

## **BOOK REVIEW: KARSTOLOGY: KARSTS, CAVES AND SPRINGS: ELEMENTS OF FUNDAMENTAL AND APPLIED KARSTOLOGY**

Eric Gilli; CRC Press, Taylor & Francis Group, Abingdon, UK 2015, 256 p., hardcover, 6.2 × 9.2 inches, hardbound \$63.99, eBook \$44.79. hardbound ISBN 9781482243154, e-book ISBN 9781482243161

This book by Prof. Eric Gilli of the University of Vincennes, Paris, was originally published in French as *Karstologie—Karsts, Grottes et Sources* (2011), Dunod Editeur, Paris. The reviewed English version (2015) was translated by Chloé Fandel, Department of Water Resources, University of Arizona.

Karstology is a field that combines geomorphology, geology, hydrogeology, engineering, paleontology, archeology, and climatology. However in France, it is traditionally considered a subtopic of geography. This book contains 22 chapters, as well as an introduction and bibliography. It gives a good representation of the field, with many color images, and explores a wide range of topics from the viewpoints of surface and underground morphology, as well as time. It covers many karst areas, although many world-famous examples are not included.

Chapters 1 and 2 introduce definitions, principles, and the history of karst science. Many authors consider Cvijić to be the founder of modern geomorphic and hydrologic karst studies in the late eighteenth and early nineteenth centuries (Ford, 2007). But Gilli regards Hacquet in the late eighteenth century to be a more valid candidate on the basis of his several books on karst written in 1778–79.

Chapter 3 concerns carbonate rocks. The coverage is not as comprehensive as that of Ford and Williams (2007). From the book title, one might expect greater attention to this topic.

Chapter 4 covers the process of dissolution and other relevant factors, and Chapter 5 introduces karst surface forms such as karren, dolines, and poljes. Gilli divides the factors affecting karst landforms into five categories: structural, topographic, pedological (soil types), meteorological, and biological. The more common classification of these features as given by Bögli (1980) and Ford and Williams (2007) receives limited coverage.

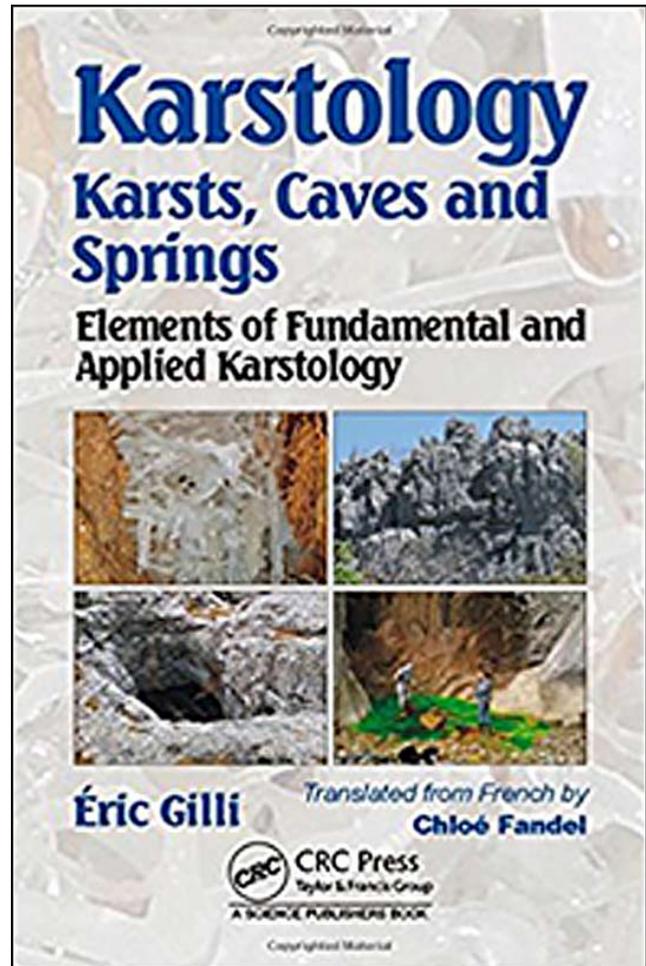
In Chapter 6, karst landscapes in various climates are considered. Caves and other underground karst features are divided between two chapters, 7 and 10. In addition, Chapters 11, 12, and 14 about aquifers could have been combined into a single chapter. In view of the growing interest in coastal karst, Gilli has covered this topic in a separate Chapter 14 on coastal and submarine karst aquifers.

Chapter 13 on water use, management, and risks in karst areas, is very important. Given the fragility of karst areas, improper use of land and water resources has caused many problems in karst regions. In Chapter 15, land management in karst is the main issue. Many examples are given of land subsidence and dam failure in various karst areas of the world, and methods of detecting them are described, such as the use of radar tracking.

This book gives greater attention to tourism in karst and caves than do other general books on karst. In recent years, tourism in karst areas has been an increasing consideration, and its importance is emphasized in Chapter 16. This chapter is limited only to caves, although surface karst forms are also important for tourism. Many tourist caves in the world are described, but there are no photos of dramatic surface karst such as tower karst in southeastern Asia. Damage to caves by tourists and amateur cavers is mentioned only briefly.

In Chapter 17, mineral resources in karst are described. Traditional resources such as bauxite and guano are covered, but the greatest attention is given to hydrocarbon resources in karst. A minor omission is travertine, which is widely used as building stone.

Chapters 18 and 19 concern thermal springs and paleokarst respectively. They are only 2 and 21 pages long, and



their topics could probably have been included in other chapters. Discussions of paleokarst and paleo-caves are also in Chapters 7, 8, and 10. Methods for determining relative and absolute ages are described, such as paleomagnetic and isotopic techniques. The consequences of climate change in karst areas are described, with the example of growth and destruction of the Maya empire.

Chapter 20 includes a discussion of two karst systems in France, with special attention to geodesy and rock deformation. Chapter 21 gives a brief coverage of the paleontology, archeology, and biology of karst environments, especially caves. The topics of “cave men” and extremophiles are included in this chapter, although the world-famous archaeological cave site, Shanadar in Iraq, is not included.

Chapter 22 ends the book with a discussion of the importance of karst studies and modern perspectives of karstologists on topics such as microorganisms in speleology, karst systems, and speleogenetic modeling.

Unlike the Ford and Williams book, which gives more attention to surface landforms, Gilli emphasizes karst groundwater and caves. His book covers mainly karst in limestone, while omitting other types of karst, such as evaporite karst and pseudokarst. The book would also have profited from additional information about natural and anthropogenic hazards in karst areas. Given the importance of this subject, I think it deserves a separate chapter. However, a very useful topic included in this book is a list of important questions in karstology that are still open.

From the book’s title, one would expect it to include examples and illustrations of the various karst regions throughout the world, but there is a strong emphasis on France and other European countries. However, the main goal of this book is to emphasize the fundamentals of karstology. References could have been given to literature that provides more detailed information on other related fields and geographic areas. Unlike many recent books, this one does not list the names of people and places in the index, so it is difficult to find them in the book.

Each chapter in this book should be of interest to students and professionals. They will be valuable to geographers, geomorphologists, geologists, hydrogeologists, speleologists, and land-use managers, as well as students at many levels from bachelors to PhD and post-graduate. It follows the strict conventions of academic and scientific writing, but is also clearly written, and the topics are easy to apply. Although the Ford and Williams book (2007) will probably remain the professional standard for many decades, this new book by Gilli can serve as a helpful guide for karst researchers at many different levels now and in the future.

## References

- Bögli, A., 1980, *Karst Hydrology and Physical Speleology*: Berlin, Springer Verlag, 284 p.  
 Ford, D.C., 2007, Jovan Cvijić and the Founding of Karst Geomorphology: *Environmental Geology*, v. 51, p. 675–684.  
 Ford, D.C., and Williams, P., 2007, *Karst Hydrogeology and Geomorphology*: Chichester, U.K., Wiley & Sons, 562 p.

Reviewed by:

Reza Khoshraftar,

Department of Geography

University of Zanjan, Iran