispute resolution, early warning monitoring systems, indicators of sustainability), and the Agenda 21.

According to Tolba the volume covers (1) policies for achieving sustainability (energy, transport, development), (2) international fora and meetings (Stockholm, UNCED, Kyoto), (3) the main principles (polluter pays, no regrets, precautionary principle), (4) concepts (cleaner production, eco-efficiency, dematerialisation, adaptive environmental monitoring strategies), (5) tools for assessing and dealing with environmental problems, (6) the major international conventions (climate change including Kyoto Protocol, biodiversity, Montreal Protocol), (7) examples of actions taken on regional problems (Mediterranean, Black Sea, Caspian Sea, Aral Sea), (8) descriptions of organisations contributing to policy formulation (IPCC, Club of Rome, WBCSD, ICSU, UNEP), and (9) 25 short biographies, including – in contrast to the other volumes – several experts from Third World countries (Agrawal, Goldemberg, Kassas, Obasi, Tolba) and also two women (Brundtland, Ward).

The former long-term Secretary General of UNEP, Mostafa K. Tolba, (born in 1922) is not only the editor, he is also the author of 25 articles, among them two superb introductory essays that give an overview of environmental responses and, with Jih C. Yang as co-author, on "Dematerialization and sustainable development" and 15 biographies of leading environmental scientists and officials around the globe. While in the first three volumes there was a clear predominance of North-American, British and Scandinavian authors, in this volume key experts from developing countries are represented. Volume 4 offers many brief and informative articles on international environmental regimes (Basel Convention,

Biodiversity, CITES, Desertification Convention), programmes (Agenda 21, Blue Plan, IHDP), organisations (EU, ECA, ECLAC, ESCAP, FAO, GATT, IMO, OECD, UNCTAD, UNDP, UNEP, UNESCO, UNFPA, WFC, WTO), institutions (IPCC, IOC, ISO, IUCN, UNCED, UNSCEAR, WCED), networks (Asia-Pacific, Club of Rome, GIS, ICSU, IFIAS, MEPC, SCOPE, START, WBCSD, WWF), and research institutes (EEA, IAI, IIASA, Worldwatch Institute, WRI).

After a brief introduction on regional responses to global environmental change, this volume includes four case studies on the Baltic, the Black, the Caspian and the Mediterranean Seas, as well as four case studies on the Aral Sea, the Great Lakes region of North America, Lake Victoria, and the Nile River and six general case studies on climate change assessment, on the Dobris European Environment Assessment process, on eco-engineering to promote ecological sustainability in China, on the MINK (Missouri, Iowa, Nebraska, Kansas) study, on RAINS (the regional air pollution information and simulation) and Transboundary Water Resources Management, dealing with Canada and the USA.

Volume 5. Peter Timmerman (ed): *Social and economic dimensions of global environmental change*, 608 pp

The fifth volume, edited by Peter Timmerman of the International Federation of Institutes for Advanced Study, highlights the shift in human thinking and awareness due to globalisation, and examines how social, cultural and economic forces are playing an increasingly dominant role in humanity's transformations of the face of the Earth. This volume focuses on the social, cultural, and economic ideas and institutions that shape the desires and hopes, the conflicts and resolutions of conflict that are central to the human dimensions of global change. It covers major political and economic theories from Plato to Rachel Carson and the seedbeds for environmental thought and practice.

The thirteen introductory essays focus on the human dimensions of global change, the changing human–nature relationships, economic and environmental global change, ecological economics and environmental politics, the historical dimension of global environmental change (GEC) and of globalisation, the role of technological society and of the social sciences in relation to GEC and its emergence into politics, the role of environment and violent conflict and of development and GEC.

The articles focus on the linkages between GEC and scientific disciplines (anthropology, art, economics, ethics, philosophy, psychology, sociology, future research, law, literature, theology), approaches (ecofeminism, eco-socialism, ecosystem), theses (demographic transition, gaia, sustainability, small is beautiful), problems (BAT, business-as-usual, environmental security, equity, man and nature, precautionary principle, Waldsterben); methods (modelling, scenarios), scientific (UNU) and non-governmental organisations (survey of NGOs, Environmental Defense Fund, Friends of the Earth, Sierra Club, WCC), religions (Bahai, Buddhism, Christianity, Hinduism, Islam, Jains, Judaism), positions (ecocentric, biocentric, gaiacentric, homocentric, new ageism, utopianism), and people (15 biographies including Attenborough, Bateson, Brower, Carson, Cousteau, Francis of Assisi, Gandhi, Kondratyev, Leopold, Malthus, Muir, Nasr, Ted Roosevelt and H.D. Thoreau and, as the only German, Petra Kelly). However, this volume lacks key articles focusing on national

and international environment policies, on international environment regimes, on problems of environmental governance, and syndromes of global environmental change. Each of the five volumes has an alphabetical list of the articles and the fifth has a list of the contributors, of abbreviations and acronyms and a detailed subject index.

From *Global environmental change* to regional environmental challenges

This reviewer has argued with regard to the regional level that six drivers may challenge the security and survival of countries in ecological hot spots, such as the countries of North Africa and the Mediterranean (MENA) on the Southern and Eastern shores of the Mediterranean that will have direct (via environmental or distress migration) implications for all European Union countries during the twenty-first century. Three of them will be induced by nature (e.g. climate, hydrological cycle and soil) and three will be caused by humankind (population growth, urbanisation and agriculture, including food needs and biodiversity).

Influenced by Braudel's *La Mediterranée* (1946, 1990), this reviewer has further argued that these six regional challenges included in his *survival hexagon* (Fig. 1) will provoke different outcomes in the socio-economic and political realm which may lead to different types of fatal outcomes, such as disasters, migration, crises and conflicts (see Fig. 2). Which of these drivers and their potential outcome on the global and regional level have been addressed in Egec and which topics have been lacking?

Nature-induced *Global environment changes*: climate change, hydrology, and soil

The first driver: climate and climate change is covered in about 16 articles in all five volumes, in addition to articles on the UNFCC and the Kyoto Protocol, the IPCCC, the WCC (World Climate Conferences: 1979–1990), the World Climate Programme and the World Climate Research Programme. The subject index refers to more than 100 articles where climate-related aspects have been covered. With regard to regional implications, there are references to future perspectives, modelling, processes and simulations and regional climate models but no detailed analyses on the impacts on world regions or intercontinental regions such as the Mediterranean that have also been excluded so far by the IPCC.

Problems of hydrology are analysed in two articles, while the hydrological cycle is covered in one detailed contribution. One introductory chapter has been devoted to "water use: future trends, and environmental and social impacts", while issues related to water resources are covered in three case studies on the Baltic Sea, the Great Lakes and the Rio de la Plata. However, the subject index lists among water-related topics around 100 different articles.

The third major nature-induced driver, "soil", is covered in five articles on soil amelioration, soil deterioration and loss of topsoil, soil erosion, soil mineralisation and soil moisture. Deserts, desertification and its UNEP definition and the desertification convention are covered in four articles and in the index some 25 references are listed. However, the complex

interaction among these three nature-induced drivers both on the global and regional drivers of global environmental change cannot easily be found and lack a systematic analysis.

Human-induced *Global environment changes*: population growth, urbanisation, food

Global population trends are covered in an introductory essay, while population growth and demographic change (Indonesia, Pacific Islands) and transition are only briefly noted. The index shows some 20 cross-references to articles where population-related aspects are examined. *Urban issues* and *urbanisation* are treated in six articles on urban climate, ecosystems, urban heat islands, population change, poverty and health, smog, and wastes, and the index adds more than 50 additional cross-references.

Agriculture is covered in four articles dealing with intensification in Java and Western Europe, with subsidies and environmental change, and with agro-forestry, while *food* is covered under food consumption patterns and their influence on greenhouse emissions and as food webs. The index adds some 30 cross-references to agrarian transformation, agricultural policy, agro-forestry and to complex man-made agrosystems. However, there is no systematic treatment of the complex interactions and feedbacks among these three human-induced drivers, nor is there any systematic analysis between the nature- and human-induced drivers of global and regional environmental change.

Global environment changes and regional impacts on the Mediterranean

The Mediterranean, as an intercontinental region that divides the OECD world from the developing countries on its southern and eastern shores, a common environmental region but a divided political space where pre-modern (Balkans), modern [Middle East and North African (MENA) countries] and postmodern conceptions of space (EU Europe) confront each other. While – from a European perspective – this is the most likely region for environmental conflicts and environmental refugees that will have repercussions on European domestic (migrants as an electoral, demographic, employment and human rights issue) and foreign policy (Schengen regime), the Mediterranean warranted only one article on the "Mediterranean Sea" and in the index only few cross-references point to Mediterranean desertification and land degradation, the Mediterranean Blue Plan, environmental degradation and to the Mediterranean Sea.

From the perspective of national and international policy makers, the regional interaction of the factors driving global environmental change and their probable implications on population movements, and on national or regional conflicts specifically, matters. However, this has not been the goal of this monumental work. This should be the task for future inter- and multidisciplinary efforts involving natural and social scientists to develop complex models and to run simulations based on empirical data.

An assessment: editorial goals and achievements

At the global level, the aim of the editors to overcome the narrow disciplinary boundaries and to contribute to bi- and multidisciplinary perspectives has been fully achieved. Two of the key editors, Ted Munn (1919) of the series and Mostafa Tolba (1922), both in their 80s, have combined a long experience in government, science and in international governmental and research organisations with a sense of responsibility about the earth system that should be sustainably managed and developed in view of the responsibility for future generations.

While there are two articles on encyclopaedias as compendia of global knowledge and on data banks, among the 900 articles there is no entry referring to the Internet as a source of scientific information and in many articles Internet sources are absent from the references. Given the high price, the publisher should consider adding a CD or DVD with Internet sources and multimedia illustrations that can be more easily and frequently updated to keep this valuable encyclopaedia topical in an era where our knowledge is expanding so rapidly.

From a social science, political science and international relations perspective, this encyclopaedia is a valuable source of reliable, readable and, for the layman, understandable scientific information primarily in the natural sciences, a major reference book on the many international research programmes, organisations active in international environment science and politics. This encyclopaedia offers many excellent introductory texts for advanced seminars on international relations and on global and regional environmental issues.

This pioneering work, while being unable to address all aspects of the complex nature–human linkages, is a source of high-quality information and inspiration across disciplinary boundaries. This encyclopaedia deserves a wide readership in major public, university and institutional libraries, but also in companies, international organisations and the media. It should be in the reference rooms of all major public libraries, of university libraries and in all environment research institutes in the countries that can afford it.

To make this information available to Third World institutions, the publisher could consider a Third World edition published and distributed in the South at prices these universities can afford. Hopefully the publisher should consider whether the whole encyclopaedia could be put on the Internet, to permit individual researchers, especially in Third World institutions, free access to this important scientific information on global environmental change and thus guarantee equal access irrespective of the different resources available to students in the North and South. Nine sample articles may already be read at http://imprimatur.springer.de/proofs/lhdp32898/www.wiley.co.uk/egec.