Most of the 21 chapters and the 13 themes deal with the issues of change in snow melt, snow depth, a longer growing season, the 14-day advance spring season, higher (air) temperature and general variabilities. The notions of ice free lakes, UV radiation and secondary plant metabolites, below-the-ground impacts, and archeology are other great topics to read up on. Links with the marine environment (e.g., sea ice) get elaborated on in detail, and so are many other science topics such as pollination, muskoxen, lemmings, migratory shorebirds (not included are gyrfalcons and most songbirds, though), tadpole shrimp, fish, (introduced) beetles, shrubs, ground-living plants, phenology, glaciers, permafrost, methane release and "weather". The infrared NDVI [Normalized Difference Vegetation Index] remote sensing work and the circumpolar breeding performance of arctic waders I also read with great interest. The chapter summaries provided make an informative text by themselves, highlighting relevant details in each chapter for managers and the lay public that are inclined to skip methodological details, for instance. But I think all audiences will find it rather annoying that the literature references follow a format that actually omits (?!) the publication titles.

The book elaborates on forecasting climate change each of its research topics. But many authors retreat to the argument of "uncertainty" and make conservative understatements for the sake of a wrongly perceived "scientific objectivity", or just use qualitative expert extrapolations, instead of employing science-based quantitative modeling, meta-analysis, the development of new methods (if needed) and the plain use of "common sense".

They should invoke these because (i) the man-made contamination of the atmosphere will certainly not be beneficial, and (ii) the warming trend will result in extinction of local DNA specifically adapted to the Arctic (both are points not made by the Arctic science experts here). Also, it would have been helpful if the editors had insisted on the use of a global taxonomy (e.g., ITIS) so that species and effects can be better described and compared globally.

A detailed index of 12 pages is found at the end of the book. Each book chapter has a nice section of tables and figures (mostly in high-quality color; unfortunately, I could not find a digital version of these to be used for lectures).

This milestone publication is a celebration of the traditional scientific approach, trying to understand biological mechanisms (a là "we sort'em post mortem") a concept that has proved inefficient worldwide and which did not really halt climate change and loss of species and wilderness. There are a few points where I strongly disagree with the authors. First, this publication has actually more American researchers involved than Greenlanders. Such a lack of native views must represent another rather outdated science concept and expert view that is driven by an "Old Boys" network, mostly being Danish with some Swedish, U.S. and Belgium help (e.g., no Canadian, Icelandic, Norwegian, Finish or Russian co-authors can be seen). Second, this book is basically a (Danish) governmental research exercise (mostly National Environmental Research Institute and University of Copenhagen) that presents us with a selective, and somewhat one-sided, view of "Arctic science". Next, the statistics employed in this book are virtually all linear, additive, correlational (e.g., the misleading notion of "coupling"), and non-spatial (tested hypotheses are often not mentioned or "poor"), whereas it has been known for over 30 years that detectability issues matter and that ecology, climate and the Arctic are complex, non-linear, multivariate, inherently spatial, and require a diversity of approaches to provide us with true progress. Lastly, it comes as a big surprise that this books makes no relevant reference to the International Polar Year (IPY; a major and ongoing planning and global science initiative for many years, and happening when this book was published. Whereas other recent Arctic programs and initiatives such as AMAP [Arctic Monitoring and Assessment Programme], ACIA [Arctic Climate Impact Assessment], ITEX [International Tundra Experiment Program] and ICARPII [International Conference on Arctic Research Planning II] are mentioned). The reader assumes that the great Zackenberg data in the BioBasis database are getting submitted to IPY and will be freely available to the global audience in compatible formats and with high-quality metadata.

This very informative science book should indeed be on your book shelf, and read by many people worldwide. However, if we really want to keep a viable Arctic, we need a better and all inclusive global economy with less growth and resource consumption, compatible and readily available global data sharing, and still have to investigate truly sustainable ways of management and living (none of this has been mentioned, studied or demanded in this book).

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Earth Matters

Edited by Elinor Greenwood and Elizabeth Haldane. 2008. DK Publishing, 375 Hudson Street, New York, New York 10014 USA. 256 pages, 27.99 USD.

Subtitled "an encyclopedia of ecology", *Earth Matters* presents a colourful survey of the world's major biomes and biodiversity, aimed at younger readers. As with all Dorling Kindersley books, this one's main

strength is its colourful and eye-catching design, with interesting graphics and splendid images. It is very similar in style and appearance to other well-received children's books by this publisher. Packed with information and rich in content, it succeeds admirably in attracting and holding the reader's attention.

The book is divided into three parts. The first part begins with an introduction to the story of life on earth. It briefly reviews some important geobiological aspects of ecosystems, including the carbon and water cycles, and presents a two-page map with the eight biomes that are the focus of the main part of the book. These comprise the polar regions, temperate forests, deserts, grasslands, tropical forests, mountains, freshwater, and oceans. Each biome chapter has a similar format, starting with a two-page spread featuring a world map, showing the distribution of the biome and naming some of the main geographic areas associated with it. The biomes are treated at a high level of abstraction, although some major ecosystems within them are highlighted. Thus, the temperate forests chapter includes two pages on the boreal ecosystem and the deciduous ecosystem, the tropical forests chapter spotlights cloud forests and tropical dry forest, and the freshwater chapter features the Everglades. Each biome is also characterized by one or more "feature creatures", predominantly mammals, but also including some birds, amphibians, insects, and plants. In the chapter on deserts, for example, we learn about the Bactrian camel and the saguaro cactus, whereas the polar bear, the caribou and the Emperor penguin exemplify the polar areas. In all cases the creatures are endangered or otherwise vulnerable to human activities. The most extreme case is that of the golden toad (*Incilius periglenes*) of Costa Rica, featured in the tropical forest chapter, which was only described in 1966 and is now thought to be extinct. At the end of each biome chapter is a section on "Making a difference", which suggests some ways in which individuals can help protect the particular ecosystems under scrutiny. The concluding part of the book is called "Helping the Earth". Here, the messages of personal action and responsibility are re-iterated. The focus is on renewable energy and wise use of energy resources. Throughout, the volume has a strong eco-activist tone and is clearly designed to encourage a sense of environmental stewardship and concern for the Earth in young readers.

Information is not offered as a narrative, but is arranged as a series of snippets or factoids, with striking use of images and distinctive typography. The "Making a Difference" sections, for instance, are laid out like a cork notice board, with notes and photos apparently "pinned" in place. Every page has a well-balanced mix of text and graphics. The photos are usually high quality, and are in focus, clear, well cropped, and with good colour rendition. Images are sometimes composite. For example, the savanna ecosystem animals (page 125) are image cutouts, presumably reprocessed to the same relative scale, and then superimposed on a background. Occasionally this leads to some oddities, such as an apparently five-legged deer (p. 178). The consistent style and layout include some common icon elements, such as stylized adult and child silhouettes that provide relative sizes for animals and plants. A stylized footprint in a "sticker" headed "what you can do" is used to highlight eco-friendly actions, such as building a birdhouse (page 89) or carrying a reusable water bottle (page 207).

The designers have cleverly used a variety of approaches to displaying data. Illustrations include some simple graphs and charts, such as a comparison of monthly rainfall amounts between Manaus, Brazil, and Paris, France (page 142), or the average monthly temperature on Mount Washington, USA (page 166). Elsewhere, illustrations include block diagrams (e.g., showing the river system, page 188), pie charts (e.g., showing how harvested wood is used, page 83, or sources of energy, pages 30-31), and cycle diagrams (e.g., showing the various paths for solar energy, page 47, or the carbon cycle, pages 26-27). Variable-sized graphics are used very effectively to present numerical data in an easily understandable format. Different sized water drops (page 32) show the relative abundance of the world's freshwater in different storage systems (glaciers and ice caps, groundwater, and surface water), whereas individuals' carbon footprints in various countries are dramatically illustrated by different-sized footprints (pages 36-37). The strong geographic focus is reflected in an abundant and effective use of maps and other remote-sensing imagery, especially the use of repeat imagery. The reduction in the extent of the Aral Sea is clearly shown in a comparison of satellite images from 1989 and 2003 (page 197), while a map series shows the reduction in the area of Lake Chad between 1963 and 2001 (page 109), and the shrinking "Altsch" [*sic* – should be Aletsch] Glacier of Switzerland is documented by photos taken in 1979 and 2002 (page 181).

Due to the sophisticated integration of different levels of information and presentation methods, *Earth Matters* will likely appeal to a broad age-range. Younger children will enjoy flipping through it and looking at the colourful pictures, while the text provides the more contextual background for older readers. The book is robust and well made, with a thick cover and mid-weight paper that should withstand much reading. I feel that it would probably appeal to the eight-to-twelve-year-old age range. One of my colleagues in the youth education field thought that the content was diverse and rich enough to interest a somewhat broader age range, perhaps seven to fourteen years old.

The book does have some weaknesses. Animals and plants are identified only by their common names, losing the opportunity to introduce Linnean terminology, a basic bioscience concept and one many youngsters, such as those enthusiastic about dinosaurs, will

have some familiarity with already. This choice leads to some confusion and mistakes. We are told that in the Canadian Arctic Inuit people have recently seen robins, birds that have not previously been found there (page 29). However, the snippet is illustrated by a photo of the European robin (*Erithacus rubecula*) not, as it should be, by the North American robin (*Turdus migratorius*), a species in a different family. The same common name can often be used for very different creatures in different parts of the world. The buffalo raised by the Marsh Arabs of Iraq (page 200) is not the same as the buffalo (actually a bison) illustrating the geological Age of Mammals (page 19).

Although the survey of biomes is a useful organizational approach, as it summarizes lots of information in a short form, it does lump together creatures from very different areas of the world. Often, the home regions or geographic distribution of the creatures shown are not identified, and this may confuse some readers. For example, the deciduous forest ecosystem is illustrated by a characteristic British woodland (page 77-78), complete with bluebells (*Endymion non-scriptum*), badgers (*Meles meles*), and tawny owls (*Strix aluco)*. However, the page also includes a picture of a chipmunk (*Tamias* sp.), a non-European species that would not be found in such woodland. The lowland rainforest ecosystem is illustrated by an image (page 142-143) that includes a toucan and caiman, which have predominantly South American distributions, in the same spread as a gibbon, species of which are found in Southeast Asia. This juxtaposition implies that these creatures could be found living in the same place, a misleading impression. In some cases, the geographic context for images is missing, especially for those images showing human activities. Where do people fish for eels with reed traps (page 201) or live in houses made of reeds? Where do people harvest cockles (page 214) or still dive for pearls?

There is also some confusion about the geographic locale of the target audience. The book appears to be aimed at readers in both the U.S. and the U.K., because sometimes terms are US-specific and sometimes UK-specific. For example, on page 136 readers are encouraged to write to their Congressperson, something only U.S. readers can do, although the animal chosen to illustrate the sample letter protesting a local development project is a European hedgehog. On the same page, readers are exhorted to leave a patch of long grass in their garden for wildlife and assured that if they do, hedgehogs might appear, something that would not happen in the U.S. The geographic muddle carries over into other parts of the text. Scandinavian people refer to their herd animals as reindeer, not caribou (page 175), and Arctic people drive dog sleds not sleighs (page 44). There needs to be more clarity and consistency in the geographic identity of the voice used throughout the book.

Earth Matters pulls together information on a great diversity of topics. I am somewhat ambivalent about its factoid approach and the consequent oversimplification of complex issues, especially when currently trendy eco-actions are involved. The directive to eat locally grown food (page 137) ignores the cultural reality that Western consumers demand a wide range of food resources at all seasons of the year. This demand can result in substantial energy inputs expended to grow crops, such as greenhouse-grown salad vegetables, beyond their natural range. In this case, simply "eating locally" is not necessarily the most environmentally friendly action. A more informed recommendation would be to "eat seasonally", consuming only organic crops that can be locally grown without the investment of additional energy or irrigation. However, it is unlikely that consumers in most regions would be satisfied with the restricted and seasonally variable diet that would result. The subtleties of such issues are obviously not identified here but could perhaps form the basis for classroom discussion or parent-guided conversations. I saw many places where statements could act as starting points for more thoughtful investigation.

Inevitably, in such a broad-based survey, there are errors. Mammoths and modern humans co-existed for thousands of years in Eurasia, where mammoths were not "wiped out" in their first encounter with hunters, as implied on page 20. Wolves were exterminated only in the U.S. portion of the Rocky Mountains (page 178); they maintained populations in the Canadian Rockies. Tumbleweed, or Russian thistle (*Salsola* spp.), was introduced to the North American prairies and spread through the interior Great Plains, not the west coast (page 121). The Lauterbrunnen valley is a superb example of a classic glacier-cut U-shaped valley, not an example of a valley produced by river erosion (page 178). Such mistakes are irritating but do not detract significantly from the book's usefulness.

However, *Earth Matters* opens with a statement of such monumental hyperbole and silliness that I almost read no further. In the foreword, David de Rothschild, identified as an adventurer and ecologist, states that inside the book "you will find everything you will ever want to know about Earth's ecology". If the intent is to present accurate and interesting information, why begin with a statement so patently untrue that it undermines the credibility of what follows? Fortunately, I read on and found the rest of the book rather more measured than that inflated and misleading declaration led me to believe. The book is well intentioned and certainly is attractive and easy to read. Despite some flaws, it has considerable educational and informational value. Overall, I liked it and I imagine that most children will enjoy it too.

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