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BOOK REVIEWS

Making computers personal

De Paor, D. G. (editor) 1996. *Structural Geology and Personal Computers*, Pergamon Press, 526 pages, list price $48. Dfl 78

The increasing calculating power and user-friendliness of personal computers has led to their gradual invasion of the offices and labs of structural geologists. I was amazed when I calculated how few years ago it was when I was still using a drawing pen and typewriter (some of my students may not know one when they see it) to produce scientific papers. I do not think that, using a computer, I can produce a paper in less time than 15 years ago, but being able to change any text or drawing at will means a greatly enhanced creativity and flexibility. Personal computers have been used in research, for plotting stereograms and for office work right from the start, but new is their gradual invasion of the class-room, especially for demonstration of the "moving parts" of structural geology. Further progress seems to be boundless, but in many cases our creativity in using computers is hampered by the battle between our budget and the yearly birth of new and faster computer models with larger hard-disks and RAM, and the steady growth of our favourite computer programs that manage to fill that RAM and disk-space just as fast, not necessarily with the things we want. However, specialized small programs for problems in structural geology cannot be bought at the corner shop and it is usually difficult to find out what is available, and where to get it.

Structural Geology and Personal Computers, edited by Declan De Paor is a very useful book in this respect. In its opening chapter, Declan does not advise us to buy the newest, fastest and glossiest machines and software; small, common and used will do the job at hand in many cases, and will stretch the available budget. This sets the trend for the rest of the book, which is a collection of 34 papers by 47 well-known authors on many aspects of structural geology and computing. Most papers describe shareware, or put simple drawing and spreadsheet programs to unexpected uses. In most cases, e-mail or web site numbers help to find further information on programs, or the programs themselves. The book is a gold mine of information on the optimal use of PCs or Macs in teaching and research. An amazing number of creative ideas of applications in teaching are given, which will make teaching a lot more fun for students, and also for teachers; theoretical and mathematical topics can be presented in an attractive way for (mostly visually oriented) geology students: ellipses will move and change shape, fossils deform before your eyes and shear strain will lose its secrets.

The book is divided into six main topics. (1) *Computer aided learning* gives advice on the development of a structural teaching lab and the integration of computer-aided teaching, using specially developed programs or photo CDs, with traditional methods. This includes a discussion of the use of Powerpoint, Structure Lab 1 and Hypercard™ for Macintosh, and of programs to illustrate 2D-flow and deformation. (2) *Microstructural analysis* discusses the usefulness of the shareware image analysis program NIH Image for the Mac in the interpretation of natural microstructures; programs for fabric analysis and microstructural modelling using rock analogues; and aspects of the use of LabView™. (3) *Analysis of orientation data* describes stereonet applications for Mac and PC; the plotting of U-stage data; the use of an application (SpheriCad) to link tectonic domains on a map and stereo plots of data in that domain; programs to plot inclined spherical projections; and the use of spreadsheets to recalculate orientation data. (4) *Strain and kinematic analysis* presents computer programs to model development of inclusion trails in porphyroblasts and the growth of pressure fringes; and programs for the construction of Flinn diagrams and Fry-analysis on the Mac. (5) *Mathematical and physical modelling* describes the Theorist™ mathematics-graphics application and programs for forward modelling of 3D structural and geophysical data, for calculation of principal stress orientation from faults, for the spring-network model of fault-system evolution, and to tackle problems of linear elastic fracture mechanics for faults and joints. Finally, the usefulness of Bézier curves for structural geology modelling is demonstrated. (6) *Structural maps and GIS* (geographic information system) outlines computerized geological map compilation and presents the program Field log for management of field-data. Further chapters explain the use of quaternions for rotational operations, the use of digital terrain models to visualize complex structures in mountainous areas, computerized cross-section balancing and restoration using standard drawing and spreadsheet programs, and the construction of block diagrams on a personal computer. The book also contains a useful 15 page subject index. Most papers are well illustrated showing what the programs can do, including examples of applications. Source codes of many programs are given.

Summarizing, this is a very useful book for all geologists who teach and do research in structural geology. The only problem with this kind of book is that it is always incomplete: your favourite program may be missing, or only be partly treated, and most papers do not try to explain methods in great depth, but try to interest readers for new possibilities and challenges. It would have been very useful if a CD had been available with the shareware programs mentioned, and examples of what these programs can do; maybe an idea for a future edition? However, the book contains so many ideas and things-you-did-not-know-existed that it is a welcome tool in structural geology, and may spawn a lot of research topics for graduate students and help to improve teaching.

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Terranes of Avalon

Nance, R. D. and Thompson, M. D. (editors) 1996. *Avalonian and Related Peri-Gondwanan Terranes of the Circum-North Atlantic*. Geological Society of America Special Paper No. 304. Geological Society of America, Boulder, Colorado, U.S.A. 390 pp. Price $95.

Avalonian and related Neoproterozoic–Early Palaeozoic terranes are distributed along the eastern seaboard of North America, in southern Britain and northwest France. There has been substantial progress in the understanding of these terranes in recent years, and this new compilation of papers is therefore a timely record of current thinking. In both the preface and introduction to this compilation, the editors emphasize four principal reasons for the recent progress. These four factors are worth reproducing here because they succinctly illustrate the main themes of the volume and the techniques applied within it: (1) the use of discriminative geochemical and isotopic studies combined with detailed fieldwork; (2) the employment of high precision geochronological techniques, particularly as applied to zircons; (3) a reassessment of faunal provinciality in the overstepping succession, combined with the application of sequence stratigraphic methods; (4) renewed interest and constraints provided by recent work on global Neoproterozoic reconstructions.

After a preface, the main part of the book contains 22 papers arranged between six sections, as follows: *Introduction* (one paper); *Avalonian type area* (one paper); *Avalonian overstep sequence* (one paper); *Terranes of eastern North America* (13 papers); *Terranes of Western Europe* (three papers); *Paleogeographic interpretations* (three papers). The book closes with a comprehensive index. Contributions arose from two conferences, one specifically on Avalon, the other a conference with a global remit held under the joint auspices of two