An Introduction To Geological Structures And Maps

A knowledge of structural geology is fundamental to understanding the processes by which the earth's crust has evolved. It is a subject of fundamental importance to students of geology, experienced field geologists and academic researchers as well as to petroleum and mining engineers. In contrast to many structural textbooks which dwell upon geometrical descriptions of geological structures, this book emphasises mechanical principles and the way in which they can be used to understand how and why a wide range of geological structures develop. Structures on all scales are considered but the emphasis of the book is on those that can be seen on the scale of hand specimen or outcrop. Drawing on their considerable teaching experience the authors present a coherent and lucid analysis of geological structures which will be welcomed by a wide variety of earth scientists.

Introduction to Geological Maps and Structures describes the basic methods to interpret and attain a better understanding of geological maps. The book describes the nature and preparation of geological maps, and then covers topics such as solid and drift maps, geological boundaries, sections, and the use of symbols. The book explains sedimentary rocks, outcrop patterns, and the topographic representation of geological structures. The text also addresses the geometry of folds and folding when pre-existing surfaces are distorted into zigzag patterns. The author explains in detail the morphology...

Detailed mapping and analysis of the structural features of rocks enable the 3D geometry of their structures to be reconstructed. The resulting evidence of the stresses and movement patterns which rocks have undergone indicates the processes by which they were formed, and allows evaluation of past deformations of the earth's crust. Written to show how one actually describes, measures and records rock structures such as folds and faults with the emphasis on accuracy, detail and on-going interpretation throughout, this handbook gives students and enthusiasts the practical information and guidance which allows their fieldwork to become vastly more rewarding. "...the author is to be congratulated on producing such an excellent text. The whole range of mapping techniques that an undergraduate student will require are described and the book will still be immense help to post-graduates setting out on their research work. The book represents extremely good value and is thoroughly recommended." —C.R.L. Friend, Mineralogical Magazine

Earth Structures

Quantitative Structural Geology

Proceedings of the 30th International Geological Congress, Volume 14

The Mechanics of Deforming Metamorphic Rocks

Basic Geological Mapping

An Introduction to Geological Structures and Maps is a concise and accessible textbook providing simple structural terminology and map problems which introduce geological structures. It is a perfect introduction to mapping for students of geology, engineering geology and civil engineering. Each topic is explained and illustrated by figures, and exercises follow on successive maps. If students are unable to complete an exercise, they can read on to obtain more specific instructions on how theory may be used to solve the problem. An appendix at the end of the book provides the solutions. This new, eighth edition contains simplified introductory matter to make the subject as easy to grasp as possible. Colour photographs illustrating geological structures bring the subject to life and a new map from the British Geological Survey illustrates a real area. There is more on outcrop patterns, which will help students to think in 3D, and on structures and the relationship of topography to geological structure. Cliff sections have been added to reinforce the concept of apparent dip. The section on planetary geology has been more closely tied to igneous geology to aid understanding of the connection between the two. Finally, a new map on economic geology has been added for the benefit of engineering students. A geological glossary helps students to understand and memorise key terms and a new, colourful, text design enlivens the appearance of this popular book.

This market-leading textbook has been fully updated in response to extensive user feedback. It includes a new chapter on joints and veins, additional examples from around the world, stunning new field photos, and extended online resources with new animations and exercises. The book's practical emphasis, hugely popular in the first edition, features applications in the upper crust, including petroleum and groundwater geology, highlighting the importance of structural geology in exploration and exploitation of petroleum and water resources. Carefully designed full-colour illustrations work closely with the text to support student learning, and are supplemented with high-quality photos from around the world. Examples and parallels drawn from practical everyday situations engage students, and end-of chapter review questions help them to check their understanding. Updated e-learning modules are available online (www.cambridge.org/fossen2e) and further reinforce key topics using summaries, innovative animations to bring concepts to life, and additional examples and figures.

This volume focuses on the engineering geological and environmental problems of major engineering works, rock and soil properties, and protection of the geoenvironment and reduction of geohazards, reflecting the major achievements and advancement of engineering geological science and technology.

Geological Maps

Geological Structures

The Mapping of Geological Structures

A Practical Guide

An Introduction to Geological Structures and Map

The Second Edition also benefits from new artwork that clearly illustrates complex concepts. New to the Second Edition: New Chapter: 15, "Geophysical Imaging," by Frederick Cook Within Chapters 21 and 22, four new essays on "Regional Perspectives" discuss the European Alps, the Altaids, the Appalachians, and the Cascadia Wedge. New and updated art for more informative illustration of concepts. The Second Edition now has 570 black & white figures.

This highly-regarded introductory textbook has been used by many generations of students worldwide. It is specifically tailored to the requirements of first or second year geology undergraduates.

The small-scale structures referred to in this publication are those structures of tectonic origin that can be observed with the naked eye in the field. Their scale varies broadly between that of the hand-specimen to that of the exposure, or even mountainside. Such structures are the visible effects of rock deformation caused by local stresses and movements which have been induced in the rocks by external tectonic forces of possibly unknown origin. Recognition of these minor structures, and appreciation of their origin and significance assist the field geologist to elucidate the larger-scale geological structures of his area. Commonly some can be used in deciphering the order of strati graphic succession in regions of strongly-folded unfossiliferous beds; and, in ground which has suffered superposed tectonic movements, the minor structures may provide evidence of successive phases or events in the tectonic history. The work contains descriptions of the more common varieties of small-scale tectonic structures, the different ways in which these structures may have been formed, and the limitations of the conclusions which can be drawn from their observation in the field. Gilbert Wilson June 1981 Acknowledgements An outline of much of the material given in this book was delivered at the 'Cinquieme Conference Gustave Dewalque' to the Societe Geologique de Belgique in 1958 and was published in the annals of the society in 1961.

Structural Geology and Geomechanics

Introduction to Small~scale Geological Structures

Structural Geology Algorithms

The Geological Structure of the Union

Eocene and Oligocene Paleosols of Central Oregon

A pioneering single-semester undergraduate textbook that balances descriptive and quantitative analysis of geological structures.

This text tries to overcome the lack of existing literature linking theoretical concepts and practical exercises in geological maps. This book starts from cutout plates, continues relating basic cartographic elements with topography and finishes interpretating more complicated geological maps, as a result of many years of selecting, preparing and experimenting with several map exercises. This book may be a useful resource at every level in which geological mapping is taught. By learning basic geological structures and their cartographic representation it should be possible to interpret advanced geological maps.

Comprehensively describes the principles and applications of 'global' and 'exploration' geophysics for introductory/intermediate university students.

An Introduction to Geological Structures and Maps, Eighth Edition

Introduction to Mineralogy and Petrology

An Introduction to Geological Geophysics

A Practical Approach

Vectors and Tensors

Introduction to Mineralogy and Petrology presents the essentials of both disciplines through an approach accessible to industry professionals, academic researchers, and students. Mineralogy and petrology stand as the backbone of the geosciences. Detailed knowledge of minerals and rocks and the process of formation and association are essential for practicing professionals and advanced students. This designed as an accessible, step-by-step guide to exploring, retaining, and implementing the core concepts of mineral and hydrocarbon exploration, mining, and extraction. Each topic is fully supported by working examples, diagrams and full-color images. The inclusion of petroleum, gas, metallic deposits and economic aspects enhance the book's value as a practical reference for mineralogy and petrology. Authored by two of the world's premier experts, this book is a must for any young professional, researcher, or student looking for a thorough and inclusive guide to mineralogy and petrology in a single source. Authored by two of the world's experts in mineralogy and petrology, who have more than 70 years of experience in research and instruction combined Addresses the full scope of the core concepts of mineralogy and petrology, including crystal structure, formation and grouping of minerals and soils, definition, origin, structure and classification of igneous, sedimentary and metamorphic rocks Features more than 150 figures, illustrations, and color photographs to vividly explore the fundamental principles of mineralogy and petrology Offers a holistic approach to both subjects, beginning with the formation of geologic structures followed by the hosting of mineral deposits and concluding with the exploration and extraction of lucrative, usable products to improve the health of global economies

Structural Geology is a groundbreaking reference that introduces you to the concepts of nonlinear solid mechanics and non-equilibrium thermodynamics in metamorphic geology, offering a fresh perspective on rock structure and its potential for new interpretations of geological evolution. This book stands alone in unifying deformation and metamorphism and the development of the mineralogical fabrics and the structures that we see in the field. This reflects the thermodynamics of systems not at equilibrium within the framework of modern nonlinear solid mechanics. The thermodynamic approach enables the various mechanical, thermal, hydrological and chemical processes to be rigorously coupled through the second law of thermodynamics, invariably leading to nonlinear behavior. The book also differs from others in emphasizing the implications of this nonlinear behavior with respect to the development of the diverse, complex, even fractal, range of structures in deformed metamorphic rocks. Building on the fundamentals of structural geology by discussing the nonlinear processes that operate during the deformation and metamorphism of rocks in the Earth's crust, the book's concepts help geoscientists and graduate-level students understand how these processes control or influence the structures and metamorphic fabrics—providing applications in hydrocarbon exploration, ore mineral exploration, and architectural engineering. Authored by two of the world's foremost experts in structural geology, representing more than 70 years of experience in research and instruction Nearly 300 figures, illustrations, workin examples, and photographs reinforce key concepts and underscore major advances in structural geology

This highly illustrated student guide introduces the skills of interpreting a geological map and relating it to the morphology of the most important types of geological structure. Thoroughly revised, and with more international examples, it is ideal for use by students with a minimum of tutorial supervision. Photographs of structures are set alongside their representations on maps. The maps used in exercises ha been chosen to provide all of the realism of a survey map without the huge amount of data often present, so that students can develop skills without becoming overwhelmed or confused. In particular, emphasis is placed throughout on developing the skill of three-dimensional visualization so important to the geologist. * Successful practical guide provides a solid introduction to the subject of geological maps Fully revised edition includes more international examples to increase the breadth of your knowledge * Illustrations and end of chapter questions make this an ideal tool to aid self-guided study

Drawing Geological Structures

Introduction to Geological Mapping

A Practical Introduction

Structural Geology

Geology of North America—An Overview

The 30th International Geological Congress was held in Beijing, China in August 1997. Leading scientists convened to present their findings and views to the international geological research community. Volume 14 of 26 focuses on structural geology and geomechanics. All articles in the proceedings have been refereed and keynote papers have been included in Volume 1. These proceedings aim to present a view of contemporary geology researchers in the geological sciences.

This combination of text and lab book presents an entirely different approach to structural geology. Designed for undergraduate laboratory classes, it provides a step-by-step guide for solving geometric problems arising from structural field observations. The book discusses both traditional methods and cutting-edge approaches, with emphasis given to graphical methods and visualization techniques that support students in tackling challengi problems. Numerous exercises encourage practice in using the techniques, and demonstrate how field observations can be converted into useful information about geological structures and the processes responsible for creating them. This updated fourth edition incorporates new material on stress, deformation, strain and flow, and the underlying mathematics of the subject. With stereonet plots and solutions to the exercises available onlin this book is a key resource for undergraduates, advanced students and researchers wanting to improve their practical skills in structural geology.

Geologists must be able to "read" a geological map. That means interpreting the vertical dimension through the 2D view represented on the map and at different scales. The main objective of this book is to help students during this difficult learning process. Based on an abundant iconography (field photos, maps, cross-sections) and on basics in mathematics and mechanics, the book dissects the geometry of emblematic geological structure models, printable in 3D. The book is dedicated to structural geology with a particular emphasis on kinematics of faulting and folding and on salt tectonics (chapters III, IV and V). The origin of continental great unconformities and oceanic break-up unconformities is also discussed (chapter II). The audience of the book is broad and includes (under)graduate students in Earth Sciences, professors of Natural Sciences, and professional or amate

Sarawak, Brunei and Sabah

Introduction to Geological Maps and Structures

Problems and Solutions in Structural Geology and Tectonics

Analysis of Geological Structures

An Introduction to Geometrical Techniques

State-of-the-art analysis of geological structures has become increasingly quantitative but traditionally, graphical methods are used in teaching. This innovative lab book provides a unified methodology for problem-solving in structural geology using linear algebra and computation. Assuming only limited mathematical training, the book begins with classic orientation problems and progresses to more fundamental topics of stress, strain and error propagation. It introduces linear algebra methods as the foundation for understanding vectors and tensors, and demonstrates the application of geometry and kinematics in geoscience without requiring students to take a supplementary mathematics course. All algorithms are illustrated with a suite of online MATLAB functions, allowing users to modify the code to solve their own structural problems. Containing 20 worked examples and over 60 exercises, this is the ideal lab book for advanced undergraduates or beginning graduate students. It will also provide professional structural geologists with a valuable reference and refresher for calculations.

The book is a comprehensive compilation of all aspects of the geology of Northwest Borneo (Sarawak, Brunei and Sabah) and the contiguous South China and Sulu Seas. The sedimentary formations are described, their palaeontology tabulated and ages discussed. Stratigraphic charts illustrate their relationships across the whole region. Detailed geological maps of selected areas are accompanied by cross sections based on outcrop patterns and drilling and seismic data offshore. Palaeocurrent maps are presented and the palaeogeography for different ages described and sedimentary provenance discussed. Descriptions of the ophiolite sequences, volcanic and plutonic rocks are accompanied by tables of selected chemical analyses and geochemical plots and their tectonic significance discussed. All radiometric data are tabulated and discussed. Regional structures and the predominantly Tertiary tectonics are described. In Sarawak the mountains are constructed of Upper Cretaceous to Lower Eocene greenschist facies shaly turbiditic Rajang Group, uplifted before the end of the Eocene. In Sabah the Western Cordillera is constructed of Eocene to Lower Miocene sandy turbidite uplifted in the Late Miocene and Pliocene. Miocene intrusion of Mount Kinabalu and uplift of the Cordillera is related to collision at the Northwest Borneo Trough. Gold, antimony, mercury and copper deposits are described and the tectonic setting of oil and gas deposits discussed. * Correlation tables, descriptions and ages of all major sedimentary formations of Sarawak, Brunei and Sabah * Petrology, geochemistry and ages of all volcanic and plutonic formations of North West Borneo and their tectonic significance * Economic geology including the geological setting of offshore oil and gas deposits

Problems and Solutions in Structural Geology and Tectonics, Volume 5, in the series Developments in Structural Geology and Tectonics, presents students, researchers and practitioners with an all-new set of problems and solutions that structural geologists and tectonics researchers commonly face. Topics covered include ductile deformation (such as strain analyses), brittle deformation (such as rock fracturing), brittle-ductile deformation, collisional and shortening tectonics, thrust-related exercises, rift and extensional tectonics, strike slip tectonics, and cross-section balancing exercises. The book provides a how-to guide for students of structural geology and geologists working in the oil, gas and mining industries. Provides practical solutions to industry-related issues, such as well bore stability Allows for self-study and includes background information and explanation of research and industry jargon Includes full color diagrams to explain 3D issues

Observation, Interpretation and Building of 3D Models

Geological Objects and Structures in 3D

An Introduction to Structural Geology and Tectonics

Engineering Geology

An Introduction to Geological Structures and Maps

This textbook is designed to aid the student in geological map interpretation. The book starts with basic concepts such as dip and strike, and progresses through a variety of exercises based on folds, faults and unconformities, up to and including the interpretation of Geological Survey Maps. In order to give a sense of reality to the text, frequent reference is made to actual examples on which many of the problem maps are based. Also included in the text are exercises concerned with bore-hole interpretation and correlation. The book, which is in two sections, is unique in that the second section contains worked solutions to the questions set in the first half.

Introduction to Geological Maps and Structures describes the basic methods to interpret and attain a better understanding of geological maps. The book describes the nature and preparation of geological maps, and then covers topics such as solid and drift maps, geological boundaries, sections, and the use of symbols. The book explains sedimentary rocks, outcrop patterns, and the topographic representation of geological structures. The text also addresses the geometry of folds and folding when pre-existing surfaces are distorted into zigzag patterns. The author explains in detail the morphology of folded layers and the mechanism involved in folding. He goes on to interpret the formation of outcrop patterns, as well as the structure of a cylindrical and cylindroidal fold patterns. The author also describes the different structures that result from the brittle fractures present in rocks that undergo massive stress. Of interest is the presentation of how fissures and mineral veins are formed and deposited. The author then discusses earth movements resulting in angular unconformities known as stratigraphic break. These breaks in the stratigraphic record, such as diastems, non-sequences, paraconformities, or disconformities, can be interpreted as the intervals of geological time. The book then explains the nature of tectonic maps, which involves features arising from the continental crust, and how these maps are different from geological maps that show the outcrop of lithostratigraphic units. Geologists, cartographers, meteorologists, seismologists, land use developers, and students of the earth sciences will find this book valuable.

Introduction to geologic fracture mechanics covering geologic structural discontinuities from theoretical and field-based perspectives.

Geological Field Techniques

Their Solution and Interpretation

Introduction

Looking Into the Earth

GEOLOGICAL FIELD TECHNIQUES The understanding of Earth processes and environments over geological time is highly dependent upon both the experience that can only be gained through doing fieldwork, and the collection of reliable data and appropriate samples in the field. This textbook explains the main data gathering techniques used by geologists in the field and the reasons for these, with emphasis throughout on how to make effective field observations and record these in suitable formats. Equal weight is given to assembling field observations from igneous, metamorphic and sedimentary rock types. There are also substantial chapters on producing a field notebook, collecting structural information, recording fossil data and constructing geological maps. Geological Field Techniques is designed for students, amateur enthusiasts and professionals who have a background in geology and wish to collect field data on rocks and geological features. Teaching aspects of this textbook include: step-by-step guides to essential practical skills such as using a compass-clinometer, making a geological map and drawing a field sketch; tricks of the trade, checklists, flow charts and short worked examples; over 200 illustrations of a wide range of field notes, maps and geological features; appendices with the commonly used rock description and classification diagrams; a supporting website hosted by Wiley-Blackwell is available at www.wiley.com/go/coe/geology

Structural geology has developed at a very rapid pace in recent years. Evolution of Geological Structures in Micro- to Macro-Scales, covering a wide spectrum of current research in structural geology from the grain scale to the scale of orogenic belts and from the brittle to the ductile field, provides an overview of newly emerging concepts in a single volume. The book covers a wide range of advances in such broad fields as hydraulic factures, normal faults, overthrusts, ductile shear zones, rock fabrics, folds, superposed folds and basement structures.

"Physical Geology is a comprehensive introductory text on the physical aspects of geology, including rocks and minerals, plate tectonics, earthquakes, volcanoes, glaciation, groundwater, streams, coasts, mass wasting, climate change, planetary geology and much more. It has a strong emphasis on examples from western Canada, especially British Columbia, and also includes a chapter devoted to the geological history of western Canada. The book is a collaboration of faculty from Earth Science departments at Universities and Colleges across British Columbia and elsewhere"--BCcampus website.

Earth Structure

Physical Geology

Geology of North-West Borneo

Geologic Fracture Mechanics

Pergamon International Library of Science, Technology, Engineering and Social Studies

Despite the modern dominance of computer graphics programs and digital cameras, the ability todraw geological structures manually remains a necessity in academic geology and beyond. Drawings serve for quick and simple documentation in the field or at the microscope. They can be applied as a language of their own as well as be adapted to suit specific requirements. Moreover, geological drawing improves observational ability and contributes to the understanding of geological structures and structure-forming processes. Geological drawing is assisted scientific thinking. Drawing Geological Structures provides undergraduate as well as graduate and practicing geologists with a thorough, step-by-step practical guide to the art of geological drawing. Beginning with the basics, the book covers thin sections, sample sections, samples and geological stereograms. The chapters provide examples of how drawings evolve and are complemented by exercises, allowing the reader to practice their drawing prior to going out into the field or working at the microscope. Users of this unique guide will develop their knowledge and technical vocabulary whilst also improving their drawing skills.

The Second Edition of Earth Structure: An Introduction to Structural Geology and Tectonics takes a balanced approach to the subject emphasizing links between structural features at all scales (microscopic, hand-specimen, outcrop, mountain-range) and deformation processes."

Designed to be carried in the field, this pocket-sized how-to book is a practical guide to basic techniques in mapping geological structures. In addition to including the latest computerised developments, the author provides succinct information on drawing cross-sections and preparing and presenting 'fair copy' maps and geological diagrams. Contains a brief chapter on the essentials of report writing and discusses how to keep adequate field notebooks. A checklist of equipment needed in the field can be found in the appendices. Quote from 3rd edition "provides a wealth of good advice on how to measure, record and write reports of geological field observations" The Naturalist

Foundations of Structural Geology

Geological Structures and Maps

Evolution of Geological Structures in Micro- to Macro-scales