

Earths Early Atmosphere And Oceans And The Origin Of Life Springerbriefs In Earth Sciences

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Ancient Diamond Time Capsules Charles E. Melton 1985

Competition Science Vision 2007-11 Competition Science Vision (monthly magazine) is published by Pratiyogita Darpan Group in India and is one of the best Science monthly magazines available for medical entrance examination students in India. Well-qualified professionals of Physics, Chemistry, Zoology and Botany make contributions to this magazine and craft it with focus on providing complete and to-the-point study material for aspiring candidates. The magazine covers General Knowledge, Science and Technology news, Interviews of toppers of examinations, study material of Physics, Chemistry, Zoology and Botany with model papers, reasoning test questions, facts, quiz contest, general awareness and mental ability test in every monthly issue.

Voyages to the Planets Andrew Fraknoi 2004 VOYAGES TO THE PLANETS provides students and professors with the ideal combination of authors and experience. It is written by an award-winning astronomy educator (Fraknoi) and two distinguished research scientists (Morrison at NASA and Wolff at NOAO). This author team combines the latest science with classroom-tested teaching strategies and a student-friendly approach. Through unique group activities and a focus on astronomy as a human endeavor, the authors engage and involve students, helping them both understand and enjoy astronomy. The market-leading technology package includes access to InfoTrac College Edition (free!) and TheSky(tm) Student Edition CD-ROM (free!), as well as an optional package with the RedShift(tm) College Edition CD-ROM (including animations) along with an accompanying workbook.

Earth's Oldest Rocks Martin J. Van Kranendonk 2018-09-26 Earth's Oldest Rocks, Second Edition, is the only single reference source for geological research of early Earth. This new edition is an up-to-date collection of scientific articles on all aspects of the early history of the Earth, from planetary accretion at 4.567 billion years ago (Ga), to the onset of modern-style plate tectonics at 3.2 Ga. Since the first edition was published, significant new advances have been made in our understanding of events and processes on early Earth that correspond with new advances in technology. The book includes contributions from over 100 authors, all of whom are experts in their respective fields. The research in this reference concentrates on what is directly gleaned from the existing rock record to understand how our planet formed and evolved during the planetary accretion phase, formation of the first crust, the changing dynamics of the mantle and style of tectonics, life's foothold and early development, and mineral deposits. It is an ideal resource for academics, students and the general public alike. Advances in early Earth research since 2007 based primarily on evidence gleaned directly from the rock record More than 50% of the chapters in this edition are new and the rest of the chapters are revised from the first edition, with more than 700 pages of new material Comprehensive reviews of areas of ancient lithosphere from all over the world, and of crust-forming processes New chapters on early solar

system materials, composition of the ancient atmosphere-hydrosphere, and overviews of the oldest evidence of life on Earth, and modeling of early Earth tectonics

Climate, Fire and Human Evolution Andrew Y. Glikson 2015-11-04 The book outlines principal milestones in the evolution of the atmosphere, oceans and biosphere during the last 4 million years in relation with the evolution from primates to the genus Homo – which uniquely mastered the ignition and transfer of fire. The advent of land plants since about 420 million years ago ensued in flammable carbon-rich biosphere interfaced with an oxygen-rich atmosphere. Born on a flammable Earth surface, under increasingly unstable climates descending from the warmer Pliocene into the deepest ice ages of the Pleistocene, human survival depended on both—biological adaptations and cultural evolution, mastering fire as a necessity. This allowed the genus to increase entropy in nature by orders of magnitude. Gathered around camp fires during long nights for hundreds of thousandth of years, captivated by the flickering life-like dance of the flames, humans developed imagination, insights, cravings, fears, premonitions of death and thereby aspiration for immortality, omniscience, omnipotence and the concept of god. Inherent in pantheism was the reverence of the Earth, its rocks and its living creatures, contrasted by the subsequent rise of monotheistic sky-god creeds which regard Earth as but a corridor to heaven. Once the climate stabilized in the early Holocene, since about ~7000 years-ago production of excess food by Neolithic civilization along the Great River Valleys has allowed human imagination and dreams to express themselves through the construction of monuments to immortality. Further to burning large part of the forests, the discovery of combustion and exhumation of carbon from the Earth's hundreds of millions of years-old fossil biospheres set the stage for an anthropogenic oxidation event, affecting an abrupt shift in state of the atmosphere-ocean-cryosphere system. The consequent ongoing extinction equals the past five great mass extinctions of species—constituting a geological event horizon in the history of planet Earth.

Encyclopedia of Astrobiology Muriel Gargaud 2011-05-26 Astrobiology is a remarkably interdisciplinary field. This reference serves as a key to understanding technical terms from the different subfields of astrobiology, including astronomy, biology, chemistry, the geosciences and the space sciences.

Environmental Geology Carla W. Montgomery 1989 Intended for the introductory-level college course, the principal aim of this text is to present the student with a broad overview of environmental geology. The text looks both at how the earth developed into its present condition and where matters seem to be moving for the future. It is hoped that this knowledge will provide the student with a useful foundation for discussing and evaluating specific environmental issues, as well as for developing ideas about how the problems should be solved. .

Our Blue Planet Heinz Haber 1971

Atmosphere, Earth and Life Peter Francis 1997 Investigates the evolution of the Earth's atmosphere from its initial condition devoid of oxygen and rich in carbon dioxide, to its present breathable state, with plenty of oxygen. Discusses whether the change was continuous and regular, or intermittent and variable, as well as the extent to which atmospheric and biological evolution are linked. Pack includes book and bookmark.

Abstracts Presented to the Topical Conference Origin of the Earth 1988

Magill's Survey of Science: A-Earth's crust Frank Northen Magill 1990

Life in the Universe, 5th Edition Jeffrey Bennett 2022-08-30 The world's leading textbook on astrobiology—ideal for an introductory one-semester course and now fully revised and updated Are we alone in the cosmos? How are scientists seeking signs of life beyond our home planet? Could we colonize other planets, moons, or even other star systems? This introductory textbook, written by a team of four renowned science communicators, educators, and researchers, tells the amazing story of how modern science is seeking the answers to these and other fascinating questions. They are the questions that are at the heart of the highly interdisciplinary field of astrobiology, the study of life in the universe. Written in an accessible, conversational style for anyone intrigued by the possibilities of life in the solar system and beyond, Life in the Universe is an ideal place to start learning about the latest discoveries and unsolved mysteries in the field. From the most recent missions to Saturn's moons and our neighboring planet Mars to revolutionary discoveries of thousands of exoplanets, from the puzzle of life's beginning on Earth to the latest efforts in the search for intelligent life elsewhere, this book captures the

imagination and enriches the reader's understanding of how astronomers, planetary scientists, biologists, and other scientists make progress at the cutting edge of this dynamic field. Enriched with a wealth of engaging features, this textbook brings any citizen of the cosmos up to speed with the scientific quest to discover whether we are alone or part of a universe full of life. An acclaimed text designed to inspire students of all backgrounds to explore foundational questions about life in the cosmos. Completely revised and updated to include the latest developments in the field, including recent exploratory space missions to Mars, frontier exoplanet science, research on the origin of life on Earth, and more. Enriched with helpful learning aids, including in-chapter Think about It questions, optional Do the Math and Special Topic boxes, Movie Madness boxes, end-of-chapter exercises and problems, quick quizzes, and much more. Supported by instructor's resources, including an illustration package and test bank, available upon request.

Coming Climate Crisis? Claire L. Parkinson 2010-04-16 Decisively cutting through the hyperbole on both sides of the debate, distinguished NASA climatologist Claire L. Parkinson brings much-needed balance and perspective to the highly contentious issue of climate change. Offering a deeply knowledgeable overview of global conditions past and present, the author lays out a compelling argument that our understandings and models are inadequate for confident predictions of the intended and unintended consequences of various projects now under consideration to modify future climate. In one compact volume, Parkinson presents a coherent synopsis of the 4.6-billion-year history of climate change on planet Earth—both before and after humans became a significant factor—and explores current concerns regarding continued global warming and its possible consequences. She ranges over the massive geoengineering schemes being proposed and why we need to be cautious about them, the limitations of current global climate models and projections, the key arguments made by those skeptical of the mainstream views, and the realistic ways we can lessen destructive human impacts on our planet. While discussing all of these polarizing topics, the author consistently shows respect for the views of alarmists, skeptics, and the vast majority of people whose positions lie somewhere between those two extremes. The book clarifies some of the most contentious points in the climate debate, and in the process treats us to a fascinating discussion interweaving Earth history, science, the history of science, and human nature. Readers will be rewarded with a genuine understanding of a complex issue that could be among the most important facing humankind in the coming decades.

The Science and Myth about Genesis Chapter 1 Ronald Reitz 2008-04 Inventor and physicist Reitz explores in detail both the scientific findings about Earth's history and the biblical account. He comes to the startling conclusion that science proves that the God of the Bible exists; and, that Genesis 1 is the result of divine revelation. (Christian)

Plate Tectonics & Crustal Evolution Kent C. Condie 1982

The Handy Dinosaur Answer Book Thomas E. Svarney 2004

Earth Science Edward J. Tarbuck 2009 For introductory courses in Earth Science in departments of Geology, Geography, Atmospheric Sciences, and Education. The twelfth edition of Earth Science offers a user-friendly overview of our physical environment with balanced, up-to-date coverage of geology, oceanography, astronomy, and meteorology for the undergraduate student with little background in science. The emphasis is on readability, with clear example-driven explanations. The twelfth edition takes full advantage of the subject's visual appeal, with discussions reinforced by incredible color photos and superb illustrations by Earth science illustrator and geologist Dennis Tasa.

Oceanography 2003

History of the Earth's Atmosphere Michael I. Budyko 1987-03-16 The authors of this book have studied the changes in the chemical composition of the atmosphere during geological history with regard to its close relationship to the evolution of the Earth's sedimentary shell. Beginning in 1977, the initial results of this study have been published as articles and parts of several monographs. Since new material clarifying atmospheric evolution have been obtained recently, the necessity has arisen to write a book treating the major results of investigations of the history of the atmosphere. In this book much consideration is given to the interrelation between the evolution of animate nature and changes in atmospheric composition. It proved necessary to study the history of the two components of atmospheric air: carbon dioxide and oxygen. Attempts have been made to represent quantitatively the conclusions drawn here, i. e. to determine by calculation the changes in the amount of carbon dioxide and oxygen over much of the history of the

atmosphere. These calculations, performed in most detail for the Phanerozoic and to a lesser degree for the Late Precambrian, are supplemented with estimates of changes in the chemical composition of the atmosphere in the Early Precambrian. Comparisons have been drawn between the changes in the chemical composition of the atmosphere and the development of animate nature, a close relationship being found to exist between the stages of the evolution of organisms and variations in the chemical composition of the atmosphere.

Earth's Early Atmosphere and Surface Environment George H. Shaw 2014 Nothing provided

Global Warming James Stryker 2013-12-01 High Quality Content by WIKIPEDIA articles! Global warming is the rise in the average temperature of Earth's atmosphere and oceans since the late 19th century and its projected continuation. Since the early 20th century, Earth's mean surface temperature has increased by about 0.8 °C (1.4 °F), with about two-thirds of the increase occurring since 1980. Warming of the climate system is unequivocal, and scientists are 95-100% certain that it is primarily caused by increasing concentrations of greenhouse gases produced by human activities such as the burning of fossil fuels and deforestation. These findings are recognized by the national science academies of all major industrialized nations.

The Oceans Eelco J. Rohling 2017-11-21 The 4.4-billion-year history of the oceans and their role in Earth's climate system It has often been said that we know more about the moon than we do about our own oceans. In fact, we know a great deal more about the oceans than many people realize. Scientists know that our actions today are shaping the oceans and climate of tomorrow—and that if we continue to act recklessly, the consequences will be dire. In this timely and accessible book, Eelco Rohling traces the 4.4 billion-year history of Earth's oceans while also shedding light on the critical role they play in our planet's climate system. Beginning with the formation of primeval Earth and the earliest appearance of oceans, Rohling takes readers on a journey through prehistory to the present age, vividly describing the major events in the ocean's evolution—from snowball and greenhouse Earth to the end-Permian mass extinction, the breakup of the Pangaea supercontinent, and the changing climate of today. Along the way, he explores the close interrelationships of the oceans, climate, solid Earth processes, and life, using the context of Earth and ocean history to provide perspective on humankind's impacts on the health and habitability of our planet—and on what the future may hold for us. An invaluable introduction to the cutting-edge science of paleoceanography, *The Oceans* enables you to make your own informed opinions about the environmental challenges we face as a result of humanity's unrelenting drive to exploit the world ocean and its vital resources.

Regents Exams and Answers: Earth Science--Physical Setting Revised Edition Edward J. Denecke 2021-01-05 Barron's Regents Exams and Answers: Earth Science provides essential review for students taking the Earth Science Regents, including actual exams administered for the course, thorough answer explanations, and comprehensive review of all topics. This edition features: Five actual, administered Regents exams so students have the practice they need to prepare for the test Review questions grouped by topic, to help refresh skills learned in class Thorough explanations for all answers Score analysis charts to help identify strengths and weaknesses Study tips and test-taking strategies Looking for additional practice and review? Check out Barron's Earth Science Power Pack two-volume set, which includes Let's Review Regents: Earth Science in addition to the Regents Exams and Answers: Earth Science book.

Evolution of Early Earth's Atmosphere, Hydrosphere, and Biosphere Stephen E. Kesler 2006-01-01 "The history of Earth's early atmosphere, hydrosphere, and biosphere, from Hadean through Proterozoic time, is one of geology's enduring puzzles. Ore deposits provide important insights into this history because they contain elements and minerals that are highly sensitive to the geochemical environment in which they form. Just what these minerals tell us remains a matter of considerable debate, however. When and how did life develop, an oxygen-rich atmosphere form, and sulfate dominate the ocean? This volume contains reports on these questions from both sides of the aisle for iron and manganese formations, uranium paleoplacers and hydrothermal deposits, and exhalative sulfides and oxides."--Publisher's website.

Early Earth Systems Hugh R. Rollinson 2009-03-12 Early Earth Systems provides a complete history of the Earth from its beginnings to the end of the Archaean. This journey through the Earth's early history begins with the Earth's origin, then examines the evolution of the mantle, the origin of the continental crust, the origin and evolution of the Earth's atmosphere and oceans, and ends with the origin of life. Looks at the evidence for the Earth's very

early differentiation into core, mantle, crust, atmosphere and oceans and how this differentiation saw extreme interactions within the Earth system. Discusses Archaean Earth processes within the framework of the Earth System Science paradigm, providing a qualitative assessment of the principal reservoirs and fluxes in the early Earth. "The book would be perfect for a graduate-level or upper level undergraduate course on the early Earth. It will also serve as a great starting point for researchers in solid-Earth geochemistry who want to know more about the Earth's early atmosphere and biosphere, and vice versa for low temperature geochemists who want to get a modern overview of the Earth's interior." Geological Magazine, 2008

Earth Facts Cally Hall 2004 Filled with charts, tables, and diagrams, this book is designed to make every facet of the Earth accessible to readers of all ages. Back by popular demand, this series of information books for children ages 8 and over are the same handy size with a fresh new design. All the facts kids need to know about natural history, science, and history topics are in these information-packed little books. Also included are reference books everyone can use-dictionaries in English and Spanish, encyclopedias in key areas, a thesaurus, and a spelling dictionary.

Voyages Through the Universe Andrew Fraknoi 1997 VOYAGES THROUGH THE UNIVERSE provides students and professors with the ideal combination of authors and experience. It is written by an award-winning astronomy educator (Fraknoi) and two distinguished research scientists (Morrison at NASA and Wolff at NOAO). This author team combines the latest science with classroom-tested teaching strategies and a student-friendly approach. Through unique group activities and a focus on astronomy as a human endeavor, the authors engage and involve students, helping them both understand and enjoy astronomy. The market-leading technology package includes access to InfoTracCollege Edition (free!) and TheSky Student Edition CD-ROM (free!), as well as an optional package with the RedShift College Edition CD-ROM (including animations) along with an accompanying workbook.

Oxygen in the Solar System Glenn J. MacPherson 2008 Reviews in Mineralogy & Geochemistry (RiMG) volumes contain concise advances in theoretical and/or applied mineralogy, crystallography, petrology, and geochemistry.

Treatise on Geochemistry 2013-10-19 This extensively updated new edition of the widely acclaimed Treatise on Geochemistry has increased its coverage beyond the wide range of geochemical subject areas in the first edition, with five new volumes which include: the history of the atmosphere, geochemistry of mineral deposits, archaeology and anthropology, organic geochemistry and analytical geochemistry. In addition, the original Volume 1 on "Meteorites, Comets, and Planets" was expanded into two separate volumes dealing with meteorites and planets, respectively. These additions increased the number of volumes in the Treatise from 9 to 15 with the index/appendices volume remaining as the last volume (Volume 16). Each of the original volumes was scrutinized by the appropriate volume editors, with respect to necessary revisions as well as additions and deletions. As a result, 27% were republished without major changes, 66% were revised and 126 new chapters were added. In a many-faceted field such as Geochemistry, explaining and understanding how one sub-field relates to another is key. Instructors will find the complete overviews with extensive cross-referencing useful additions to their course packs and students will benefit from the contextual organization of the subject matter Six new volumes added and 66% updated from 1st edition. The Editors of this work have taken every measure to include the many suggestions received from readers and ensure comprehensiveness of coverage and added value in this 2nd edition The esteemed Board of Volume Editors and Editors-in-Chief worked cohesively to ensure a uniform and consistent approach to the content, which is an amazing accomplishment for a 15-volume work (16 volumes including index volume)!

Climate Process and Change Edward Bryant 1997-10-28 Encompasses the true complexity of climate change, presenting in simple terms, the processes that drive the Earth's present climate system. The author outlines the nature and reasons for temperature fluctuations over millennia, including recent human-induced climate change.

The Human Condition Stefan Wurm 2020-03-10 Over a very short period, only a few hundred years, our understanding of the cosmos, our planet Earth, the evolution of life on it, and the beginnings of our very own human endeavor have radically changed. These revolutions in science and technology have dramatically altered our societies in many ways. For quite some time it seemed as if our planets resources were unlimited. Today we know that this is not the case. Human civilizations are shaping our planets future in ways that have profound consequences for all other life on Earth as well as for us. We need to reflect broadly on what defines our human condition if we wish our societies to be successful in navigating a future that cannot be just ours but must

include the broad diversity of life on Earth without which humankind will not survive. This book tells the story of how we discovered the universe, how we learned about our planet and the life evolving on it, how humanity emerged from pre-history, and what some of the future of our civilizations could hold. Planetary Astrobiology Victoria Meadows 2020-06-16 "Planetary Astrobiology provides an accessible, interdisciplinary gateway to the frontiers of knowledge in astrobiology via results from the exploration of our own solar system and exoplanetary systems"--

Encyclopedia of Paleoclimatology and Ancient Environments Vivien Gornitz 2008-10-31 One of Springer's Major Reference Works, this book gives the reader a truly global perspective. It is the first major reference work in its field. Paleoclimate topics covered in the encyclopedia give the reader the capability to place the observations of recent global warming in the context of longer-term natural climate fluctuations. Significant elements of the encyclopedia include recent developments in paleoclimate modeling, paleo-ocean circulation, as well as the influence of geological processes and biological feedbacks on global climate change. The encyclopedia gives the reader an entry point into the literature on these and many other groundbreaking topics.

Chemistry of Environmental Systems Jeffrey S. Gaffney 2019-10-21 A modern guide to environmental chemistry Chemistry of Environmental Systems: Fundamental Principles and Analytical Methods offers a comprehensive and authoritative review of modern environmental chemistry, discussing the chemistry and interconnections between the atmosphere, hydrosphere, geosphere and biosphere. Written by internationally recognized experts, the textbook explores the chemistries of the natural environmental systems and demonstrates how these chemical processes change when anthropogenic emissions are introduced into the whole earth system. This important text: Combines the key areas of environmental chemistry needed to understand the sources, fates, and impacts of contaminants in the environment Describes a range of environmental analytical methodologies Explores the basic environmental effects of energy sources, including nuclear energy Encourages a proactive approach to environmental chemistry, with a focus on preventing future environmental problems Includes study questions at the end of each chapter Written for students of environmental chemistry, environmental science, environmental engineering, geoscience, earth and atmospheric sciences, Chemistry of Environmental Systems: Fundamental Principles and Analytical Methods covers the key aspects and mechanisms of currently identified environmental issues, which can be used to address both current and future environmental problems.

Earth as an Evolving Planetary System Kent C. Condie 2015-12-01 Earth as an Evolving Planetary System, Third Edition, examines the various subsystems that play a role in the evolution of the Earth, including subsystems in the crust, mantle, core, atmosphere, oceans, and life. This third edition includes 30% new material and, for the first time, includes full color images in both the print and electronic versions. Topics in the great events chapters are now included in the beginning of the book, with the addition of a new feature of breakout boxes for each event. The second half of the book now focuses on a better understanding of Earth's history by looking at the interactions of the subsystems over time. The Earth's atmosphere, hydrosphere, and biosphere, crustal and mantle evolution, the supercontinent cycle, great events in Earth history, and the Earth in comparison to other planets are also covered. Authored by a world leader in tectonics who also authored the two previous editions Presents comprehensive coverage of the Earth's history that is relevant for both students and teachers Includes important section on Comparative Planetary Evolution, not found in other textbooks All illustrations presented throughout both the print and electronic versions in full color

Introductory Oceanography Harold V. Thurman 2004 The 10th edition of this popular book continues to provide an excellent foundation in science by examining the vast body of oceanic knowledge. Spanning the disciplines of geology, chemistry, physics, and biology, it allows readers to have a fundamental understanding of how oceans work. Interwoven within the book are hundreds of photographs, illustrations, real-world examples, and applications that make the material relevant, accessible, and entertaining. Well-organized and clearly written, this book covers scientific inquiry and gives an historical look at the study of oceanography; the origins of life, the earth, and the oceans; plate tectonics; marine provinces; marine sediments; water and seawater; air-sea interaction; ocean circulation; waves, tides, and coastlines; biological productivity and the marine habitat; marine resources; and environmental concerns. This book is intended to help readers in their quest to find out more about oceans. Because of its comprehensive scope and

excellent resource materials, it can also serve as an excellent reference work for those involved in oceanography.

The Chemical Evolution of the Atmosphere and Oceans Heinrich D. Holland 2020-10-06 In this first full-scale attempt to reconstruct the chemical evolution of the Earth's atmosphere and oceans, Heinrich Holland assembles data from a wide spectrum of fields to trace the history of the ocean-atmosphere system. A pioneer in an increasingly important area of scholarship, he presents a comprehensive treatment of knowledge on this subject, provides an extensive bibliography, and outlines problems and approaches for further research. The first four chapters deal with the turbulent first half billion years of Earth history. The next four chapters, devoted largely to the Earth from 3.9 to 0.6 b.y.b.p., demonstrate that changes in the atmosphere and oceans during this period were not dramatic. The last chapter of the book deals with the Phanerozoic Eon; although the isotopic composition of sulfur and strontium in seawater varied greatly during this period of Earth history, the chemical composition of seawater did not.

Earth's Early Atmosphere and Oceans, and The Origin of Life George H. Shaw 2015-10-07 This book provides a comprehensive treatment of the chemical nature of the Earth's early surface environment and how that led to the origin of life. This includes a detailed discussion of the likely process by which life emerged using as much quantitative information as possible. The emergence of life and the prior surface conditions of the Earth have implications for the evolution of Earth's surface environment over the following 2-2.5 billion years. The last part of the book discusses how these changes took place and the evidence from the geologic record that supports this particular version of early and evolving conditions.

Essentials of Oceanography Harold V. Thurman 1999 Revised for increased readability and streamlined for clarity, this text is designed to accompany an introductory college-level course in oceanography. This insightful, ecologically sensitive presentation of the relationship of scientific principles to ocean phenomena is made even more relevant to a new generation of teachers and students by pairing new co-author Alan Trujillo with renowned author Harold V. Thurman. *NEW - A new coauthor: - With Thurman's retirement from teaching, Alan Trujillo of Palomar College has been added as co-author for this edition. Alan's ideas and approach will help make this edition as relevant to a new generation of teachers and students as previous editions were to Thurman's contemporaries. *NEW - Changes in chapter organization: - A new Chapter 1, Introduction to Planet Earth, replaces the old Chapter 1 (History of Oceanography). The historical perspective is now included as chapter-opening feature boxes which highlight important events in oceanographic history relevant to chapter-specific material. - New placement of the chapter on plate tectonics (switched with the chapter on sea floor features) ensures that the processes of plate tectonics can be

Mosaic 1984