

Book Review: An Introduction to Mine Hydrogeology by Pradipta Kumar Deb

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An Introduction to Mine Hydrogeology by P. K. Deb was recently published by Springer (ISBN 978-3-319-02987-0, 54 p., 12 illustrations with 3 in color). This book is a part of the Springer Briefs in Water Science and Technology Series (Fig. 1), which attempts to present concise summaries of cutting-edge research and practical applications of water science and technologies. As its title advertises, the book discusses some basic but important issues of mine hydrogeology, and in the process, introduces some mining projects in India. This book is a worthwhile addition to the literature and potentially of great value to mining professionals, new mine hydrogeologists, and students. The mining hydrogeological investigations and mine water management case studies in various mines of India can be useful to practitioners in other countries facing similar issues.

The book consists of eight chapters and two appendices. A short, useful reference list is provided at the end of each chapter. However, these references are quite old, and should have been supplemented with more recent literatures. The book covers a wide range of topics in mine hydrogeology, including descriptions and purposes of hydrogeological investigations in mining areas, work that should be done in such investigations, remediation measures that can be taken to deal with mine water pollution, and some Indian case studies. The book is quite easy to

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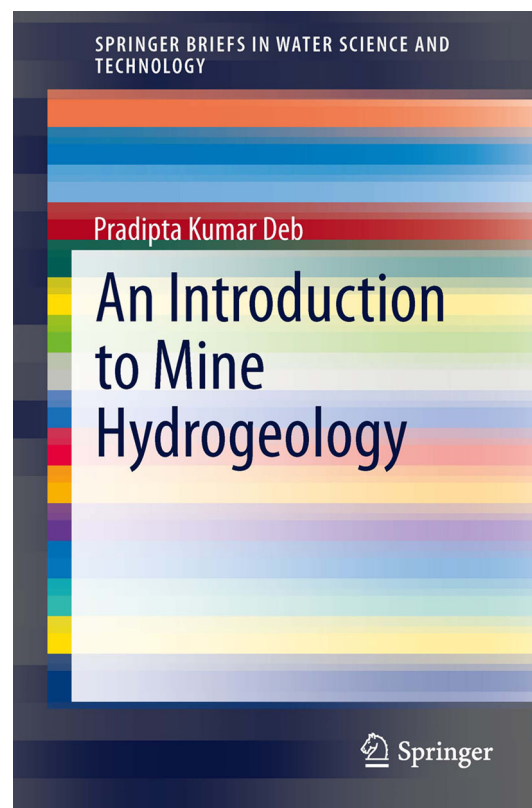


Fig. 1 Book cover of *An Introduction to Mine Hydrogeology*

read and understand, and will help students gain a basic knowledge of mine hydrogeology.

Chapter 1 starts with an introduction to world groundwater availability and groundwater scenarios in India. Then it introduces the hydrological and hydrogeological conditions at four Indian mines to provide some basic information for the case studies provided in Chapter 7. The purposes of hydrogeological investigations in mining areas and the

potential environmental impacts of mine excavation are also briefly summarized. Chapter 2 focuses on what should be implemented in a groundwater investigation and in what ways the hydrogeological studies can be used. It is only a summarized introduction, which may seem superficial to senior hydrogeologists and researchers, but would still be valuable to students, regulators, and some practitioners. A weakness of the chapter is that the figures are not of high quality. Fig. 2.1 is of low resolution, and the tick labels, axis titles, and legends in Fig. 2.2 cannot be easily distinguished. This drawback is common throughout the entire book.

Chapter 3 focuses on pumping tests and aquifer parameters that are important in hydrogeological investigations. Pumping tests carried out in exploratory wells (step drawdown and aquifer performance tests) are introduced and appropriate parameters are described. Unlike professional books in groundwater hydraulics and aquifer tests that usually contain detailed introductions of pumping tests and theoretical derivations of equations for solving groundwater flow during pumping, this chapter provides only a general introduction to the pumping tests carried out in Indian hydrogeological investigations, with only five references listed at the end. In my opinion, the author should have cited more literature and provided supplemental references for interested readers.

Groundwater quality is just as important as its quantity. Groundwater quality studies in mining areas should focus on providing safe drinking water to miners and nearby villages, and reducing contaminant loads to avoid polluting the surrounding environment. In Chapter 4, the author provides tables showing part of the WHO drinking water standards (Table 4.1) and some groundwater quality parameters in Nongkheih (Table 4.2). An odd thing with the tables is that most of the parameters listed in Table 4.2 do not have corresponding standards in Table 4.1. Then, rather than the WHO standards, the author compares these parameters with Indian standards that are not provided, which makes it even stranger.

Chapter 5 introduces the two basic methods of mining: open cast mining and underground mining. The choice of method depends on many factors, such as geological, hydrogeological, technological, geotechnical, and environmental conditions. This chapter provides a rather basic knowledge of mining methods, mining procedures, and mining equipment, which is essential for new mine hydrogeologists, students, and for those who are interested in mine hydrogeology, but have little knowledge in this field.

The following chapter (6) discusses the environmental impacts of mining on the hydrological regime and

remediation options. Although the impacts of mining on hydrogeology and surface water hydrology are site specific, this chapter lists some common impacts on local hydrogeology, and generally discusses some instructive engineering measures that have been used to deal with water pollution in mining areas. For example, the author describes how deep wells were constructed by the mining authority as a short term measure to supply potable water to villagers to cope with mine water pollution from opencast coal mines in West Bengal, India.

Chapter 7 consists of two parts; the first part discusses the purposes of mine hydrogeology and environmental impact assessments, while the second describes three Indian case studies. The first part is an extended version of 1.4 and 1.5, which is acceptable and may be beneficial for readers, but it also contains material discussed in chapter 6, which is unnecessary. The three Indian case studies may be potentially useful to mine hydrogeologists in other regions, but they all focus on water quantity, totally neglecting water quality. What were the consequences of such water management frameworks depicted in the cases to water quality?

The concluding chapter of the book (Chapter 8) summarizes the main contents of the book. It would have been much better if some perspectives on mine hydrogeology development had been provided so that young mine hydrogeologists could clearly understand what they need to do to further advance the field. Appendix 1, listing the geological time scale, is of potential value to readers, because this information is quite often referred to in hydrogeological studies. Appendix 2, showing unit conversion factors, is unnecessary in my opinion, because they are quite irrelevant in hydrogeological studies and can be found easily on the web. More important knowledge that is not contained in the book, such as useful equations for calculating hydrogeological parameters, should have been included instead.

Overall, this book, which by its introductory nature is limited in terms of the depth and breadth of the topics it addresses, is still a worthwhile addition to the literature and a potential asset to mine hydrogeologists, practitioners, and students who are or will be involved in mine water management and hydrogeological studies in mine areas. It communicates some basic but useful and important knowledge in mine hydrogeology to readers, and shares some valuable experiences in mine water management and mine hydrogeological studies. I recommend the book to mining engineers, students, and policy makers as a good introduction to the field.