

Márton Veress: Karst Environments: Karren Formation in High Mountains. Springer Verlag, Dordrecht–Heidelberg, 2010. 230 p.

In mountains of higher elevation the characteristic environmental properties (lower temperature values and higher precipitation amounts, the proximity of glaciers, enduring snow cover or simply the frequent occurrence of bare rock surfaces) modify the karstification process and produce particular assemblages of karst features.

Author's investigations on karren (lapiés) in high-mountain environments date back to almost two decades. His findings were published in Hungarian in 2007. The book, used widely as a university text-book, is now made available in author's translation into English for the international public.

Following a brief historical overview of geomorphological research in high-mountain karst regions, the major characteristics of high-mountain karstification are briefly presented and illustrated with a general figure showing the distribution pattern of landforms. This figure is a good "appetizer" for a long series of carefully designed and drawn block diagrams and profiles, which are closely integrated into the text. Further chapters deal with the nature and rate of karren formation and classify the contributing factors (water runoff and rock structure) distinguishing altitudinal zones according to the presence or lack of vegetation (the pine zone, dwarf pine zone and bare rock zone). The diversity of forms is illustrated with examples from author's study areas: the Julian Alps in Slovenia, the Totes Gebirge and the Dachstein in Austria and the Asiago Plateau in the southern range of the Italian Alps. The variable densities of feature occurrence challenge interesting explanations.

Veress typically favours minute classification as the basic approach to the description of individual features: the morphological properties of rillenkarren, trittkarren, and particularly rinnenkarren are all meticulously characterized and typified. Equally great attention is devoted to karst features originated by seepage. Soe subtypes are identified and denominated in the English language for the first time. For exactly this reason their name may not be perfectly selected but the illustrations (cross-sections, block diagrams and colour photographs) help the reader recognize them and find their equivalent in their own study areas.

Although a good proportion of karren are of complex origin, such features are often neglected in karst literature. Naturally, their classification involves the greatest difficulties. Author handles this problem in combination with another typical property of karren features: that they often do not occur individually but join in assemblages. Such assemblages can be particularly well studied on glacially eroded surfaces: in glacier valleys and on slopes. The latter topic, karren formation on high-mountain slopes provides an excellent opportunity for the presentation of the local zonality of features. Veress describes in detail how karstification processes influence general slope development.

Another major issue treated in the book is the combination of karren features, how they coalesce to form complex morphological units. The causes which lead to establishing connections between karren features are diverse. The findings of their detailed analyses are shown in clearly drawn profiles and map representations. Finally, a comprehensive holistic approach, the karren cell concept, is put forward to provide a common framework for the ideas initiated by author and elaborated by his students on the dynamics of karren formation and on the zonation of features.

This succinctly but precisely written monograph should appear on the reading list of all geomorphologists involved in the research of high-mountain karst regions. It is also useful for any geographer who guides field trips of students to the karst mountains of Central Europe.

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