

Werk

Jahr: 1987

Kollektion: fid.geo

Signatur: 8 Z NAT 2148:61

Werk Id: PPN1015067948_0061

PURL: http://resolver.sub.uni-goettingen.de/purl?PID=PPN1015067948_0061 | LOG_0029

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Book reviews

Active Tectonics. Geophysics Study Committee. Series 'Studies in Geophysics', 266 p., US \$ 26.95, Export \$ 32.50, National Academy Press, Washington, D.C., 1986

This book aims to provide a survey of those phenomena of tectonics being of significance to society. It is not only addressed to the scientist but is also intended to give help, from the scientific community, to policymakers in decisions on societal problems involving geophysics. This is also one of the purposes of a series of 'Studies in Geophysics' of the Geophysics Research Forum, of which this book is a part.

In this context, the term 'active tectonics' is neither defined as movements currently happening – since the term 'currently' is ambiguous – nor is the frequency of faulting events within a certain time the specific characterization of 'active'. Here 'active tectonics' is defined as "tectonic movements that are expected to occur within a future time span of concern to society." Therefore, the forecast of earthquakes and the evaluation of possible volcanic eruptions and seismic hazards are topics of this book as well as slower tectonic processes causing serious economic problems, e.g. the disruption of river channels or the changing of coastlines. Concerning these topics, the book is meant to provide contributions to research on styles, rates and impacts of active tectonics. The book is divided into 16 chapters, each written by a different author. These contributions are based on scientific findings presented at an American Geophysical Union symposium in San Francisco in 1983.

In the first seven chapters the styles of active tectonics are treated phenomenologically. Events at the margins between the North American and the Pacific plate are discussed as well as active faulting, associated hazards and postglacial rebound phenomena like the uplift of Fennoscandia. Furthermore, active tectonic movements in coastal areas and the response of rivers, channels and escarpments to geomorphological changes due to tectonics are presented, mostly in the form of case studies in which areas of the North American continent were investigated. Social aspects are not treated in detail here.

In the following seven chapters, mainly methods of evaluating active tectonics are considered. Geomorphological and geological investigations are essential to the recognition of tectonically active regions and different dating methods are necessary for their chronological assessment. Geodetic measurements play an important role; both monitoring of fault movements by precise surveying of permanent bench marks close to a fault and far-field, or global, geodesy. Unfortunately, the reader is not given a more detailed description of extraterrestrial surveying methods such as Very-Long-Baseline Interferometry (VLBI), which has been successfully applied recently. It is only briefly mentioned here and is missing in the register.

The last two chapters deal with tectonic problems related to volcanoes. Here the impact on society of these processes is treated in detail. The effects volcanoes have on people living near them

and the public response to volcanic eruptions are discussed. The section containing the classification of volcanoes and eruptions is a little short and unstructured compared with descriptions in other chapters. In the last chapter, volcanic hazard assessment for disposal of high-level radioactive waste is investigated by a study of a potential waste-disposal site in Nevada.

Since all chapters are written by different authors, they are of different styles. In most cases, however, a general knowledge of geosciences is sufficient for understanding, which corresponds to the editor's intention. The book contains a wealth of figures and diagrams. It cannot and does not want to be a substitute for a textbook on tectonics, but with many examples and detailed references in each chapter it is a useful complement.

V. Tönnies

Zakharova, A.I.: Estimation of Seismicity Parameters Using a Computer. A.A. Balkema, Rotterdam. 160 pages, 30 tables, 18 figures. Cloth-bound volume. 75.90 DM, 1986

The aims of this book are considerably advanced. It claims to establish algorithms for the determination of seismicity parameters and gives computer programs which can be adopted, a little modified or improved if necessary. The whole collection should be of use for seismic zoning and parameters like the number of earthquakes of a certain magnitude, the seismic activity and the maximal possible earthquake of a territory should be evaluated as well as recorded cartographically from continual registration of several seismograph stations. Concerning the estimation of epicentres, hypocentres and focal depth, other publications are referred to.

The book is subdivided into two main parts. The first, which is the more theoretical part, contains Chapters I and II. In the first chapter a few seismicity parameters are defined, mathematically explained and the various expressions are put together for comparison. This chapter appears to be a good, but not complete, survey of the quantitative formulation of seismicity. The second chapter gives references to computer programs for the localization of epicentres and hypocentres, for the evaluation of focal depth, emergence time and angle and for the construction of epicentre maps for given registration arrays and computer configurations. The basic ideas of these programs and the given configurations are explained briefly in comparison. In addition, it advertises programs for the quantitative analysis of earthquakes; like the calculation of magnitudes, frequency content, seismic activity and maximal possible intensity. The theoretical bases of these programs are explained in more detail.

The second part, containing Chapters III–V, refers more to the applications, especially of computer calculations. Altogether seven programs are introduced, which are fairly informatively called SP-1 to SP-7. SP stands for "Seismic Parameters". This significant description conceals four programs for cartographical

recording of seismic activity by different methods, a program for the calculation of the number of earthquakes with a certain magnitude and two programs for the cartographical registration of maximal possible earthquakes. The program description is given by: a theoretical introduction, mostly with the basic formulas; a block diagram – not however, drawn up according to the rules of structured programming; a program listing, but only in machine code in octal representation; and an “illustrative example” in the form of tables of the input and output parameters (formatted decimal, so that you may get the value but not its order of magnitude). With that information it is quite impracticable to adopt the programs and it is not at all possible either to adapt the programs to your own conditions or to develop them. Therefore, the book has failed in its main claim. Only the block diagrams could be regarded as stimulation for your own developments. But, being neither a flow chart nor a structured block diagram, this work would be quite arduous and it has to be questioned whether a development with the help of these diagrams would mean a gain in time in comparison with your own creations based on the given definitions.

But what are these programs able to achieve, if you actually succeed in getting them running? In one of the five forewords it is said that the standard evaluation with these programs is up to ten times faster than the manual estimation and cartographical registration. I suppose that your own developments would carry out this work considerably faster. In addition it will be more structured and – being written in standards like FORTRAN or Pascal – compatible as well. But what can you expect? The English translation from the Russian language came out recently, but the book had been published in the Soviet Union in 1971 and it is based on investigations from the years 1961 to 1970! Just to complete the picture, it has to be mentioned that the programs – because of the machine-code programming – would only work on M-20, M220, BESM-90 computers and would need their “standard program library”, whatever this may conceal.

So, what is the use, even if in the last chapter these programs are applied to seismicity evaluation in East Uzbekistan and the reader can admire the various beautiful maps that came out as a result of these exotic calculation machines?

D. Schröder

