Tropical Climatology An Introduction To The Climates Of The Low Latitudes 2nd Edition

This book brings together a wealth of scientific findings andecological knowledge to survey what we have learned about the“Wet Tropics” rainforests of North Queensland,Australia. This interdisciplinary text is the first book to providesuch a holistic view of any tropical forest environment, includingthe social and economic dimensions. The most thorough assessment of a tropical forest landscape todate Explores significant scientific breakthroughs in areasincluding conservation genetics, vegetation modeling, agroforestryand revegetation techniques, biodiversity assessment and modeling,impacts of climate change, and the integration of science innatural resource management Research achieved, in part, due to the Cooperative ResearchCentre for Tropical Rainforest Ecology and Management (theRainforest CRC) Written by a number of distinguished internationalexperts contains chapter summaries and section commentaries

Today, given the well-publicized impacts of events such as El Niño, there is an unequaled public awareness of how climate affects the quality of life and environment. Such awareness has created an increasing demand for accurate climatological information. This information is now available in one convenient, accessible source, the Encyclopedia of World Climatology. This comprehensive volume covers all the main subfields of climatology, supplies information on climates in major continental areas, and explains the intricacies of climatic processes. The level of presentation will meet the needs of specialists, university students, and educated laypersons. A successor to the 1986 Encyclopedia of Climatology, this compendium provides a clear explanation of current knowledge and research directions in modern climatology. This new encyclopedia emphasizes climatological developments that have evolved over the past twenty years. It offers more than 200 informative articles prepared by 150 experts on numerous subjects, ranging from standard areas of study to the latest research studies. The relationship between climatology and both physical and social science is fully explored, as is the significance of climate for our future well-being. The information is organized for speedy access. Entries are conveniently arranged in alphabetical order, thoroughly indexed, and cross-referenced. Every entry contains useful citations to additional source materials. The Editor John E. Oliver is Professor Emeritus at Indiana State University. He holds a B.Sc. from London University, and a MA and Ph.D from Columbia University. He taught at Columbia University and then at Indiana State where he was formerly Chair of the Geography-Geology Department, and Assoc iate Dean, College of Arts and Sciences. He has written many books and journal articles in Climatology, Applied Climatology and Physical Geography.

This book highlights some of the most recent research in the climatological behavior of tropical cyclones as well as the dynamics, predictability, and character of these storms as derived using remote sensing techniques. Also included in this book is a review of the interaction between tropical cyclones and coastal ocean dynamics in the Northwest Pacific and an evaluation of the performance of CMIP6 models in replicating the current climate using accumulated cyclone energy. The latter demonstrates how

the climate may change in the future. This book can be a useful resource for those studying the character of these storms, especially those with the goal of anticipating their future occurrence in both the short and climatological range and their associated hazards.

Wind systems of the tropics. Radiation temperature and humidity. Precipitation and evaporation. Vertical energy transfer. The trade wind inversion. Diurnal and local controle. Weather observation and analyses. Synoptic scale weather systems. Tropical cyclones structure and mechanics. Tropical cyclones formation and movement. Numerical hurricane prediction by Ferdinand Baer. The general circulation.

"Global change of the climate is a problem at a planetary scale, and the whole world will have to settle it. Making a coordinated decision is as necessary and unavoidable as a common fight against terrorism. And the earlier politicians begin real actions, the less damage will be. But we would like to understand if the man is really such a self-killer, that he tries to kill himself and every living thing on the planet so passionately: from the first minute of it's comparatively intelligent existence the humanity has always made damage to the planet to survive, since it has not had any other way to continue its existence on the Earth. All natural forces and other types of animals have always been stronger than the Homo Sapiens"--

This book provides valuable lessons that will improve public policy and the quality of decisions that will affect generations to come. Richard Moss, Senior Director Climate and Energy, United Nations Foundation An excellent addition to the body of knowledge on adaptation to climate change from the developing world, which has been largely missing until now. Saleemul Huq, Director, Climate Change Programme, International Institute for Environment and Development This important volume is a valuable effort on adaptation to climate change that needs to be on the desks of those seeking coping strategies for longer term responses to evolving climate changes. Roger Kasperson, Emeritus, Clark University, USA The IPCC, winner of the Nobel Peace Prize for 2007, makes clear that while climate change mitigation is vital, the world must also begin to adapt. But how best can this be achieved? This authoritative volume (along with its companion on vulnerability), resulting from the work of the Assessments of Impacts and Adaptations to Climate Change (AIACC) project launched with the IPCC in 2002, is the first to provide an in-depth investigation of the stakes in developing countries. It covers current practices for managing climate risks, deficits between current practices and needs, the changing nature of the risks due to human caused climate change, strategies for adapting to changing risks, and the need to integrate these strategies into development planning and resource management. The book also identifies obstacles to effective adaptation and explores measures needed to create conditions that are favourable to climate change adaptation. Published with TWAS and START

Provides a comprehensive introduction to the complex systems of the tropics, covering a broad, cross-regional range of humid through to semi-arid tropical climate zones. Offers a balanced mix of biophysical and human management issues.

This original book describes the behavior of tropical cyclones in the South Pacific. It investigates the broad range of disturbance effects these violent storms have on the physical environments of the islands that lie in their path and the

people who live on them. It is the first book to link these two themes – the characteristics of cyclones and their landscape impacts. Examples and illustrations are drawn widely from across the region, resulting in a highly readable volume.
The elements of climate; Air temperature (including insolation); Atmospheric pressure and winds; Atmospheric moisture and precipitation; Air masses and fronts; Atmospheric disturbances and their associated weather types; The world pattern of climates; Climatic types and their distribution; Classification of climates and the world pattern; The tropical rainy climates; The dry climates; The humid mesothermal climates; The humid microthermal climates; Polar climates and highland climates; Koppen's classification of climates; Supplementary climatic data for selected stations.
Tropical cyclones are topic that is not appropriately known to the public at large, but climate change has been on the public's mind since the last decade and a concern that has peaked in the new millennium. Like the television programs of Jean Yves Cousteau the 'plight of the oceans', have recent documentaries nurtured a conscio- ness that major climatological changes are in the offing, even have started to develop. The retreat of glaciers on mountain tops and in Polar Regions is 'being seen' on 'the small screen' and has favored an environmental awareness in all populations that are enjoying an average well-being on Planet Earth. The vivid images on screen of storms, floods, and tsunamis share the fear provoking landscapes of deforestation, desertification and the like. Watching such as this one is seen are voices warning of what over is 'in store' if the causative problems are not remedied. Talking and d- cussing are useful, but action must follow. Understanding the full ramifications of climate change on tropical cyclones is a task that will takes several decades. In Climate Change 2007, the Fourth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (IPCC) a high probability of major changes in tropical cyclone activity across the various ocean basins is highlighted.
This book reviews the latest assessments of climate variability and climate change, and their impacts on agriculture and forestry, and recommends appropriate adaptation strategies for reducing the vulnerability of agriculture and forestry to climate variability and climate change. Among other solutions, the text offers management strategies to mitigate greenhouse gas emissions from different agroecosystems, and proposes the use of seasonal climate forecasts to reduce climate risk.
This revised text presents a cogent explanation of the fundamentals of meteorology, and explains storm dynamics for weather-oriented meteorologists. It discusses climate dynamics and the implications posed for global change. The Fourth Edition features a CD-ROM with MATLABÂ® exercises and updated treatments of several key topics. Much of the material is based on a two-term course for seniors majoring in atmospheric sciences. * Provides clear physical explanations of key dynamical principles * Contains a wealth of illustrations to elucidate text and equations, plus end-of-

chapter problems * Holton is one of the leading authorities in contemporary meteorology, and well known for his clear writing style * Instructor's Manual available to adopters NEW IN THIS EDITION * A CD-ROM with MATLABÂ® exercises and demonstrations * Updated treatments on climate dynamics, tropical meteorology, middle atmosphere dynamics, and numerical prediction

This book provides examples of climate change characterization and decision-making tools for subtropical and tropical adaptation planning. It is intended for local operators, physical planners, besides researchers and students of these subjects. The first chapter describes the status of climate planning in large subtropical and tropical cities. The following six chapters discuss hazards (drought, intense precipitations, sea level rise, sea water intrusion) and early warning systems. Nine chapters enlarge on flood risk analysis and preliminary mapping, climate change vulnerability, comparing contingency plans in various scales and presenting experiences centred on adaptation planning. The last three chapters introduce some best practices of weather and climate change monitoring and flood risk mapping and assessment.

This book presents a unique and comprehensive view of the fundamental dynamical and thermodynamic principles underlying the large circulations of the coupled ocean-atmosphere system Dynamics of The Tropical Atmosphere and Oceans provides a detailed description of macroscale tropical circulation systems such as the monsoon, the Hadley and Walker Circulations, El Niño, and the tropical ocean warm pool. These macroscale circulations interact with a myriad of higher frequency systems, ranging from convective cloud systems to migrating equatorial waves that attend the low-frequency background flow. Towards understanding and predicting these circulation systems. A comprehensive overview of the dynamics and thermodynamics of large-scale tropical atmosphere and oceans is presented using both a “reductionist” and “holistic” perspectives of the coupled tropical system. The reductionist perspective provides a detailed description of the individual elements of the ocean and atmospheric circulations. The physical nature of each component of the tropical circulation such as the Hadley and Walker circulations, the monsoon, the incursion of extratropical phenomena into the tropics, precipitation distributions, equatorial waves and disturbances described in detail. The holistic perspective provides a physical description of how the collection of the individual components produces the observed tropical weather and climate. How the collective tropical processes determine the tropical circulation and their role in global weather and climate is provided in a series of overlapping theoretical and modelling constructs. The structure of the book follows a graduated framework. Following a detailed description of tropical phenomenology, the reader is introduced to dynamical and thermodynamical constraints that guide the planetary climate and establish a critical role for the tropics. Equatorial wave theory is developed for simple and complex background flows, including the critical role played by moist processes. The manner in which the tropics and the extratropics interact is then described, followed by a

discussion of the physics behind the subtropical and near-equatorial precipitation including arid regions. The El Niño phenomena and the monsoon circulations are discussed, including their covariance and predictability. Finally, the changing structure of the tropics is discussed in terms of the extent of the tropical ocean warm pool and its relationship to the intensity of global convection and climate change. Dynamics of the Tropical Atmosphere and Oceans is aimed at advanced undergraduate and early career graduate students. It also serves as an excellent general reference book for scientists interested in tropical circulations and their relationship with the broader climate system.

This book offers a solutions-based approach to climate change problems which potentially impinge on human beings within the tropics. It largely comprises research articles with supplementary applications and illustrations. The effects of atmospheric phenomena, energy acquisition, wind power, CO2 sequestration, are linked with soils, aquatic life, reducing deforestation, rainwater harvesting and clay pot farming, climate, plant disease and food security to show that no area of life is untouched by the phenomenon of climate change. It discusses specific problem areas and provides an overview of geotechnical and sustainable solutions to lessen the impact of climate.

What can we expect as global change progresses? Will there be thresholds that trigger sudden shifts in environmental conditions--or that cause catastrophic destruction of life? Effects of Past Global Change on Life explores what earth scientists are learning about the impact of large-scale environmental changes on ancient life--and how these findings may help us resolve today's environmental controversies. Leading authorities discuss historical climate trends and what can be learned from the mass extinctions and other critical periods about the rise and fall of plant and animal species in response to global change. The volume develops a picture of how environmental change has closed some evolutionary doors while opening others--including profound effects on the early members of the human family. An expert panel offers specific recommendations on expanding research and improving investigative tools--and targets historical periods and geological and biological patterns with the most promise of shedding light on future developments. This readable and informative book will be of special interest to professionals in the earth sciences and the environmental community as well as concerned policymakers.

This book details the outcomes of new research focusing on climate risk related to hurricanes. Topics include numerical simulation of tropical cyclones, through tropical cyclone hazard estimation to damage estimates and their implications for commercial risk. Inspired by the 6th International Summit on Hurricanes and Climate Change: From Hazard to Impact, this book brings together leading international academics and researchers, and provides a source reference for both risk managers and climate scientists for research on the interface between tropical cyclones, climate and risk.

Tropical Climatology Second Edition Glenn R. McGregor, The University of Birmingham, UK Simon Nieuwolt (deceased) Formerly Adjunct Professor, University of Guelph, Canada Climatology, the scientific study of climate, is not only concerned with explaining why a location's or region's climate is like it is but also with describing the nature and availability of the climate resource for a wide range of human activities. This subject is of great relevance to the tropics as climate in many ways controls the lives and economic activities of the approximately 2400 million people living in tropical regions. Tropical climates also have effects that reach far beyond the limits of the regions where they actually prevail: the global general circulation is largely driven by the export of considerable amounts of heat energy from tropical to extratropical latitudes: a large part of all atmospheric water content originates from the tropics, and intermittent tropical phenomena, like El Nino Southern Oscillation (ENSO), not only influence the climates over extensive tropical areas but many parts of the extratropics. The climate sensitivity of

populations and economic production in the tropics also makes these regions especially vulnerable to any negative impacts arising from human-induced climate change. Tropical Climatology aims to provide a geographical viewpoint on the physical processes in the tropical atmosphere: to offer explanations of how a location's climate is a product of these processes and to highlight the implications of tropical atmospheric behaviour and climate change for those living in the tropics. This is the second edition of the book and reflects the substantial developments in the field of tropical climatology which have taken place over the two decades since the publication of the first edition. New and updated material has been included on the nature of the general tropical circulation, the monsoons, the quasi-biennial oscillation, the 40-50 day tropical circulation, the El Nino Southern Oscillation phenomenon and its climatic impacts, tropical disturbances, the characteristics of regional tropical climates and climate change in the tropics. The readership of the book remains essentially the same as that for which the first edition was intended; second to third year students in geography and the environmental sciences who have some background in climatology. The updated reference list will, however, provide an entry point for non-specialist postgraduates into the field of tropical climatology.

Climate change represents one of the most alarming long-term threats to ecosystems the world over. This new collection of papers provides, for the first time, an overview of the potentially serious impact that climate change may have on tropical forests. The authors, a multi-disciplinary group of leading experts in climatology, forestry, ecology and conservation biology, present a state-of-knowledge snapshot of how tropical forests are likely to react to the changes being wrought on our planet's atmosphere and climate. Tropical forests represent extraordinary harbours for biological diversity, and yet as deforestation and degradation continue apace, they are under greater pressure from human impacts than ever before. Climate change adds yet another threat to these valuable ecosystems, and this volume demonstrates just how significant a problem this may really be. The authors identify certain types of forest, including tropical montane cloud forest that may be particularly vulnerable. They also show the strong likelihood of global warming aggravating problems in already fragmented forest areas.

Global Physical Climatology is an introductory text devoted to the fundamental physical principles and problems of climate sensitivity and change. Addressing some of the most critical issues in climatology, this text features incisive coverage of topics that are central to understanding orbital parameter theory for past climate changes, and for anthropogenic and natural causes of near-future changes-- Key Features * Covers the physics of climate change * Examines the nature of the current climate and its previous changes * Explores the sensitivity of climate and the mechanisms by which humans are likely to produce near-future climate changes * Provides instructive end-of-chapter exercises and appendices

Tropical ClimatologyAn Introduction to the Climates of the Low LatitudesJohn Wiley & Sons

The first edition of my book "Climate and Circulation of the Tropics" was reasonably up to date to the middle of 1985. In a second printing in 1988 it was possible to complete a few literature references and to correct some misprints. However, vigorous research has taken place over the past five years in various areas of tropical climate dynamics, especially in the atmosphere-ocean mechanisms of climate anomalies, climate prediction, ocean circulation, and paleoclimates. Promising progress has also been made in the application of general circulation modelling to tropical climate problems. In the present second edition, named "Climate Dynamics of the Tropics", I have attempted to incorporate much of the recent

work to late 1990. Chapters 8 and 9 have been essentially re-written, and major additions have been made to Chapters 4 and 12 in particular. I would like to acknowledge the continued support by the U.S. National Science Foundation over the past five years. B. Parthasarathy, Poona, and H. Lessmann, San Salvador, sent me updates of data series not easily accessible. I have benefitted from discussions with numerous colleagues in the United States and overseas. In the preparation of this second edition, Marilyn Wolff patiently transferred my illegible hand-written drafts onto word processor. Dierk Polzin and Dan Skemp assisted me with the creation of the page masters and the subject index and Christopher Collimore with the author index.

This book is a survey of the research work done by the author over the last 15 years, in collaboration with various eminent mathematicians and climate scientists on the subject of tropical convection and convectively coupled waves. In the areas of climate modelling and climate change science, tropical dynamics and tropical rainfall are among the biggest uncertainties of future projections. This not only puts at risk billions of human beings who populate the tropical continents but it is also of central importance for climate predictions on the global scale. This book aims to introduce the non-expert readers in mathematics and theoretical physics to this fascinating topic in order to attract interest into this difficult and exciting research area. The general thyme revolves around the use of new deterministic and stochastic multi-cloud models for tropical convection and convectively coupled waves. It draws modelling ideas from various areas of mathematics and physics and used in conjunction with state-of-the-art satellite and in-situ observations and detailed numerical simulations. After a review of preliminary material on tropical dynamics and moist thermodynamics, including recent discoveries based on satellite observations as well as Markov chains, the book immerses the reader into the area of models for convection and tropical waves. It begins with basic concepts of linear stability analysis and ends with the use of these models to improve the state-of-the-art global climate models. The book also contains a fair amount of exercises that makes it suitable as a textbook complement on the subject.

The need to respond to the rapidly changing city climate is particularly urgent in the tropics where the urban transition is currently at its peak. While the need is clearly felt by the tropical urban dwellers, texts that provide an overview of the problem and indicate possible design solutions are rare. This comprehensive reference will be welcomed by student and practising architects as well as other built envronment professionals engaged with the environmental effects of building in worldwide warm and humid climates.

'Sound and solid case studies on vulnerability and adaptation have been woefully lacking in the international discourse on climate change. This set of books begins to bridge the gap.' Achim Steiner, UN Under-Secretary General and Executive Director of United Nations Environment Programme 'Important reading for students and practitioners alike.'

Martin Parry, Co-Chair, Working Group II (Impacts, Adaptation and Vulnerability), Intergovernmental Panel on Climate Change (IPCC) 'Fills an important gap in our understanding ... It is policy-relevant and deserves to be widely read.' Richard Klein, Senior Research Fellow, Stockholm Environment Institute (SEI), Sweden The Intergovernmental Panel on Climate Change (IPCC) concluded in its 2001 report that much of the developing world is highly vulnerable to adverse impacts from climate change. But the IPCC also concluded that the vulnerabilities of developing countries are too little studied and too poorly understood to enable determination of adaptation strategies that would be effective at reducing risks. These authoritative volumes, resulting from the work of the Assessments of Impacts and Adaptations to Climate Change (AIACC) project launched by the IPCC in 2002, are the first to provide a comprehensive investigation of the issues at stake. Climate Change and Vulnerability discusses who is vulnerable to climate change, the nature of their vulnerability and the causes of their vulnerability for parts of the world that have been poorly researched until now. Climate Change and Adaptation covers current practices for managing climate risks to food security, water resources, livelihoods, human health and infrastructure, needs for effective management of climate risks, the changing nature of the risks, strategies for adaptation, and the need to integrate these strategies into development planning and resource management.

This textbook introduces fundamental dynamics of tropical atmosphere and ocean useful for advanced graduate courses in atmospheric and climate sciences. It presents an overview of simple atmospheric and oceanic models, as well as the observed phenomena associated with major climate modes in the tropics. It provides students with an up-to-date understanding of the dynamics of tropical climate and weather phenomena. A particular focus is given to scale interactions and atmosphere-ocean interactions associated with tropical mean climate (such as ITCZ asymmetry and annual cycles), synoptic-scale variability (such as synoptic wave trains, easterly waves and tropical cyclones), intraseasonal oscillations (such as Madden-Julian Oscillation and boreal summer intraseasonal oscillation), and interannual variability (such as El Niño-Southern Oscillation and Indian Ocean Dipole). Theoretical and conceptual models are presented for better understanding of physical mechanisms behind the observational phenomena. This book aims to motivate graduate students in atmospheric sciences and oceanography by providing them with the key methods and tools necessary to conduct research.

"Among the places worst hit by climate change are areas of high urban growth in the warm, humid tropics of Asia and Latin America. In these places, the global trend of rapid urbanisation and conditions of local warming compound the effects of climate change. This three-part book explores the unique local climate consequences of urban growth trajectories of tropical cities and provides strategies and design approaches to enhance the quality of life of tropical urban

dwellers in the face of urban warming. Part One considers the philosophical basis of the climate challenge in this context and investigates tropical urbanism from the viewpoints of urban activity patterns and the notion of 'thermal pleasure'. Part Two explores specific, practical techniques in enhancing ventilation, shading and greenery as well as the challenges in local climate assessment in the tropics. Part Three explores the barriers and future opportunities for climate-sensitive urban planning and presents specific examples of good practice, contextualized within the wider global debate on adapting to climate change. Urban Climate Challenges in the Tropics is an indispensable companion for planners, designers, architects and students of all levels."--Provided by publisher.

Tropical Environments presents a comprehensive introduction to the complex systems of the tropics. Covering a broad, cross-regional range of humid through to semi-arid tropical climate zones, the book features a wealth of case studies drawn from throughout the tropical world. The authors tackle the major problems within the tropics, from complex biological interactions and soil nutrient deficiencies, offering a balanced integration of biophysical and human management issues.

This book provides research that shows tropical cyclones are more powerful than in the past with the most dramatic increases occurring over the North Atlantic and with the strongest hurricanes. Although such increases are correlated with warming oceans and are consistent with the thermodynamic theory of hurricane intensity, there remains doubt about the interpretation, integrity, and meaning of these results. Arising from the 5th International Summit on Hurricanes and Climate Change, this book contains new research on topics related to hurricanes and climate change. Bringing together international leading academics and researchers on various sides of the debate, the book discusses new research and expresses opinions about what is happening and what might happen in the future with regard to regional and global hurricane (tropical cyclone) activity.

What do we mean by the tropics? The weather and the climates it produces across the tropical zone are significantly different from those experienced by the people living in higher latitudes, so forecasters across Europe and much of North America are unfamiliar with its effects. In this book, Jim Galvin demystifies the topic in this zone that is increasingly of interest to those studying weather and climate. This book was written for weather forecasters, meteorology, environmental science and geography students as an introductory guide. It builds on the experience of the author, his professional experience in the World Area Forecast Centre at the Met Office, Exeter, using studies into the weather and climate seen within the tropical air mass conducted over many years. Its unique approach presents a practical approach to tropical weather studies, drawing on both academic and practical knowledge, covering air mass dynamics, seasonal changes, moist and dry weather, climate variability and human health in chapters and appendices that build up the overall picture, summarising our current state of knowledge. As an overview, it covers the broad range of effects connected with climate and weather in a straightforward way and is clearly illustrated throughout.

Synoptic and Dynamic Climatology provides the first comprehensive account of the dynamical behaviour and mechanisms of the global climate system and its components, together with a modern survey of synoptic-scale weather systems in the tropics and extratropics, and of the methods and applications of synoptic climate classification. It is unrivalled in the scope and detail of its contents. The work is thoroughly

up to date, with extensive bibliographies by chapter. It is illustrated with nearly 300 figures and plates. *Part 1 provides an introduction to the global climate system and the space-time scales of weather and climate processes, followed by a chapter on climate data and their analysis *Part 2 describes and explains the characteristics of the general circulation of the global atmosphere and includes the nature and causes of global teleconnection patterns *Part 3 discusses synoptic weather systems in the extratropics and tropics and satellite-based climatologies of synoptic features. It also describes the applications of synoptic climatology and summarises current climatic research and its directions.