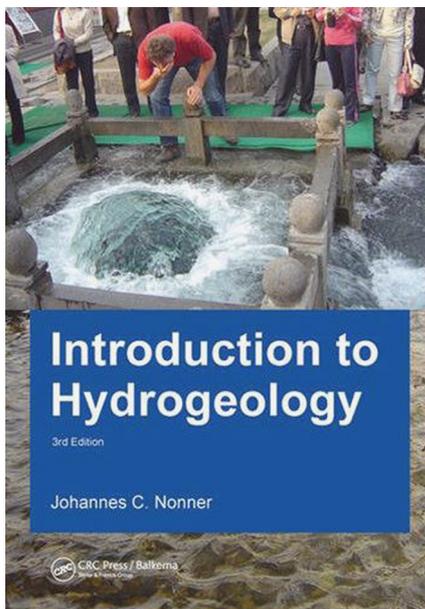


Book reviews

Introduction to hydrogeology, by Johannes C. Nonner, 2015. CRC Press/Balkema, Taylor & Francis Group, London, UK. 263 pages. Hardcover price £39.99, ISBN 978-1-138-02890-6 (paperback edition).



The science of groundwater is captivating on account of the clandestine nature of the element under study, often concealed and challenging to access, while simultaneously being pivotal in determining life on Earth. As noted by the author on the cover of the present tome, groundwater constitutes of the world's most critical resources. Hence, it is imperative to cultivate interest among young people in this extraordinary scientific domain to foster a deeper comprehension of the environment that surrounds us. But, how to do this? Naturally, by writing good text books on the subject. Accessibility to such resources is abundant, with numerous authors in various languages producing texts with significant pedagogical potential. There are many hydrogeologists who have grasped fundamental knowledge from such sources.

And such a volume has been written by Johannes C. Nonner, who undoubtedly has extensive experience in hydrogeological research, having been involved in groundwater consulting and

training assignments around the globe. The success of this text warrants examination. The organisation and subdivision of content into chapters adhere to well-established and effective patterns. Thus, we move on from general information, a description of the relationship between rocks and groundwater to the principles of filtration with basic formulas, after which we learn about the concepts of water balance, problems of forming the chemical composition and, finally, about groundwater management and resource evaluation. The content is accessible, effectively encapsulating crucial aspects of hydrogeological research.

In Chapter 1, general information and basic definitions, historical background, as well as assumptions regarding the processes of water circulation in nature with reference to surface water systems, unsaturated zone and groundwater systems can be found. Chapter 2 delves into the physical properties of the rock medium, filtration parameters and explanation of aquifer typology and aquifer systems in various rock formations. In addition, the main groundwater investigative methods are described. Chapter 3 focuses on deriving governing equations for groundwater flow. All derivations are presented in a clear way, starting with Darcy's law, linking to the continuity equation and finally presenting the application of these formulas to groundwater flow calculations. Of course, there is also a thorough discussion of important issues such as the concept of hydraulic head, flow rate and velocity, regional flow or flownet analysis. In addition, several pages are devoted to numerical modelling of flow, explaining the basics of model construction and the results possible to obtain. A significant part of this chapter also concerns the concept of local flow, flow to a well and the method of its interpretation. The next chapter is simply entitled 'Water Balances', and it is such a key issue for understanding the water cycle that it deserves special treatment, although the focus is, of course, on groundwater balances.

Although the most important part is the one devoted to methods of groundwater balance estimations, it is equally interesting to read about the balances for various environments in terms of climate and geology. In chapter 5 hydrogeochemical topics are presented, from principles of solute formation, transport and groundwater contamination to chemical processes in groundwater, including all important reaction equations. Moreover, the relationship between groundwater chemistry and the rock environment is summarised. The next chapter, chapter 6, explores water management issues, emphasising the role of groundwater in supply systems and identification methods, especially within the context of monitoring. At the end of this section studies of groundwater resources are described, both in regional and local aspects, not forgetting the methodology for groundwater availability assessments.

The present text book concludes with a section featuring exercises and problem-solving scenarios, thus enhancing our understanding through practical application. Following these examples and explanatory drawings, it is not difficult to find out the result for yourself. There is even an example of numerical modelling of a simple aquifer system, which

is something I particularly like. If anything could have been added here, it would revolve around more interesting examples to inspire students.

Furthermore, the work is interestingly illustrated, often schematically without excessive detail, which makes it easy to read and understand the issues described. The figures and photographs from diverse geographical regions enhance comprehension and provide context to the various environments where groundwater phenomena occur.

The author's objective, as stated on the cover, to render groundwater "visible" to the reader, is undeniably achieved. Consequently, this text book is a valuable resource for individuals seeking to delve into the realm of hydrogeology, offering insight into methodologies employed for assessing and preserving groundwater resources. It is highly recommended to both students and professionals alike, serving as a comprehensive reference in the field. I shall certainly include it as an important source of information for my students.

*Jacek Gurwin
Wrocław University, Poland
e-mail: jacek.gurwin@uwr.edu.pl*