



Deserts and desert environments, by Julie Laity, 2008. Wiley-Blackwell Publications, Chichester, United Kingdom (order though: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-157718033X.html>). Paperback, 360 pages. Price USD 64.99; EUR 37.40; GBP 32.50. ISBN 978-1-57718-033-3.

Deserts are one of the most intriguing sedimentary environments. In spite of several interesting sedimentological works about this environment, they are, however, commonly dealt with in connection with intensive aeolian processes and the resulting relief forms. It should be realized, however, that the present-day deserts are due to climate changes in the past in combination with currently active processes. Consequently, they represent one of the most complex and least known ecosystems on Earth. The book under review presents the deserts as coherent complex ecosystems in an excellent way, and can simultaneously be considered a compendium on desert sedimentology and geomorphology. Especially valuable is the explanation of all aspects of the hydrological processes that are active in deserts, and of the interactions between the geology, geomorphology, climatology, biology (including human interventions) and hydrology that take place within desert environments.

Not only general information about desert processes and relief forms is provided, but very detailed topics are discussed as well. It is highly fortunate that the author uses numerous examples from all over the world when dealing with the various aspects. This makes the information truly interesting and is of great help for the understanding of the processes that affect deserts. Additionally, the author presents case studies which show important and sometimes even spectacular changes that occurred in dry areas during the last few decades; the sections on 'The waters of Niger-Euphrates Basin and the impact of modern water management' (pp. 94-97) and on 'Borrego badlands, California' (pp. 144-145) are good examples of this approach.

It is worth while to mention here that the book presents results of modern research. The huge bibliography contains 1141 works, 300 of which postdate 2000. Significant progress concerning deserts environments was obtained in the past decade, including detailed information about past climate changes. This facilitates a better understanding of the development of currently dry environments.

The book is subdivided into 13 chapters which can be grouped in 5 themes. The first theme is an introduction to the topic; this is covered by Chapters 1 and 2. Chapter 1 gives basic information on desert locations as well as indices of aridity. It presents general data on desert development and indicates the problem posed by human influence on desert environments. Chapter 2 details the largest deserts of the various continents, explaining the different factors that influence their origin, evolution, relief forms and processes that shape deserts.

The second theme is covered by Chapters 3 and 4. They deal with the climatological and hydrological conditions that characterize arid environments. Chapter 3 ("The climate framework") presents information about the various complex climate aspects, starting from weather data and the difficulties posed by their collection; then it describes the surface boundary layer, surface and subsurface temperature, albedo, precipitation variability, wind, etc., giving excellent examples of high-intensity events. Additionally, the effect of urbanization on the quality of the desert atmosphere and on the formation of heat islands is analysed, with examples from all over the world. An important aspect mentioned here is the variability of the desert climate in time and space, with examples dealing with the El Niño Southern Oscillation (ENSO), one of the most prominent large-scale climatic disturbances in the oceanic/meteorological system, and with the expansion of the Sahara desert. Chapter 4 ("The hydrologic framework") deals with deserts as regions of hydrological extremes, which is important for the recognition and understanding of the processes operating in hot deserts. The complex hydrological characteristics of desert areas are described in a detailed way, with attention for surface hydrology (water balance, precipitation, interception, evapotranspiration, infiltration) and subsurface hydrology (groundwater, subsurface flow and springs). Much attention is paid to surface runoff and floods. This chapter also emphasizes the problem of water resources in dry areas.

The third theme regards the processes operating in areas with different relief (Chapters 5-10). Chapter 5 examines the development of past and present lake systems in the arid environments. Such

systems are integral parts of the surface-drainage network. This chapter is therefore broken up into three parts: modern lake systems, paleolake systems, and lakes of the arid environment worldwide. The first part presents the classification of desert lakes, the processes involved, the hydrological budgets and the processes of playa degradation. All aspects are supported by excellent examples from all over the world. The second part only mentions paleolakes as important information sources for paleoclimatic changes at a regional and global scale. A more detailed description of the unique characteristics of desert lakes in specific regions is given in the third part of this chapter.

Chapter 6 (“Weathering processes and hillslope system”) contains detailed information about the types of rock weathering, weathering forms and the nature of hillslope processes operating in deserts. Much attention is paid to duricrusts and desert varnish, including their characteristics and the terminology. Chapter 7 concerns desert soils and geomorphic surfaces. Characteristics of the various present-day soil types are presented as well as the relicts of Pleistocene and even older ones. Several widespread surface types, including desert pavements and soil crusts, are also described. Water, being a highly important geomorphological agent, is (together with relief forms resulting from water flows) presented in Chapter 8 (“Water as a geomorphic agent”). It is explained that deserts environments are particularly influenced by surface runoff and subsurface erosion (e.g. seepage erosion associated with sapping). This chapter presents also extreme features related to fluvial processes. Chapters 9 and 10 present eolian processes and associated landforms. The basic eolian processes responsible for the movement of particles are described in a well understandable way. Much attention is paid to depositional landforms (sand sheets and dunes) as well as to the classification and characteristic landforms resulting from wind erosion. This chapter also deals with desert dust and its role in the desert environment.

The fourth theme of the book includes Chapters 11 (“Plant communities and their geomorphic impacts”) and 12 (“Animal communities”), which deal with the role of flora and fauna in desert environments. These two aspects are rarely mentioned in earth-scientific literature about deserts. There is nevertheless a close relationship, for instance with respect to the plants’ and animals’ adaptation to the harsh conditions (such as limited water, salty soils, high temperature and solar irradiation).

Chapter 13 (“Desertification and the human dimension”) can be considered as representing the fifth theme of the book. It starts with the terminology related to desertification and shows different approaches towards this phenomenon. Furthermore, it presents the probable causes of problems such as climate change and anthropogenic influence on desertification.

All chapters of the book are preceded by a short introduction, which is very useful. The book is richly illustrated in the form of both black-and-white and colour photos (but the colour figures duplicate the black-and-white ones!), graphs and diagrams. Only the maps should have been prepared with a better quality. Taken all together, the book can be recommended to graduate students and researchers dealing with deserts; sedimentology is certainly not the main topic, but much information is very useful to increase the insight into the conditions that control the sedimentological processes in this environment.

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