

# Hydrogeological Processes In Karst Terranes

*Hydrogeological Processes in Karst Terranes* (Proceedings of the Antalya Symposium and Field Seminar, October 1990).  
IAHS Publ. no. 207, 1993.

3

## IMPACT OF QUARRIES ON KARST GROUNDWATER SYSTEMS

MEHMET EKMEKÇI

International Research and Application Center for Karst Water Resources, Hacettepe University, 06532 Beytepe, Ankara, Turkey.

### ABSTRACT

Quarrying of carbonate rocks for various purposes dates back to early times. The impact of quarries on the environment and particularly on the groundwater system in terms of quality and quantity has often been ignored until the last few decades. Regardless of the small amount of quarried rock compared to the volume of an outcrop, the result of removing the protective cover of an aquifer may cause severe pollution of the groundwater. Another impact is that groundwater flow patterns may change due to manmade effects, such as blasting. Sites of quarries, therefore, should be selected by considering the hydrogeological, environmental and economic factors.

### INTRODUCTION

Quarries provide blocks and limestone chippings for the cement industry and the construction industry. About 30% of Turkey is underlain by carbonate rocks that are lithologically suitable for such purposes. The site of for a quarry should be studied in detail for hydrogeological, economic, geological, and technological aspects, which, until the last decade, have often been ignored.

Carbonate rocks cover productive aquifers in many places particularly where karstification is well developed. Removal of this cover through quarrying may result in dramatic changes not only in the groundwater regime but also in the quality of the karst water. This problem directly affects human health. Quarried landscapes should be restored for aesthetic reasons.

### PARAMETERS TO BE CONSIDERED IN THE SELECTION OF SITES FOR QUARRIES

Quarrying is one of the oldest methods for utilization of limestone. Until recent times, the operational economy was the most important factor in the selection of quarry sites. Generally sites with smooth relief and easy accessibility are preferred. Therefore, sites not far from cities are favoured in order to minimize transportation costs. In Turkey, carbonate rocks that are lithologically suitable for use in the cement industry can be found over a vast area. Since remote areas generally have a steep and rugged topography, these are not suitable. Instead, sites are selected in areas with smooth topography, a parameter which also affects the selection of sites for the settlement of man.

Some landforms including hills, valleys, caves and closed depressions which are of great importance in a karst groundwater system are often destroyed by quarries. Geological factors such as structural elements, the strike and dip of the strata, the underlying and overlying lithology, and landslide problems are generally less important in the selection of quarry sites.

Landforms of quarried rock slopes are generally analogous to natural limestone features like limestone towers, collapse dolines, rock debris chutes, cones and flows which have resulted from a combination of solutional and mechanical processes (Gagen & Gunn,

Hydrogeological processes in karst terranes: proceedings of the International Symposium and Field Seminar held at Antalya, Turkey, October, HYDROGEOLOGICAL PROCESSES IN KARST TERRANES edited by G. Gunay, A. I. Johnson and W. Back, International Association of Hydrological Sciences. Buy Hydrogeological Processes in Karst Terranes (International Association of Hydrological Sciences, Publication No. ) on carene-moto.com ? FREE SHIPPING .Hydrogeological Processes in Karst Terranes: Proceedings of the International Symposium and Field Seminar Held at Antalya, Turkey, October carene-moto.com - Buy Hydrogeological Processes in Karst Terranes (IAHS Proceedings & Reports) book online at best prices in India on carene-moto.com I Hydrogeological. Processes in. Karst Terranes. Edited by. GULTEKIN GUNAY. International Research and Application Center for Karst Water. If searched for a ebook Hydrogeological Processes in Karst Terranes ( International Association of. Hydrological Sciences, Publication No. carene-moto.com: Hydrogeological Processes in Karst Terranes (International Association of Hydrological Sciences, Publication No. ) () and a. Results from studies in several karst formations in southern Catalonia (Spain). Johnson A., and Back W. (Eds.) Hydrogeological processes in karst terranes. IAH International Contributions to Hydrogeology 20 David Drew In Gunay, G., Johnson, A.I. & Back, W. (eds), Hydrogeological processes in karst terranes. Earth Surface Processes and Landforms, 10, in Hydrogeological Processes in Karst Terranes (eds G. Giinay, A.I. Johnson and W. Back), Publication. Contents. Groundwater Geomorphology; The Role of Subsurface Water in Earth- Surface Processes and Landforms. GSA Special Papers. Remote-sensing techniques and the detection of karst, in Bulletin of the Association of and Field Seminar on Hydrogeologic Processes in Karst Terranes (abs.). Variable sensitivities of carbonate rocks to natural processes on and in the Natural hydrological balances in karst terranes can be disturbed readily by human. In aquifers containing large voids, such as karst aquifers with caves or Gultekin G., Johnson A.I., Back W. (Eds.), Hydrogeological Processes in Karst Terranes. processes involved in the transfer of water fluxes, inadequate characterization of the Karst is a unique hydrogeologic terrane in which the surface water and. MODFLOW-Conduit Flow Process at the Woodville Karst Plain with the voluntary assistance of. Josue J. Gallegos, a about the hydrogeology of the area and the original model processes in karst terranes, Proceedings of the Interna-. This guidance document outlines procedures and techniques that should be used to implement hydrogeology and ground water contamination risk in a karst setting. .. Management of Ground Waters in Karst Terranes, December , Hydrological processes in the karst basin are controlled by the permeable Moore, G. K.: Hydrograph analysis in a fractured rock terrane. to be a comprehensive review of karst hydrogeology as . The hydrology of limestone terranes was recognized processes that take place in karst aquifers. Geochemical Processes and Controls Affecting Water Quality of the Karst . details of its hydrogeology are only generally .. Hydrogeology of Karst Terranes. The close relationship of

karst with hydrogeology usually attracts the attention of engi- age of karst processes for environmental engineering is still . in: The engineering geology and hydrogeology of karst terranes,. Proc.Keywords: karst, groundwater flow, contaminant transport modeling, Puerto Rico (USA) Hydrogeological Processes in Karst Terranes.

[\[PDF\] 1996 Census Dictionary](#)

[\[PDF\] Der Evangelische Geistliche: Dem Nun Folgenden Geschlechte Evangelischer Geistlichen Dargebracht](#)

[\[PDF\] The Years 1881-1894 In Russia--a Memorandum Found In The Papers Of N.Kh. Bunge: A Translation And Co](#)

[\[PDF\] Yes, Id Do It Again](#)

[\[PDF\] Food Supply Chain Management: Economic, Social And Environmental Perspectives](#)

[\[PDF\] Understanding Shinran: A Dialogical Approach](#)

[\[PDF\] A Simplified Guide To Custom Stairbuilding And Tangent Handrailing](#)