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# Physical Sciences Pprelims 2014 Gauteng

**Katrin Zwirglmaier**



## **Physical Sciences Pprelims 2014 Gauteng:**

*Climate Change 2021 – The Physical Science Basis* Intergovernmental Panel on Climate Change (IPCC), 2023-07-26 The Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change IPCC provides a comprehensive assessment of the physical science basis of climate change It considers in situ and remote observations paleoclimate information understanding of climate drivers and physical chemical and biological processes and feedbacks global and regional climate modelling advances in methods of analyses and insights from climate services It assesses the current state of the climate human influence on climate in all regions future climate change including sea level rise global warming effects including extremes climate information for risk assessment and regional adaptation limiting climate change by reaching net zero carbon dioxide emissions and reducing other greenhouse gas emissions and benefits for air quality The report serves policymakers decision makers stakeholders and all interested parties with the latest policy relevant information on climate change Available as Open Access on Cambridge Core

*Soft Computing in Chemical and Physical Sciences* Kanchan Sarkar, Sankar Prasad Bhattacharyya, 2017-11-06 This book can be regarded as Soft computing for physicists and chemists self taught It prepares the readers with a solid background of soft computing and how to adapt soft computing techniques to problem solving in physical and chemical research Soft computing methods have been little explored by researchers in physical and chemical sciences primarily because of the absence of books that bridge the gap between the traditional computing paradigm pursued by researchers in science and the new soft computing paradigm that has emerged in computer science This book is the interface between these primary sources and researchers in physics and chemistry

**Challenging the Modern Synthesis** Philippe Huneman, Denis M. Walsh, 2017 Since its origin in the early 20th century the Modern Synthesis theory of evolution has grown to become the orthodox view on the process of organic evolution Its central defining feature is the prominence it accords to genes in the explanation of evolutionary dynamics Since the advent of the 21st century however the Modern Synthesis has been subject to repeated and sustained challenges These are largely empirically driven In the last two decades evolutionary biology has witnessed unprecedented growth in the understanding of those processes that underwrite the development of organisms and the inheritance of characters The empirical advances usher in challenges to the conceptual foundations of evolutionary theory The extent to which the new biology challenges the Modern Synthesis has been the subject of lively debate Many current commentators charge that the new biology of the 21st century calls for a revision extension or wholesale rejection of the Modern Synthesis Theory of evolution Defenders of the Modern Synthesis maintain that the theory can accommodate the exciting new advances in biology The original essays collected in this volume survey the various challenges to the Modern Synthesis arising from the new biology of the 21st century The authors are evolutionary biologists philosophers of science and historians of biology from Europe and North America Each of the essays discusses a particular challenge to the Modern Synthesis treatment of

inheritance development or adaptation Taken together the essays cover a spectrum of views from those that contend that the Modern Synthesis can rise to the challenges of the new biology with little or no revision required to those that call for the abandonment of the Modern Synthesis The collection will be of interest to researchers and students in evolutionary biology and the philosophy and history of the biological sciences Seeing Science Through the Eyes of Canadian Teachers and Learners Christine D. Tippet, *Energy Landscapes of Nanoscale Systems* David J. Wales, 2022-06-08 *Energy Landscapes of Nanoscale Systems* provides a snapshot of the state of the art in energy landscapes theory and applications The book's chapters reflect diversity and knowledge transfer that is a key strength of the energy landscape approach To reflect the breadth of this field contributions include applications for clusters biomolecules crystal structure prediction and glassy materials Chapters highlighting new methodologies especially enhanced sampling techniques are included In particular the development and application of global optimization for structure prediction methods for treating broken ergodicity on multifunnel landscapes and treatment of rare event dynamics that reflect the state of the art are featured This book is an important reference source for materials scientists and energy engineers who want to understand more about how nanotechnology applies to the energy landscape approach This volume is dedicated to Prof Roy L Johnston who was formerly Co Editor of the *Frontiers of Nanoscience* series and who passed away in 2019 Outlines applications and advances in theory and simulation of energy systems at the nanoscale Explores how the energy landscapes approach is being applied to nanoscale materials Assesses major challenges in applying nanomaterials for energy applications on an industrial scale

Anatomy of a South African Karst Hydrosystem Philip J. Hobbs, Harrison Pienaar, Eddie van Wyk, Yongxin Xu, 2022-08-05 This book combines the results of the research activities in the assessment of water resources environment and an integrated water resource monitoring program to support preservation efforts of the aquatic environment of the Cradle of Humankind COH World Heritage Sites A poor understanding of the surface and groundwater resources of the COH property has precipitated often alarmist reporting in the media regarding the negative impacts associated with various sources of poor quality water The most notable of these is the acid mine drainage threat to karst ecosystems and fossil sites across the property These circumstances have generated wide and considerable concern for the preservation of the UNESCO inscribed fossil sites and integrity of the water resources of the property **Visions into Voyages for Planetary Science in the Decade 2013-2022** National Academies of Sciences, Engineering, and Medicine, Division on Engineering and Physical Sciences, Space Studies Board, Committee on the Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences, 2018-11-30 In spring 2011 the National Academies of Sciences Engineering and Medicine produced a report outlining the next decade in planetary sciences That report titled *Vision and Voyages for Planetary Science in the Decade 2013-2022* and popularly referred to as the decadal survey has provided high level prioritization and guidance for NASA's Planetary Science Division Other considerations such as budget realities congressional language in authorization

and appropriations bills administration requirements and cross division and cross directorate requirements notably in retiring risk or providing needed information for the human program are also necessary inputs to how NASA develops its planetary science program In 2016 NASA asked the National Academies to undertake a study assessing NASA's progress at meeting the objectives of the decadal survey After the study was underway Congress passed the National Aeronautics and Space Administration Transition Authorization Act of 2017 which called for NASA to engage the National Academies in a review of NASA's Mars Exploration Program NASA and the Academies agreed to incorporate that review into the midterm study That study has produced this report which serves as a midterm assessment and provides guidance on achieving the goals in the remaining years covered by the decadal survey as well as preparing for the next decadal survey currently scheduled to begin in 2020

**History, Philosophy and Science Teaching** Michael R. Matthews, 2017-08-30 This anthology opens new perspectives in the domain of history philosophy and science teaching research Its four sections are first science culture and education second the teaching and learning of science third curriculum development and justification and fourth indoctrination The first group of essays deal with the neglected topic of science education and the Enlightenment tradition These essays show that many core commitments of modern science education have their roots in this tradition and consequently all can benefit from a more informed awareness of its strengths and weaknesses Other essays address research on learning and teaching from the perspectives of social epistemology and educational psychology Included here is the first ever English translation of Ernst Mach's most influential 1890 paper on The Psychological and Logical Moment in Natural Science Teaching This paper launched the influential Machian tradition in education Other essays address concrete cases of the utilisation of history and philosophy in the development and justification of school science curricula These are instances of the supportive relation of HPS a subject long discussed in philosophy of education but inadequately in science education This book is a timely reminder of why history and philosophy of science are urgently needed to support understanding of science From major traditions such as the Enlightenment to the tensions around cultural studies of science the book provides a comprehensive context for the scientific endeavour drawing on curriculum and instructional examples Sibel Erduran University of Oxford UK The scholarship that each of the authors in this volume offers deepens our understanding of what we teach in science and why that understanding matters This is an important book exploring a wide set of issues and should be read by anyone with an interest in science or science education Jonathan Osborne Stanford University USA This volume presents new and updated perspectives in the field such as the Enlightenment Tradition Cultural Studies Indoctrination in Science Education and Nature of Science Highly recommended Mansoor Niaz Universidad de Oriente Venezuela This volume provides an extremely valuable set of insights into educational issues related to the history and philosophy of science Michael J Reiss University College London UK

**The Role of Laboratory Work in Improving Physics Teaching and Learning** Dagmara Sokółowska, Marisa Michelini, 2018-11-03 This book explores in

detail the role of laboratory work in physics teaching and learning Compelling recent research work is presented on the value of experimentation in the learning process with description of important research based proposals on how to achieve improvements in both teaching and learning The book comprises a rigorously chosen selection of papers from a conference organized by the International Research Group on Physics Teaching GIREP an organization that promotes enhancement of the quality of physics teaching and learning at all educational levels and in all contexts The topics covered are wide ranging Examples include the roles of open inquiry experiments and advanced lab experiments the value of computer modeling in physics teaching the use of web based interactive video activities and smartphones in the lab the effectiveness of low cost experiments and assessment for learning through experimentation The presented research based proposals will be of interest to all who seek to improve physics teaching and learning

The Metabolism of Islands Simron Singh, Marina Fischer-Kowalski, Marian Chertow, 2021 This book makes the case for why we should care about islands and their sustainability Islands are hotspots of biocultural diversity and home to 600 million people that depend on one sixth of the earth's total area including the surrounding oceans for their subsistence Today they are at the frontlines of climate change and face an existential crisis Islands are however potential hubs of innovation that are uniquely positioned to be leaders in sustainability and climate action This volume argues that a full fledged program on island industrial ecology is urgently needed with the aim of offering policy relevant insights and strategies to sustain small islands in an era of global environmental change The nine contributions in this volume cover a wide range of applications of socio metabolic research from flow accounts to stock analysis and their relationship to services in space and time They offer insights into how reconfiguring patterns of resource use will allow island governments to build resilience and adapt to the challenges of climate change

*Potato Production Worldwide* Mehmet Emin Caliskan, Allah Bakhsh, Khawar Jabran, 2022-10-22 Potato is a crop grown on all inhabited continents of the globe It is included in the top five crops of the world used as staple food in several countries and the number of people daily consuming the potato may surpass one billion Despite the high quantities of seed potato produced worldwide there are yield gaps due to challenges such as abiotic stresses pests climate change and poor production practices A region wide critical analysis of yield declining factors can help formulate management strategies that can improve potato yields Bridging yield gaps in potato will ultimately ensure the role of this crop in securing current and future food security Potato Production Worldwide presents information on this global crop from its history morphology and taxonomy to the growth and development of the potato crop including the latest strategies in addressing today's biotic and abiotic challenges This book identifies the reasons for yield gaps in various potato production regions of the world as well as presenting the best production practices pest management strategies and approaches to deal with climate change from the perspective of potato production Chapters provide important insights into potato production cultures and approaches in the major potato production countries Potato Production Worldwide will be a valuable resource for

researchers scientists and students seeking a comprehensive view of successful potato production Provides comprehensive information on the origin history taxonomy morphology ecophysiology growth and development of the potato Addresses production practices including irrigation nutrient management harvesting and post harvest techniques Explores the impact of Abiotic stresses drought chilling salinity etc and their management

**Air Pollution and Its Complications** Shani Tiwari,Pallavi Saxena,2021-05-19 This book provides an overview of the fundamental concept of air pollution emission sources of air pollutants and their transportation First the book presents a brief background on air pollution and its emission sources then it continues with their impact on agriculture health and climate change Furthermore it covers the basic concepts of air pollution transportation of air pollutants global climate change and the use of science in air pollution policy formulation in detail It also emphasizes the effects of air pollutants in altering the onset pattern of the Indian Summer Monsoon In addition it describes the impacts of air pollution on the cryosphere and human health In this book the editors provide an interdisciplinary unique collection of new studies and findings on the groove of air pollution to improve the basic understanding of graduate students as well as researchers in the field of air pollution and its impacts on various aspects of the atmosphere and surroundings This collection covers the basic concepts of air pollution transportation of air pollutants and global climate change and the use of science in air pollution policy formulation

**Challenging Inequality in South Africa** Michelle Williams,Vishwas Satgar,2021-05-14 In Challenging Inequality in South Africa Transitional Compasses leading scholars of South Africa explore creative possibilities to challenge structures of economic social and political power that produce inequality Through concrete empirical examples of movements workers struggles initiatives and politics in challenging inequality the authors illustrate transitional compasses that go beyond protest politics to a generative politics a politics of building the alternatives in the interstitial spaces of capitalism The conceptual framing is oriented around the way in which power is produced and reproduced through intricate relationships between hegemonic projects and everyday life While power underpins all social relations it is often taken for granted as it is frequently hidden behind other social relations Resistance to power emerges through engendering counter hegemonic projects that are intertwined with alternative everyday practices The authors highlight sources of alternative forms of power found in resistance to dominant forms of power through concrete experiences to create transformative alternatives To concretize the conceptual framing the authors look at the emancipatory possibilities of a universal basic income the use of law in tackling inequality in health and education creative initiatives to establish a people centred food system through food sovereignty new forms of organizing led by precarious workers democratic possibilities in local state delivery and attempts at reconceptualizing the good life by looking at issues of happiness and ecosocialism The chapters in this book were originally published in the journal Globalizations

Exploring Synergies and Trade-offs between Climate Change and the Sustainable Development Goals V.  
Venkatramanan,Shachi Shah,Ram Prasad,2020-11-16 The existential environmental crisis prompted the United Nations to

formulate the Millennium Development Goals at the turn of the 21st century in order to embark on an era of sustainable development. The progress and deficiencies in achieving the Millennium Development Goals provided impetus to the intelligentsia and policymakers to map out the pertinent goals for a sustainable growth trajectory for humanity and the planet. The United Nations 2030 Agenda for Sustainable Development, which was adopted in September 2015, took the shape of 17 Sustainable Development Goals (SDGs) and 169 targets. In effect, the 17 Sustainable Development Goals focus on protecting the earth's life support systems for intra and inter-generational equity and for development that is rooted in sustainability science. Attaining these goals is an uphill task; nevertheless, scientific knowledge transfer and interdisciplinary inquiries, concerted global action, and capacity building would provide an enabling environment for achieving the SDGs. This book explores the synergies and trade-offs between climate change management and other SDGs. It highlights the policy imperatives as well as the interrelations between combating climate change and its impacts: SDG 13 and food and nutritional security, SDG 2 water security, SDG 6 soil security, SDG 15 energy security, SDG 7 poverty eradication, SDG 1 gender equality, SDG 5 resilient infrastructure, SDG 9 and sustainable and resilient cities, SDG 11.

**Scientific and Technical Aerospace Reports**, 1974      *Carbon: The Next Silicon?* Marc J. Madou, Victor H. Perez-Gonzalez, Bidhan Pramanick, 2016-01-12. This book provides an introduction to the state of the art in C-MEMS and C-NEMS with an emphasis on lithographically patterned photo polymers carbonized in an inert atmosphere. We can expand our perspective considerably by learning from the traditional carbon manufacturing community where researchers deal with a much wider variety of carbon feed stocks such as coal, coconut shell, wood, agricultural wastes, and industrial wastes to make all types of useful carbons. The new concepts are introduced by discussing carbon nanomaterials synthesis aided with catalysts and chemistry and detailing the microstructure of the resulting nanocarbons.

**Integrating Conservation Biology and Paleobiology to Manage Biodiversity and Ecosystems in a Changing World** G. Lynn Wingard, Chris Schneider, Gregory P. Dietl, Damien Fordham. Policy makers and resource managers must make decisions that affect the resilience and sustainability of natural resources including biodiversity and ecosystem services. However, these decisions are often based on evidence or theory derived from highly altered systems and over short time periods of low-magnitude environmental and climatic change. Because natural systems change and evolve across multiple timescales from instantaneous to millennial, long-term understanding of how past life has responded to perturbations can inform resource managers. By using these natural laboratories of the past, conservation paleobiology and paleoecology provide the framework necessary to anticipate and plan for future changes. The goal of this Research Topic is to heighten awareness among conservation and restoration practitioners to the value and applications of long-term perspectives provided by conservation paleobiology and paleoecology. Most conservation studies focus on systems already impacted by anthropogenic change; these studies would benefit from paleontological data through expanded temporal scales, identification of baselines, and an understanding of how organisms have responded to past changes. However, resource



management decisions rarely include input from paleontologists and paleoecological research is rarely incorporated into conservation decision making We seek to bridge this research implementation gap by highlighting the application of paleoecological data to issues such as biodiversity dynamics extinction risks and resilience to perturbations among other topics We hope to foster new cross disciplinary synergies by encouraging conservation scientists and managers to collaborate with paleontologists to improve conservation decision making and by increasing awareness among paleontologists to the needs of the resource management community This Research Topic will provide a forum for both the paleontological and resource management communities to exchange ideas that will enhance restoration and conservation decision making We invite papers on conceptual advances reviews of specific topics to guide efforts in research or practice case studies of successful applications articles describing datasets with applied value and perspective papers summarizing a body of paleontological research with relevance to the resource management community Topics can include but are not limited to Responses of species communities and ecosystems to perturbations Strategies to achieve the direct integration of paleobiology and paleoecology into on ground resource management Identifying baselines and reference conditions Increasing the robustness of forecasting models through the incorporation of paleontological data Identifying key species interactions and other phenomena as indicators of impending change New methodologies analytical tools and or proxies in the application of paleontological data to conservation and restoration practice Lynn Wingard Damien Fordham and Greg Dietl have no conflicts of interest Chris Schneider has a potential conflict of interest where manuscripts pertain to stakeholders in the petroleum industry as she is an independent contractor in the Alberta Oil Sands mining area

**Understanding Soils of Mountainous Landscapes** Rahul Bhadouria, Shipra Singh, Sachchidanand Tripathi, Pardeep Singh, 2023-01-21 Understanding Soils of Mountainous Landscapes Sustainable Use of Soil Ecosystem Services and Management focuses on the patterns and processes of mountainous soils including threats due to the fragile nature of mountain ecosystems and the conservation and management of soil ecosystem services and restoration processes The book covers a balanced approach to land and resource management ensuring that environmentally and socio culturally sound interventions are developed and applied in the complex geophysical ecological and social landscapes of the world s mountain systems The book provides holistic understanding of mountain soils to help environmental and soil scientists gain insight and develop new problem solving approaches With obvious up and downstream linkages e g a large proportion of urban canters globally depend on water that originates in the mountains as well as globalization e g continental scale impacts of air pollution and climate change on glaciers the long range success of conservation measures in mountain regions requires that the following discrete but interconnected interventions be pursued concurrently 1 the protection of biodiversity and ecosystem services 2 empowerment of mountain communities including family farming and 3 elaboration of more thoughtful context specific policy environments for sustainable mountain development Offers comprehensive coverage of all aspects of

mountain soils including climate change ecosystem services and threats Focuses on exploring the human and anthropogenic challenges associated with the sustainable management of soils in mountain landscapes Includes content on biochar mediated microbial community dynamics      *Air Pollution and Environmental Health* Pallavi Saxena, Anju Srivastava, 2020-06-08 Air pollution is an alarming problem not only in terms of air quality but also in relation to health issues Toxic air pollutant concentrations produce harmful impacts on plant health and human health Further though there are various sources of air pollution anthropogenic and biogenic sources are becoming increasingly problematic A number of control methods have been applied to reduce the air pollutant concentrations so that their global environmental burden on plants as well as humans can be mitigated However as confirmed in numerous reports and studies their concentrations continue to be very high and everyday cases related to air pollution have become exponentially high not only in developing countries but also in developed countries In plants toxic air quality has various adverse effects including biochemical and physiological disorders chronic diseases and or lower yields In humans air pollutants affect the body's metabolism and immune system lungs and central nervous system This book provides an essential overview of air pollution its impacts on plant and human health and potential control strategies The respective chapters cover general monitoring and characterization techniques for air pollutants air quality modelling applications plant and human health effects risk assessment and air pollution control policy Given its scope the book offers a valuable and unique resource for students of Environmental Science Biological Science Medical Science and Agriculture and for environmental consultants researchers and other professionals whose work involves air quality plant and human related research      *Microbes for Sustainable Development and Bioremediation* Ram Chandra, RC Solti, 2019-12-13 Microbes are the predominant form of life on the planet due to their broad range of adaptation and versatile nutritional behavior The ability of some microbes to inhabit hostile environment incompatible with most forms of life means that their habitat defines the extent of the biosphere and delineates the barrier between the biosphere and geosphere The direct and indirect role of microbes that include bacteria fungi actinomycetes viruses mycoplasma and protozoans are very much important in development of modern human society for food drugs textiles agriculture and environment Furthermore microorganisms and their enzyme system are responsible for the degradation of various organic matters Microbes for Sustainable Development and Bioremediation emphasizes the role of microbes for sustainable development of ecosystem Environmental microbiology role in biogeochemical cycle and bioremediation of environmental waste is major theme which comprises the following aspects Bacterial phytoextraction mechanism of heavy metals by native hyperaccumulator plants from complex waste contaminated site for eco restoration Role of microbial enzyme for eco friendly recycling of industrial waste Field scale remediation of crude oil contaminated desert soil and treatment technology Microbial technology for metal recovery from e waste printed circuit board Impact of genomic data on sustainability of ecosystem Methane monooxygenases their regulations and applications Role of microbes in

environmental sustainability and food preservation This book will be directly beneficial to researchers and classroom students in areas of biotechnology environmental microbiology molecular biology and environmental engineering with specialized collection of cutting edge knowledge

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