

Chapter 4.

Outcrop groundwater prospecting, drilling and well construction in hard rocks in semi-arid regions

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ABSTRACT

This chapter presents some recommendations for prospecting, drilling and well construction in hard rocks in semi-arid regions. Considering that these conditions are present in many countries where technology is not always available, the chapter concentrates on the most basic and simple methods to plan where best to drill and maximize success through the direct observation of rock types, weathering and fracturing. The advantage for the geologist and hydrogeologist in an arid or semi-arid environment is that vegetation is normally scarce and the weathering layer thin, allowing a direct view of the rock in circumstances impossible in other climate regions of the world. The close observation of the weathering material, and especially of the fracture network, mainly the fracture density, dip, extension and interconnection, can provide important information for a field hydrogeologist who can then plan the best place for drilling. The most appropriate drilling technique, if available in the area, is rotary percussion, also designated as down-the-hole drilling, with drilling rates that can achieve 100 m per day in normal circumstances. This allows a well to be constructed in about two days, essential in the case of disaster relief. Finally, some information is given about well construction, careful planning of the work, protection to preserve the water quality, avoiding problems of partial or total collapse of the hole during construction or of the well and after completion, and how to avoid direct contact between the surface or sub-surface waters with the aquifer along the walls of the well to protect the well and the aquifer against contamination.

(The full document is available in the book – You can contact the author: achambel@uevora.pt)