

that are arranged in reverse stratigraphical order. Much use has been made of data from UK hydrocarbon exploration activities that reached their height in the 1980s and 1990s, augmented by academic research studies and government-funded strategic surveys. Most data have been determined using X-ray diffraction (XRD) analyses, underlining the importance of this technique when studying fine-grained minerals, but the book is enhanced by the inclusion of both colour and monochrome optical, scanning electron and transmission electron micrographs.

The first chapter (Huggett & Knox) discusses the smectite-dominated clay mineral assemblages of the onshore Tertiary and their more extensive offshore equivalents which are derived from the alteration of volcanic ash and the weathering of smectite-rich soils. However, considering the increasing level of interest in the shallow interface, it is perhaps disappointing that few data and little discussion are focussed on the Quaternary deposits that often overlie the 'solid geology'.

Almost half of the book is composed of lengthy chapters on the onshore Cretaceous, Jurassic and Permo-Triassic, contributed by C. V. Jeans. These chapters have a similar style, drawing on much unpublished literature, presenting abundant stacked X-ray diffraction traces and copious appendices of tabulated data. The stratigraphical and regional variations in the clay mineral assemblages are employed to interpret palaeogeography, palaeoclimate, sediment source areas, soil types, volcanism and sedimentary facies.

Offshore chapters for the Cretaceous and Jurassic (Wilkinson, Haszeldine & Fallick), the Permo-Triassic (Ziegler) and the Carboniferous (Shaw) illustrate the use of clay mineral assemblages to hydrocarbon exploration. In the Cretaceous and Jurassic chapters, changes in kaolinite morphology and polytype are related to increased burial while K–Ar dating of authigenic illites may record the timing of oil charge; both being used to calibrate basin history. Additional factors control clay mineralogy in the Permo-Triassic including variations in depositional environment, the chemistry and flow of porewaters, the timing of clay mineral formation and the action of meteoric water.

The diverse clay-bearing sedimentary rocks of the onshore Carboniferous (marine and non-marine shales, turbidites, fire-clays, seat-earths, K-bentonites and tonsteins) are reflected in a diversity of their clay mineral assemblages (Spears). Highly variable clay mineral assemblages are typical of the ORS and Devonian, often illustrating the influence of diagenetic or progressive/retrogressive metamorphic change (Hillier, Wilson & Merriman). In the final chapter, R. J. Merriman describes how clay mineral assemblages of Lower Palaeozoic pelites are related to their contrasting geotectonic settings, principally using the Kübler index of illite 'crystallinity' for a dataset comprising over 4500 samples.

The wide applicability of clay mineralogy and its role in interpreting geological processes means that this data-filled book should form an essential reference work for not only clay mineralogists but for petroleum geoscientists, engineering geologists, environmental consultancies, forensic specialists, soil scientists and earth science students. The contributors, but especially the editors, are to be congratulated on bringing this long-term project to such a successful conclusion.

Simon J. Kemp

Reference

- PERRIN, R. M. S. 1971. *The Clay Mineralogy of British Sediments*. London: The Mineralogical Society of London, 247 pp.

- HANDY, M. R., HIRTH, G. & HOVIUS, N. (eds) 2007. *Tectonic Faults. Agents of Change on a Dynamic Earth*. Report of the 95th Dahlem Workshop on the Dynamics of Fault Zones, Berlin, January 16–21, 2005. xiii + 446 pp. Cambridge, London: MIT Press. Price £27.95 (hard covers). ISBN 9780 262 08362 1. doi:10.1017/S0016756808004822

This 446-page volume disseminates the results and ideas arising from the 95th Dahlem Conference, held in January 2005 and titled 'The Dynamics of Fault Zones'. The week-long workshop brought together 41 scientists with expertise in subjects including geochemistry, geodesy, hydrothermal processes, metamorphic geology, neotectonics, numerical modelling, seismology, solid-earth geophysics, structural geology, surface processes and tectonics. The book comprises 14 original papers that encompass the four themes of the meeting: (1) nucleation and growth of fault systems; (2) rheology of fault rocks and their surroundings; (3) climatic and surficial controls on and of faulting; and (4) fluids, geochemical cycles and mass transport in fault zones. For those like myself who have not attended a Dahlem workshop, selected participants are asked to draft two or three 'working papers' on each of the meeting themes. The papers are circulated to participants in the months prior to the meeting and form the starting point for workshop discussions. It is these papers – modified in the light of discussions at the workshop and subsequent peer review – that form the bulk of the volume. In addition, it includes four multi-author 'group reports' that summarise the thematic discussions that took place during the meeting. The result is a book that provides a state-of-the-art review of our understanding of faulting at different levels within (and upon the surface of) the lithosphere, based upon observations gathered across a wide range of spatial and temporal scales. Ultimately, the book raises as many questions as it answers. As such, it will appeal to researchers concerned with tectonic faults themselves, the effects of faulting upon surface and/or crustal processes and/or with mitigating fault-related hazards. I believe that the multi-disciplinary, forward-looking nature of the volume also makes it ideal for use as an advanced-level undergraduate course book. In particular, the wide range of techniques used to study tectonic faults (and which are highlighted by the collection of papers in this volume) should help students to appreciate the value of *all* their Earth Science subjects. Moreover, the multitude of questions raised by the discussions and captured by the group reports can be used to encourage students to question everything they read, i.e. taking the view that just because it has been peer-reviewed does not mean it is 'right'! Overall, I recommend this book highly as part of a research or teaching collection, particularly given its very reasonable list price of US\$45/£27.95.

Jonathan Imber

- MURRAY, J. 2006. *Ecology and Applications of Benthic Foraminifera*. xi + 426 pp. Cambridge, New York, Melbourne: Cambridge University Press. Price £80.00, US \$150.00 (hard covers). ISBN 9780 521 82839 0. doi:10.1017/S0016756808004676

In this book, John Murray sets out to discuss benthic foraminiferal ecology and its applications on the basis of observations of living assemblages on a global scale. This strict approach is different from previous efforts, which often considered dead assemblages as well. It results in a very

clear observational framework about the actual conditions that support the assemblages found. The book is very clearly laid out, supported by an enormous web-based resource, with tables of all the data presented in the book.

The book starts with brief summaries on methods and biological/ecological aspects. Next, it launches into the discussion of benthic foraminiferal distributions. Here, the text sometimes assumes the character of an encyclopaedia, listing somewhat 'dry' facts and statistics about benthic foraminifera in a range of different environments around the world. However, it is well organized and as a result easy to digest and follow from one section to another. Personally, I would have liked to see maps identifying the many geographic locations that are discussed, but this omission is easily dealt with by evaluating the book next to an atlas, or a web-based geographic resource. Once the reader hits Chapter 7, on the deep sea, the text becomes much more specific on the processes and controls that govern the distribution patterns. It is obvious that it is in the deep sea that the vast majority of such data have been obtained. Here, I find that the text excels in clarity, and that it provides an impressive synthesis of a vast array of studies. Even more than the preceding chapters, the deep-sea chapter delivers a truly essential starter to all who consider a career in benthic foraminiferal ecology or its use in reconstructions of (past) environments.

The final chapters summarize living distributions and the processes behind them, discuss the changes from live to dead and fossil assemblages (essential for down-core studies), and introduce applications of the observations that are brought together in the book in palaeoecological and palaeoceanographic studies. The latter two topics are not at the core of the book, and are mainly presented in the form of brief summaries and examples. Still, they convey the message well, and the reader is left with a positive impression of having been presented with a state-of-the-art introduction and overview in benthic foraminiferal ecology and its applications. This book is written by an acclaimed authority, and it shows.

The copy I had for evaluation was hardbound and very neatly printed. All figures are clear and well laid out, and the scanning electron micrographs are of excellent quality – it's a shame there were not a few more of those throughout the book. Good images can always be found on the web, but there's no substitute to having them within the main text volume. The reference list is as extensive as it could possibly be, and the volume of data that has been brought together from around the world is truly amazing. This is a very good reference volume for people working in the discipline, and a great introduction to those aspiring to do so. Now for a volunteer to integrate all these datasets into a Google-Earth-type framework...

Eelco J. Rohling

HOLMAN, J. A. 2006. *Fossil Salamanders of North America*. xv + 232 pp. Bloomington, Indianapolis: Indiana University Press. Price US \$55.00 (hard covers). ISBN 0 253 34732 7.
doi:10.1017/S0016756808004743

Indiana University Press is producing an extraordinary variety of texts under their 'Life of the Past' series edited by James O. Farlow. They range between rather naïve, poorly edited books on dinosaurs and scholarly tomes written exclusively by acknowledged experts that have the 'air' of a more traditional monograph. This falls into the latter cat-

egory, and is the third to have been produced by Alan Holman (the first having been *The Fossil Snakes of North America*, the second *The Fossil Frogs and Toads of North America*).

As with the earlier volumes this is an impressively comprehensive survey of a comparatively obscure group of amphibians. Since these are ecologically extremely vulnerable in modern habitats, being able to survey their anatomy, taxonomy, history and distribution in exquisite detail is a valuable resource. In this respect Indiana University Press is to be congratulated in its altruism – this is not going to be a 'best seller' in any sense of that word, since it fits into the category of worthy (but comparatively dull).

Salamanders are biologically wonderful animals (as indeed are their cousins the frogs and toads), living as they do at the water–land interface. They combine fish-like and classical tetrapod adaptations with great facility since they can (and do) prosper in both environments. Early reports dating to the late 18th and beginning of the 19th centuries confounded the naturalists – in much the same way as the duckbilled platypus did. Were they 'fish' (aquatic)? or were they actually 'saurian' (crawlers on land)? – the combination of gills (some retained externally in the adult) and legs seemed to cut right across conventional wisdom on how to distinguish between the then-understood groups of animals.

Such developmental and anatomical plasticity, and ecological flexibility are part of the wonder of this underestimated group, and this volume that provides an insight into their evolutionary history and diversity is both timely and valuable. This is an excellent addition to the list provided by Indiana University Press. Unfortunately its audience will inevitably be rather limited given the non-prevalence of taxonomically oriented courses taught in biology departments at the present time; this is an indictment of the present state of our educational system.

David Norman

LOWRIE, W. 2007. *Fundamentals of Geophysics*, 2nd ed. x + 381 pp. Cambridge, New York, Melbourne: Cambridge University Press. Price £70.00, US \$140.00 (hard covers), £35.00, US \$70.00 (paperback). ISBN 9780 521 85902 8; 9780 521 67596 3 (pb).
doi:10.1017/S0016756808004871

Are textbooks in their traditional form still relevant? Increasingly feedback from students reveals that they read fewer texts and spend more time reading online material. Textbooks have to compete for attention from instantly searchable material available on a computer screen anywhere in the world at the click of a mouse. The internet makes not just one point of view or explanation but tens, hundreds or thousands available in an instant. Academic staff have seen the development of the internet but learned the material they teach from textbooks, meanwhile the students they teach have now grown up in the internet age and have little concept of life without it. The staff and the students they teach gather information in different ways. Who is to say which is best?

As the influence of the internet has grown *Fundamentals of Geophysics* has been published and has established itself as one of the most widely used geophysics textbooks. It has recently been revised and published in a second edition. This new edition is similar to the first, with one major change: the contents of the final chapter on Geodynamics from the first edition have been incorporated into chapters one to five of the second edition. In my mind this is an improvement because much of this material now follows in context from the more introductory material in each