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This book provides an up-to-date and comprehensive report on the soils of Wisconsin, a state that offers a rich tapestry of soils. It discusses the relevant soil forming factors and soil processes in detail and subsequently reviews the main soil regions and dominant soil orders, including paleosols and endemic and endangered soils. The last chapters address soils in a changing climate and provide an evaluation of their monetary value and crop yield potential. Richly illustrated, the book offers both a valuable teaching resource and essential guide for policymakers, land users, and all those interested in the soils of Wisconsin. Methods of presentation of soil data; Time as a soil-forming factor; Parent material as a soil forming factor; Topography as a soil forming factor; Climate as a soil-forming factor; Organisms as a soil-forming factor. Pedogenesis and Soil Taxonomy: Concepts and Interactions single copy This book is the first of two volumes intended to replace the old and now out of print Precis de pedologie, the previous three editions of which were pro duced by the same publisher in 1960, 1965 and 1970. It was apparent that the term 'precis', which means that the text was neces sarily condensed and summarised, no longer corresponded with the present day situation, for pedology has developed considerably in the past 10 years and it now makes use of the most modern and varied research techniques. It has become an entirely separate discipline and has assumed, at least in certain countries, considerable importance. In addition, different schools of thought have developed and their sometimes contradictory viewpoints are presented at many international conferences, which, if valid conclusions are to be reached from them, required considerable space for discussion. Thus, even by being very concise it was no longer possible to deal with the whole of soil science within the space of one volume, so that a two volume format became a necessity. As soil science is known to have two fundamentally distinct aspects, it has been easy to determine the contents of each volume and also to give each an identity and unity, as well as enabling a different kind of presentation to be made in each case. This book provides the most up-to-date knowledge on water in soils and applications for the best use of our water resources. It first addresses the influence of soils on water quality, which is linked to rock weathering, soil formation, acidity and waterlogging. Here, the constituents of soils – such as clay minerals and iron oxides – play a major role. These modifications also have an impact on biogeochemical processes at the global scale, including the carbon cycle and the composition of the atmosphere. Secondly, this book discusses soil salinity, alkalinity and sodification in climates spanning from Mediterranean to arid. Here, water quality results from the concentration of solutes by evaporation and the transpiration of plants. The proper

management of irrigation both protects soils against acidification and ensures sustainable agroecological development, while improper management leads to soil degradation and groundwater overexploitation. Lastly, the book describes how excess transfer of phosphorus in lakes results from a cascade of liberation and immobilization in the structure of the surrounding landscape. This leads to a general integrative method to limit eutrophication and restore the quality of water bodies. Morphology of soils; Soil micromorphology; Soil composition and characterization; Weathering and soil formation; Pedogenic processes: internal, soil-building processes; Soil environment: External factors of soil formation; Parent material: initial material of the solum; Relief and landscape factors of the soil and its environment; Contributions of climate to the total soil environment; Organisms: biological portion of the soil and its environment; Time as a factor of soil formation; Principles and historical development of soil classification; Modern soil classification systems; Entisols:recently formed soils: Vertisols: shrinking and swelling dark clay soils; In ceptisols: emleryonic soils with few diagnostic features; Aridisols: soils of arid regions; Mollisols: grassland soils of steppes and prairies; Spodosols: soils with subsoil, accumulations of sesquioxide and humus; Alfisols:high base status soils; Ultisols: low base status forest soils: Oxisols: sesquioxide - rihch, highly weathered soils of the intertropical regions; Histosols: organic soils. This book was born as an international tribute to Fiorenzo C. Ugolini, an outstanding soil scientist, now retired from university teaching and research. It is a synthesis of the knowledge of soils, their genesis, functions and management, and includes contributions from leading soil scientists. It provides the basic concepts as well as data and practical examples from across the discipline. The book also discusses the increasingly important role of soils in enabling the preservation of life and contains a rare attempt to cross-harmonize the Soil Groups of the World Reference Base of Soil Resources with the Orders of the Soil Taxonomy. It also considers the possible existence of extraterrestrial soils based on the findings from the last space missions. This volume will be a valuable resource for researchers and students of soil science, soil conservation, geography and landscape ecology. Soil Genesis and Classification, Sixth Edition, builds on the success of the previous editions to present an unparalleled resource on soil formation and classification. Featuring a color plate section containing multiple soil profiles, this text also includes information on new classification systems and emerging technologies and databases with updated references throughout. Covering the diverse needs of both the academic and professional communities, this classic text will be a must have reference for all those in soil science and related fields. Landscapes viewed from afar have a timeless quality that is soothing to the human spirit. Yet a tranquil wilderness scene is but a snapshot in the steady stream of surficial change. Wind, water and human activities reshape the landscape by means of gradual to catastrophic and usually irreversible events. Much of this change destroys past landscapes, but at some times and places, landscapes are buried in the rock record. This work is dedicated to the discovery of past landscapes and their life through the fossil record of soils. A long history of surficial changes extending back almost to the origin of our planet can be deciphered from the study of these buried soils, or paleosols. Some rudiments of this history, and our place in it, are outlined in a final section of this book. But first it is necessary to learn something of the language of soils, of what happens to them when buried in the rock record and which of the forces of nature can be confidently reconstructed from their remains. Much of this preliminary material is borrowed from soil science, but throughout emphasis is laid on features that provide most reliable evidence of landscapes during the distant geological past. This book has evolved primarily as a text for senior level university courses in paleopedology: the study of fossil soils. Masterpiece offers a detailed discussion of the nature of the earth's terrestrial environment, and a method of subdividing and studying it. 1941 edition. Fundamental concepts in pedology. Factors of soil formation. Processes in the soil system. Properties of soil horizons. Nomenclature and classification. Soil classes of the world. Soil classification - a review. Soil relationship. Explores soil as a nexus for water, chemicals, and biologically coupled nutrient cycling Soil is a narrow but critically important zone on Earth's surface. It is the interface for water and carbon recycling from above and part of the cycling of sediment and rock from below. Hydrogeology, Chemical Weathering, and Soil Formation places chemical weathering and soil formation in its geological, climatological, biological and hydrological perspective. Volume highlights include: The evolution of soils over 3.25 billion years Basic processes contributing to soil formation How chemical weathering and soil formation relate to water and energy fluxes The role of pedogenesis in geomorphology Relationships between climate soils and biota Soils, aeolian deposits, and crusts as geologic dating tools Impacts of land-use change on soils The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals. Find out more about this book from this Q&A with the Editors The climate-dependency of the rates and types of soil formation processes on level landforms has been recognized and documented for decades. In contrast, methods for quantifying rates of soil formation and transport on hillslopes have only recently been developed and the results suggest that these rates are independent of climate. One explanation for this discrepancy is that hillslopes and their soil mantles are dynamic systems affected by local and regional tectonic effects. Tectonics can change local or regional baselevel which affects the hillslope through stream incision or terrace formation at its basal boundary. Another explanation is that in most of the world hillslope processes are biotic, and biota and their effects vary nonlinearly with climate. The effects of both tectonics and life can obscure climatic effects. Recent studies have been made to isolate the climatic effect on hillslope processes, but they are few and focus on humid and semiarid hillslopes. In order to isolate the effects of boundary condition, precipitation, and life, I studied pairs of hillslopes in northern Chile in semiarid, arid, and hyperarid climates. In each pair, one hillslope was bounded by an incising (bedrock-bedded), first-order channel, and the other was bounded by a low-slope, non-eroding surface. This precipitation gradient spans the transition from biotic to abiotic landscapes. The guiding framework for this study is a hillslope soil mass balance model in which the soil mass is controlled by the balance of soil production from bedrock and from atmospheric input, and soil loss through physical and chemical erosion. My objectives were to quantify the components of the mass balance model, identify the processes driving soil production from bedrock and soil transport, and interpret this data in the context of climate and hillslope morphology. In the field, I made observations of the processes driving soil formation and transport, surveyed the hillslopes to produce high-resolution topographic maps, and sampled soils and rock for chemical analysis and particle size analysis. Dust collectors were erected to measure atmospheric input. Bedrock and surface gravel samples were collected in order to calculate the rate of soil production from bedrock, the incision rate of the channels, the age of the non-eroding surfaces, and the exposure history of surface gravels using the concentrations of in situ-produced 10Be and 26Al. Rates of physical and chemical erosion were calculated using the soil mass balance model, based on the rate of soil production from bedrock, the atmospheric deposition rate, and the concentrations of an immobile element in the soil, bedrock, and atmospheric input. In addition, to understand the effect of precipitation on the landscape and to quantify the infiltration rate of the soil, sprinkling experiments were conducted in each climate region and infiltrometer measurements were made in the hyperarid region. The effect of boundary condition on soil thickness was observed in all climate zones, with thicker soils on hillslopes with non-eroding boundaries compared to hillslopes bounded by channels. However, the expected effect of boundary condition on the rates of soil production from bedrock, with slower erosion rates on hillslopes with non-eroding boundaries, decreased as precipitation decreased. In contrast to previous work on wetter hillslopes which showed little climatic sensitivity, rates of soil production from bedrock increase with precipitation following a power law, from ?1 m My-1 in the hyperarid region to ?40 m My-1 in the semiarid region. A geomorphic and pedologic threshold was observed at mean annual precipitation (MAP) ?100 mm, marked by changes in soil chemistry and thickness, types of erosion mechanisms, and rates of soil production. In the semiarid region, where MAP = 100 mm, the hillslopes are soil-mantled with a relatively thick, chemically-weathered soil where MAP is high enough to support coastal desert vegetation. Soil formation and transport is primarily through bioturbation. As MAP decreases to 10 mm in the arid region, the hillslopes are nearly soil- and plant-free, and soil transport is through overland flow, rather than bioturbation. In the hyperarid region, where MAP is 2 mm, the hillslopes are mantled with salt-rich soils which are primarily derived from atmospheric input rather than bedrock erosion. Soil transport is through overland flow and likely some salt shrink-swell. The spatially-explicit physical erosion rates were used to test the applicability of four soil transport models. Where bioturbation is active, soil transport is slope- and depth-dependent. In the plant-free regions, soil transport is a function of slope and distance downslope. The transport coefficients in the transport models increase several orders of magnitude with increasing MAP. A comparison of these values with those determined on wetter hillslopes suggests that at MAP100 mm, transport coefficients are a function of MAP. Where MAP100 mm, they are a function of the types of

organisms driving bioturbation and other soil properties. This threshold corresponds to the MAP below which there is a dramatic decrease in net primary productivity (NPP), and suggests that hillslope process rates are sensitive to MAP where the effect of life is small. A unique feature on the hyperarid hillslopes was darkly-varnished, contour-parallel bands of gravels on the soil surface which I call "zebra stripes". Based on cosmogenic radionuclide concentrations in surface gravel and bedrock, as well as salt deposition rates from the atmosphere and content in the soils, I propose that the salt-rich soils began accumulating0.5-1 Ma and the zebra stripes formed in the last 103-105 y. The zebra stripe pattern has been preserved due to the self-stabilization of the gravels within the stripes and the continued absence of life (which would disturb the surface, as seen at the arid site). The accumulation of the salt-rich mantle and the formation of zebra stripes suggest a profound climatic change occurred sometime between the late Pliocene and early Holocene. The Atacama Desert provides a multi-million year-old experiment testing the effect of water and life on geophysical and geochemical processes. In contrast with portions of the planet where biota modulates soil production and erosion through complex and rapid feedbacks, this work shows that the absence of biota in the driest parts of the Atacama Desert results in the rates and mechanisms of geomorphic processes being extremely precipitation-sensitive. This unusual environment, for Earth, illuminates the uniqueness and complexity of a planet whose surface bears the indelible imprint of life. Soil Formation deals with qualitative and quantitative aspects of soil formation (or pedogenesis) and the underlying chemical, biological, and physical processes. The starting point of the text is the process - and not soil classification. Effects of weathering and new formation of minerals, mobilisation, transport, and breakdown or immobilisation of dissolved and suspended compounds are discussed. Soil processes and profiles are discussed in relation to the landscape, the geosphere, and the biosphere. Emphasis lies on the universality of soil-forming processes in past and present, and on the soil as a dynamic entity that forms part of the total environment. Complexity of genetic processes in time and space is given much attention. The text gives many examples from literature and places some in a new light. The reader is guided through the subject matter by a large number of questions and problems to help understand and synthesis the material. Answers to all questions are included. This second edition has been updated to reflect recent discoveries. Printing errors have been corrected, and new photographs support the text. Soil Organic Matter: Its Nature, Its Role in Soil Formation and in Soil Fertility focuses on the contributions of soil organic matter in soil formation and fertility, including weathering, decomposition, and synthesis of humus substances. The publication first elaborates on the main stages in the history of soil humus study and ideas on the composition of soil organic matter and nature of humus substances. Discussions focus on organic substances of individual nature, strictly humus substances in soil organic matter, and humus substances as a complex of high molecular- weight compounds. The text then examines the biochemistry of humus formation, including the role of physical, chemical, and biological factors, origin of humus substances, possible participation of lignin in the formation of humus substances, and the role of oxidizing enzymes in the synthesis of humus substances. The manuscript takes a look at the importance of organic matter in soil formation and soil fertility and the natural factors of humus formation. Topics include the role of organic matter in the weathering and decomposition of soil minerals; role of organic matter in the formation of soil structure; effect of organic matter on the growth and development of plants; and influence of chemical and physicochemical soil properties on humus formation. The publication is a dependable source material for readers interested in the influence of soil organic matter in soil formation and fertility. For the past 200 years, geological scientists have used the present as a key to unlocking the past. This volume continues the tradition by exploring the processes of weathering and soil formation as indicators of the present environment of the Earth's land surface. Examined are the various ways in which this information can be used to interpret past environments which have produced the soils now preserved as paleosols. Because the surface environment of the earth may now be undergoing rapid change (the greenhouse effect), the book is a timely one for those researchers looking for evidence of analogous changes in the Earth's past. The work is divided into three major sections. The first deals with fundamental considerations of weathering, clay mineralogy and diagenesis. The second deals with the formation of soils from various starting materials and in various surficial environments. And the final section is an interpretation of paleosols. This volume provides valuable reading material for graduate and senior-undergraduate courses. This Encyclopedia of Land Use, Land Cover and Soil Sciences is a component of the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Land is one of our most precious assets. It represents space, provides food and shelter, stores and filters water, and it is a base for urban and industrial development, road construction, leisure and many other social activities. Land is, however not unlimited in extent, and even when it is physically available its use is not necessarily free, either because of natural limitations (too cold, too steep, too wet or too dry, etc.) or because of constraints of access or land tenure. This 7-volume set contains several chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It carries state-of-the-art knowledge in the fields of Land Use, Land Cover and Soil Sciences and is aimed, by virtue of the several applications, at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs. The composition of the lithosphere. Weathering. Leaching. New mineral formation. Soil fabric. The process of lateral surface movement. The effect of the biosphere on the processes of epimorphism. The effect of the biosphere on the processes of lateral movement. The factors of soil formation. Pedological provinces. This is a discount Black and white version. Some images may be unclear, please see BCCampus website for the digital version.This book was born out of a 2014 meeting of earth science educators representing most of the universities and colleges in British Columbia, and nurtured by a widely shared frustration that many students are not thriving in courses because textbooks have become too expensive for them to buy. But the real inspiration comes from a fascination for the spectacular geology of western Canada and the many decades that the author spent exploring this region along with colleagues, students, family, and friends. My goal has been to provide an accessible and comprehensive guide to the important topics of geology, richly illustrated with examples from western Canada. Although this text is intended to complement a typical first-year course in physical geology, its contents could be applied to numerous other related courses. This book is an introduction to soil science and describes the development of soils, their characteristics and material composition, and their functions in terrestrial and aquatic environments. Soil functions include the delivery of goods and services for human society, such as food, clean water, and the maintenance of biodiversity. This concise yet comprehensive text is supplemented throughout with colour illustrations, diagrams, and tables. It is ideal reading for all those looking to understand soils, their functions, their importance in terrestrial and aquatic environments, and their contribution to the development of human society. It will provide a valuable resource for teachers, practitioners, and students of soil science, agriculture, farming, forestry, gardening, terrestrial and aquatic ecology, and environmental engineering. For much of history, soil has played a major, and often central, role in the lives of humans. Entire societies have risen, and collapsed, through the management or mismanagement of soil; farmers and gardeners worldwide nurture their soil to provide their plants with water, nutrients, and protection from pests and diseases; major battles have been aborted or stalled by the condition of soil; murder trials have been solved with evidence from the soil; and, for most of us, our ultimate fate is the soil. In this book Richard Bardgett discusses soil and the many, and sometimes surprising, ways that humanity has depended on it throughout history, and still does today. Analysing the role soil plays in our own lives, despite increasing urbanization, and in the biogeochemical cycles that allow the planet to function effectively, Bardgett considers how superior soil management could combat global issues such as climate change, food shortages, and the extinction of species. Looking to the future, Bardgett argues that it is vital for the future of humanity for governments worldwide to halt soil degradation, and to put in place policies for the future sustainable management of soils. Masterpiece offers a detailed discussion of the nature of the earth's terrestrial environment, and a method of subdividing and studying it. 1941 edition.

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