[DOC] Deformation Of Earth Materials An Introduction To The Rheology Of Solid Earth

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Deformation of Earth Materials-Shun-ichiro Karato 2008-01-22 This graduate textbook, first published in 2008, presents a comprehensive, unified treatment of the materials science of deformation as applied to solid Earth geophysics and geology. The deformation of Earth materials is presented in a systematic way covering elastic, anelastic and viscous deformation. Advanced discussions on relevant debates are also included to bring readers a full picture of science in this interdisciplinary area. This textbook is ideal for graduate courses on the rheology and dynamics of solid Earth, and includes review questions with solutions so readers can monitor their understanding of the material presented. It is also a much-needed reference for geoscientists in many fields including geology, geophysics, geochemistry, materials science, mineralogy and ceramics.

Deformation of Earth Materials-Shun'ichirō Karato 2008 "Much of the recent progress in the solid Earth sciences is based on the interpretation of a range of geophysical and geological observations in terms of the properties and deformation of Earth materials. One of the greatest challenges facing geoscientists in achieving this lies in finding a link between physical processes operating in minerals at the smallest length scales to geodynamic phenomena and geophysical observations across thousands of kilometers."--Page [4], cover.

Deformation of Earth Materials-Shun-ichiro Karato 2012-07-26 This graduate textbook presents a comprehensive, unified treatment of the materials science of deformation as applied to solid Earth geophysics and geology. The deformation of Earth materials is presented in a systematic way covering elastic, anelastic and viscous deformation. Advanced discussions on relevant debates are also included to bring readers a full picture of science in this interdisciplinary area. This textbook is ideal for graduate courses on the rheology and dynamics of solid Earth, and includes review questions with solutions so readers can monitor their understanding of the material presented. It is also a much-needed reference for geoscientists in many fields including geology, geophysics, geochemistry, materials science, mineralogy and ceramics.

Rheology of Polyphase Earth Materials-Shaocheng Ji 2002

Deformation of Earth Materials- 1991

Deformation of Earth Materials-Jiban Kōgakkai 2001

Earth Materials-Kevin Hefferan 2010-11-09 Minerals and rocks form the foundation of geologic studies. This new textbook has been written to address the needs of students at the increasing number of universities that have compressed separate mineralogy and petrology courses into a one- or two-semester Earth materials course. Key features of this book include: equal coverage of mineralogy, sedimentary petrology, igneous petrology and metamorphic petrology; copious field examples and regional relationships with graphics that illustrate the concepts discussed; numerous case studies to show the uses of earth materials as resources and their fundamental role in our lives and the global economy, and their relation to natural and human-induced hazards; the integration of earth materials into a cohesive process-based earth systems framework; two color thoughout with 48 pages of four color. Readership: students taking an earth materials, or combined mineralogy and petrology course in an earth science degree program. It will also be useful for environmental scientists, engineering geologists, and physical geographers who need to learn about minerals, rocks, soil and water in a comprehensive framework. A companion website for this book is available at: www.wiley.com/go/hefferan/earthmaterials.

Plastic Deformation of Minerals and Rocks-Shun-ichiro Karato 2018-12-17 Volume 51 of Reviews in Mineralogy and Geochemistry highlights some of the frontiers in the study of plastic deformation of minerals and rocks. This book reviews large-strain shear deformation and deformation experiments under ultrahigh pressures; the issues of deformation of crustal rocks and the upper mantle; the interplay of partial melting and deformation; the new results of ultrahigh pressure deformation of deep mantle minerals; the stability of deformation under deep mantle conditions with special reference to phase transformations and their relationship to the origin of intermediate depth and deep-focus earthquakes; a detailed description of fracture mechanisms of ice; of experimental and theoretical studies on seismic wave attenuation; the relationship between crystal preferred orientation and macroscopic anisotropy; recent progress in poly-crystal plasticity to model the development of anisotropic fabrics both at the microscopic and macroscopic scale; a thorough review of seismic anisotropy of the upper mantle covering the vast regions of geodynamic interests and the theoretical aspects of shear localization. All chapters contain extensive reference lists to guide readers to the more specialized literature. This volume was written for a workshop, in December 2002 in Emeryville, California.

Earth Materials-Dexter Perkins 2019-08-05 There is a large and growing need for a textbook that can form the basis for integrated classes that look at minerals, rocks, and other Earth materials. Despite the need, no high-quality book is available for such a course. Earth Materials is a wide-ranging undergraduate textbook that covers all the most important kinds of (inorganic) Earth materials. Besides traditional chapters on minerals and rocks, this book features chapters on sediments and stratigraphy, weathering and soils, water and the hydrosphere, and mineral and energy deposits. Introductions to soil mechanics and rock mechanics are also included. This book steers away from the model of traditional encyclopedic science textbooks, but rather exposes students to the key and most exciting ideas and information, with an emphasis on thinking about Earth as a system. The book is written in such a manner as to support inquiry, discovery and other forms of active learning. All chapters start with a short topical story or vignette, and the plentiful photographs and other graphics are integrated completely with the text. Earth Materials will be interesting and useful for a wide range of learners, including geoscience students, students taking mineralogy and petrology courses, engineers, and anyone interested in learning more about the Earth as a system.

Geotechnology-A. Roberts 2014-05-18 Geotechnology: An Introductory Text for Students and Engineers focuses on the principles, methodologies, approaches, and applications of geotechnology. The publication first elaborates on engineering in earth materials and behavior of earth materials under static load. Discussions focus on rheological properties of earth materials, elastic materials, plane strain, stress, systematic description of geological factors, engineering classification of rocks and rock masses, classification of soils for engineering purposes, and soil and rock mechanics. The text then examines time-dependent behavior of earth materials, failure criteria for soils and rocks, engineering properties of soils, fluids in soils and rocks, and laboratory measurement of load, stress, and strain in earth materials. The manuscript examines the gathering and recording of data on geology, rock structure, and rock classification, application of models to geotechnology, response of earth materials to dynamic loads, and observation of mass deformations in geotechnology. The publication is a vital source of data for students, engineers, and researchers wanting to explore geotechnology.

Earth Structures Engineering-R. Mitchell 2012-12-06 Earth structures engineering involves the analysis, design and construction of structures, such as slopes and dams, that are composed mainly of earth materials, and this is a growth area in geotechnical engineering practice. This growth is due largely to increased involvement in designing various types of earth structures for the resources industries (slopes, impoundment structures, offshore islands, mine backfills), to the development of increas ingly large hydroelectric projects, to the need for more freshwater storage and diversion schemes, and to the need for transportation, communications and other facilities in areas where the natural earth materials are occasionally subject to mass instabilities. Although geotechnical engineering transects traditional disciplinary boundaries of civil, geological and mining engineering, the majority of geotechnical engineers are graduates from civil engineering schools. Here the geotechnical instruction has been concentrated on soil mechanics and foundation engineering because foundation engineering has traditionally been the major component of geotechnical practice. Geotechnical special ists, however, generally have acquired considerable formal or informal training beyond their first engineering degree, and an advanced degree with considerable cross-discipline course content is still considered an advantage for a young engineer entering a career in geotechnical engineering. Practical job experience is, of course, a necessary part of professional development but is readily interpreted and assimilated only if the required background training has been obtained.

Earth Materials-Dexter Perkins 2019-07-24 There is a large and growing need for a textbook that can form the basis for integrated classes that look at minerals, rocks, and other Earth materials. Despite the need, no high-quality book is available for such a course. Earth Materials is a wide-ranging undergraduate textbook that covers all the most important kinds of (inorganic) Earth materials. Besides traditional chapters on minerals and rocks, this book features chapters on sediments and stratigraphy, weathering and soils, water and the hydrosphere, and mineral and energy deposits. Introductions to soil mechanics and rock mechanics are also included. This book steers away from the model of traditional encyclopedic science textbooks, but rather exposes students to the key and most exciting ideas and information, with an emphasis on thinking about Earth as a system. The book is written in such a manner as to support inquiry, discovery and other forms of active learning. All chapters start with a short topical story or vignette, and the plentiful photographs and other graphics are integrated completely with the text. Earth Materials will be interesting and useful for a wide range of learners, including geoscience students, students taking mineralogy and petrology courses, engineers, and anyone interested in learning more about the Earth as a system.

Mechanical properties of earth materials-Stanford Research Institute 1964

Creep of Crystals-Jean-Paul Poirier 1985-02-28 This textbook describes the physics of the plastic deformation of solids at high temperatures. It is directed at geologists or geophysicists interested in the high-temperature behaviour of crystals who wish to become acquainted with the methods of materials science in so far as they are useful to earth scientists. It explains the most important models and recent experimental results without losing the reader in the primary literature of materials science. In turn the book deals with the essential solid-state physics; thermodynamics and hydrostatics of creep; creep models and their applications in the geological sciences; diffusion creep; superplastic deformation and deformation enhanced by phase transformations. Five concluding chapters give experimental results for metals, ceramics and minerals. There are extensive bibliographies to aid further study.

Experimental and Analytical Study of the Response of Earth Materials to Static and Dynamic Loads-H. P. Pratt 1976 A field and laboratory experimental test program was conducted at the Mixed Company and Cedar City test sites to determine the effect of specimen size on the strength and deformation of intact and jointed rock. The strength of Cedar City quartz diorite decreased by a factor of four with increasing specimen size; the Kayenta sandstone decreased by a factor of less than two. A large block test was conducted at the Mixed Company site in which deformation and velocity was measured as a function of stress. The in-situ stress conditions were measured at the Mixed Company site and had a marked effect on the seismic wave velocity in the sandstone. In addition, in situ modulus was measured by several different techniques. A constitutive model for jointed rock, incorporating real data, was developed for use in the calculation of rock mass response. The model for the compressive properties consists of a rate dependent model of the Maxwell type while the plastic shear response due to the presence of joints, is accounted for in terms of additional plastic deformation associated with slip on the joint planes.

Rheology of the Earth-Giorgio Ranalli 1995-05-31 Beginning with basic principles, this advanced text gives a complete treatment of deformation and flow of earth materials from both the continuum mechanics and the microphysical viewpoints. It covers the role and consequences of rheological processes in geophysics and geodynamics in a quantitative and authoritative manner. The second edition of this successful text: provides the only unified treatment of the rheology of the Earth at this level, making it useful to students and researchers alike; includes discussions of seismology, mantle convection and plate tectonics; is completely up to date, providing a much needed account of thermal and mechanical processes in geodynamics.

Earth Materials and Health-National Research Council 2007-04-09 A range of natural earth materials, like arsenic or fluoride, have long been linked to significant human health effects. Improved understanding of the pervasive and complex interactions between earth materials and human health will require creative collaborations between earth scientists and public health professionals. At the request of the National Science Foundation, U.S. Geological Survey, and National Aeronautics and Space Administration, this National Research Council book assesses the current state of knowledge at the interface between the earth sciences and public health disciplines. The book identifies high-priority areas for collaborative research, including understanding the transport and bioavailability of potentially hazardous earth materials, using risk-based scenarios to mitigate the public health effects of natural hazards under current and future climate regimes, and understanding the health risks that result from disturbance of earth systems. Geospatial information - geological maps for earth scientists and epidemiological data for public health professionals - is identified as one of the essential integrative tools that is fundamental to the activities of both communities. The book also calls for increased data sharing between agencies to promote interdisciplinary research without compromising privacy.

Crustal Earth Materials-Loren A. Raymond 2017-10-20 An understanding of rocks and the minerals that comprise them lies at the core of every geologist’s education. As more curricula combine mineralogy and petrology into a single course, Raymond and Johnson have responded with a concise introduction to the study of Earth materials. The authors have written at a level that won’t intimidate students encountering fundamental concepts for the first time, yet with enough rigor that they’ll be well prepared for future study. A broad approach to the subject that incorporates fluids and soils will appeal to instructors who teach engineering and environmental science students as well as future geoscientists. Abundant illustrations reinforce all of the ideas in the text. Many images are presented in color, with additional color images available at waveland.com/Raymond-Johnson. Problems appear throughout the book, encouraging a deeper understanding for students. Helpful appendices make it easy for instructors to assign further exercises in rock and mineral identification as well as optical mineralogy and petrography.

Materials Science for Structural Geology-Mervyn S. Paterson 2012-11-28 This book sets out the basic materials science needed for understanding the plastic deformation of rocks and minerals. Although at atmospheric pressure or at relatively low environmental pressures, these materials tend to be brittle, that is, to fracture with little prior plastic deformation when non-hydrostatically stressed, they can undergo substantial permanent strain when stressed under environmental conditions of high confining pressure and high temperature, such as occur geologically in the Earth’s crust and upper mantle. Thus the plastic deformation of rocks and minerals is of fundamental interest in structural geology and geodynamics. In mountain-building processes and during convective stirring in the Earth’s mantle, rocks can undergo very large amounts of plastic flow, accompanied by substantial changes in microstructure. These changes in microstructure remain in the rocks as evidence of the past deformation history. There are a number of types of physical processes whereby rock and minerals can undergo deformation under geological conditions. The physics of these processes is set out in this book.

Stress Field of the Earth's Crust-Arno Zang 2009-12-06 Stress Field of the Earth’s Crust is based on lecture notes prepared for a course offered to graduate students in the Earth sciences and engineering at University of Potsdam. In my opinion, it will undoubtedly also become a standard reference book on the desk of most scientists working with rocks, such as geophysicists, structural geologists, rock mechanics experts, as well as geotechnical and petroleum en- neers. That is because this book is concerned with what is probably the most pe- liar characteristic of rock – its initial stress condition. Rock is always under a natural state of stress, primarily a result

of the gravitational and tectonic forces to which it is subjected. Crustal stresses can vary regionally and locally and can reach in places considerable magnitudes, leading to natural or man-made mechanical failure. P- existing stress distinguishes rock from most other materials and is at the core of the discipline of “Rock Mechanics”, which has been developed over the last century. Knowledge of rock stress is fundamental to understanding faulting mechanisms and earthquake triggering, to designing stable underground caverns and prod- tive oil fields, and to improving mining methods and geothermal energy extraction, among others. Several books have been written on the subject, but none has atte- ted to be as all-encompassing as the one by Zang and Stephansson.

Structural Geology: A Quantitative Introduction-David D. Pollard 2020-07-23 Tackling structural geology problems today requires a quantitative understanding of the underlying physical principles, and the ability to apply mathematical models to deformation processes within the Earth. Accessible yet rigorous, this unique textbook demonstrates how to approach structural geology quantitatively using calculus and mechanics, and prepares students to interface with professional geophysicists and engineers who appreciate and utilize the same tools and computational methods to solve multidisciplinary problems. Clearly explained methods are used throughout the book to quantify field data, set up mathematical models for the formation of structures, and compare model results to field observations. An extensive online package of coordinated laboratory exercises enables students to consolidate their learning and put it into practice by analyzing structural data and building insightful models. Designed for single-semester undergraduate courses, this pioneering text prepares students for graduates studies and careers as professional geoscientists.

Treatise on Geophysics- 2015-04-17 Treatise on Geophysics, Second Edition, is a comprehensive and in-depth study of the physics of the Earth beyond what any geophysics text has provided previously. Thoroughly revised and updated, it provides fundamental and state-of-the-art discussion of all aspects of geophysics. A highlight of the second edition is a new volume on Near Surface Geophysics that discusses the role of geophysics in the exploitation and conservation of natural resources and the assessment of degradation of natural systems by pollution. Additional features include new material in the Planets and Moon, Mantle Dynamics, Core Dynamics, Crustal and Lithosphere Dynamics, Evolution of the Earth, and Geodesy volumes. New material is also presented on the uses of Earth gravity measurements. This title is essential for professionals, researchers, professors, and advanced undergraduate and graduate students in the fields of Geophysics and Earth system science. Comprehensive and detailed coverage of all aspects of geophysics Fundamental and state-of-the-art discussions of all research topics Integration of topics into a coherent whole

High-pressure Researches in Geoscience-Werner Schreyer 1982

Landscapes on the Edge-National Research Council 2010-04-25 During geologic spans of time, Earth's shifting tectonic plates, atmosphere, freezing water, thawing ice, flowing rivers, and evolving life have shaped Earth's surface features. The resulting hills, mountains, valleys, and plains shelter ecosystems that interact with all life and provide a record of Earth surface processes that extend back through Earth's history. Despite rapidly growing scientific knowledge of Earth surface interactions, and the increasing availability of new monitoring technologies, there is still little understanding of how these processes generate and degrade landscapes. Landscapes on the Edge identifies nine grand challenges in this emerging field of study and proposes four high-priority research initiatives. The book poses questions about how our planet's past can tell us about its future, how landscapes record climate and tectonics, and how Earth surface science can contribute to developing a sustainable living surface for future generations.

Earth Dynamics-D. E. Smylie 2013-03-07 A rigorous overview of the solid Earth's dynamical behaviour, explaining the theory with methodology and online freeware for numerical implementation.

Advances in Interpretation of Geological Processes-Maria Iole Spalla 2010 Iterative comparison of analytical results and natural observations with predictions of numerical models improves interpretation of geological processes. Further refinements derive from wide-angle comparison of results from various scales of study. In this volume, advances from field, laboratory and modelling approaches to tectonic evolution - from the lithosphere to the rock scale - are compared. Constructive use is made of apparently discrepant or non-consistent results from analytical or methodological approaches in processing field or laboratory data, P-T estimates, absolute or relative age determinations of tectonic events, tectonic unit size in crustal-scale deformation, grain-scale deformation processes, various modelling approaches, and numerical techniques. Advances in geodynamic modelling critically depend on new insights into grain- and subgrain-scale deformation processes. Conversely, quantitative models help to identify which rheological laws and pa-rameters exert the strongest control on multi-scale deformation up to lithosphere and upper mantle scale

Earth Materials Investigation Manual-United States. Bureau of Reclamation 1947

Excel Senior High School Earth and Environmental Science-Raimund R. Pohl 2003

Rheology of the Earth-Giorgio Ranalli 1987

A Nonlinear Elastic-viscoplastic Constitutive Relationship for Earth Materials-Behzad Rohani-Najafabadi 1970

Fundamentals of Geophysics-William Lowrie 2020-01-02 This enduringly popular undergraduate textbook has been thoroughly reworked and updated, and now comprises twelve chapters covering the same breadth of topics as earlier editions, but in a substantially modernized fashion to facilitate classroom teaching. Covering both theoretical and applied aspects of geophysics, clear explanations of the physical principles are blended with step-by-step derivations of the key equations and over 400 explanatory figures to explain the internal structure and properties of the planet, including its petroleum and mineral resources. New topics include the latest data acquisition technologies, such as satellite geophysics, planetary landers, ocean bottom seismometers, and fibre optic methods, as well as recent research developments in ambient noise interferometry, seismic hazard analysis, rheology, and numerical modelling - all illustrated with examples from the scientific literature. Student-friendly features include separate text boxes with auxiliary explanations and advanced topics of interest; reading lists of foundational, alternative, or more detailed resources; end-of-chapter review questions and an increased number of quantitative exercises. Completely new to this edition is the addition of computational exercises in Python, designed to help students acquire important programming skills and develop a more profound understanding of geophysics.

The Earth's Mantle-Ian Jackson 2000-06-19 Authoritative review of composition, structure and evolution of the mantle for researchers and graduate students.

Earth Materials-Cornelis Klein 2012-08-27 Key concepts in mineralogy and petrology are explained alongside beautiful full-color illustrations, in this concisely written textbook.

Structural Geology-Haakon Fossen 2016-03-03 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.

The Dynamics of Partially Molten Rock-Richard F. Katz 2021-12-07 A valuable synthesis of the physics of magmatism for students and scholars Magma genesis and segregation have shaped Earth since its formation more than 4.5 billion years ago. Now, for the first time, the mathematical theory describing the physics of magmatism is presented in a single volume. The Dynamics of Partially Molten Rock offers a detailed overview that emphasizes the fundamental physical insights gained through an analysis of simplified problems. This textbook brings together such topics as fluid dynamics, rock mechanics, thermodynamics and petrology, geochemical transport, plate tectonics, and numerical modeling. End-of-chapter exercises and solutions as well as online Python notebooks provide material for courses at the advanced undergraduate or graduate level. This book focuses on the partial melting of Earth’s asthenosphere, but the theory presented is also more broadly relevant to natural systems where partial melting occurs, including ice sheets and the deep crust, mantle, and core of Earth and other planetary bodies, as well as to rock-deformation experiments conducted in the laboratory. For students and researchers aiming to understand and advance the cutting edge, the work serves as an entrée into the field and a convenient means to access the research literature. Notes in each chapter reference both classic papers that shaped the field and newer ones that point the way forward. The Dynamics of Partially Molten Rock requires a working knowledge of fluid mechanics and calculus, and for some chapters, readers will benefit from prior exposure to thermodynamics and igneous petrology. The first book to bring together in a unified way the theory for partially molten rocks End-of-chapter exercises with solutions and an online supplement of Jupyter notebooks Coverage of the mechanics, thermodynamics, and chemistry of magmatism, and their coupling in the context of plate tectonics and mantle convection Notes at the end of each chapter highlight key papers for further reading

IX Hotine-Marussi Symposium on Mathematical Geodesy-Pavel Novák 2020-09-16 This volume gathers the proceedings of the IX Hotine-Marussi Symposium on Mathematical Geodesy, which was held from 18 to 22 June 2018 at the Faculty of Civil and Industrial Engineering, Sapienza University of Rome, Italy. Since 2006, the Hotine-Marussi Symposia series has been produced under the auspices of the Inter-Commission Committee on Theory (ICCT) within the International Association of Geodesy (IAG). The ICCT has organized the last four Hotine-Marussi Symposia, held in Wuhan (2006) and Rome (2009, 2013 and 2018). The overall goal of the ICCT and Hotine-Marussi Symposia has always been to advance geodetic theory, as reflected in the 25 peer-reviewed research articles presented here. The IX Hotine-Marussi Symposium was divided into 10 topical sessions covering all aspects of geodetic theory including reference frames, gravity field modelling, adjustment theory, atmosphere, time series analysis and advanced numerical methods. In total 118 participants attended the Symposium and delivered 82 oral and 37 poster presentations. During a special session at the Accademia Nazionale deiLincei, the oldest scientific academy in the world, six invited speakers discussed interactions of geodesy with oceanography, glaciology, atmospheric research, mathematics, Earth science and seismology.

Structural Geology-Bruce E. Hobbs 2014-11-21 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, working examples, and photographs reinforce key concepts and underscore major advances in structural geology

Geologic Fracture Mechanics-Richard A. Schultz 2019-08-08 Introduction to geologic fracture mechanics covering geologic structural discontinuities from theoretical and field-based perspectives.

Mechanical Behaviour of Salt VII-Pierre Bérest 2012-03-22 This collection of papers on research into and management of underground structures in salt formations represents the state-of-the-art on applications of salt mechanics in mines and storage caverns for gas/hydrocarbon, radioactive waste and toxic waste disposal. The contributions cover laboratory experiments, constitutive numerical modeling and fie

Arc-Continent Collision-Dennis Brown 2011-06-29 Arc-continent collision has been one of the important tectonic processes in the formation of mountain belts throughout geological time, and it continues to be so today along tectonically active plate boundaries such as those in the SW Pacific or the Caribbean. Arc-continent collision is thought to have been one of the most important process involved in the growth of the continental crust over geological time, and may also play an important role in its recycling back into the mantle via subduction. Understanding the geological processes that take place during arc-continent collision is therefore of importance for our understanding of how collisional orogens evolve and how the continental crust grows or is destroyed. Furthermore, zones of arc-continent collision are producers of much of the worlds primary economic wealth in the form of minerals, so understanding the processes that take place during these tectonic events is of importance in modeling how this mineral wealth is formed and preserved. This book brings together seventeen papers that are dedicated to the investigation of the tectonic processes that take place during arc-continent collision. It is divided into four sections that deal firstly with the main players involved in any arc-continent collision; the continental margin, the subduction zone, and finally the volcanic arc and its mineral deposits. The second section presents eight examples of arc-continent collisions that range from being currently active through to Palaeoproterozoic in age. The third section contains two papers, one that deals with the obduction of large-slab ophiolites and a second that presents a wide range of physical models of arc-continent collision. The fourth section brings everything that comes before together into a discussion of the processes of arc-continent collision.