



The water circulation in the fractured rock: the role of stylolites in the development of karst

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Karst development is strongly influenced by the tectonic deformation of the area where they occur. This is because, the structure of the rock mass in which it occurs (eg. lithology, primary porosity, environmental conditions, etc) affects the water circulation, thereby affecting permeability and porosity. Traditionally, in the field of karstology, it is maintained that water circulation is essentially related to extensional structures which, it is assumed, are more favorable to water circulation. In fact, the permeability of the fault zone is sufficiently high only in the early stages of the movement, because after a short period the deposition of minerals (e.g., calcite) coming from these same fluids reduces its porosity/permeability. Fault zones and fractures play an important role in fluid circulation, acting as permeability barriers or conductors, depending on the specific conditions (lithological and structural in particular), and on the distribution of other structures associated with them. Therefore, structural analysis can provide both qualitative and quantitative assessments of the relationship between structure and fluid circulation and allow us to determine whether a fault zone acts as a barrier or as a hydraulic conductor (Caine 1996). The stylolites (Rawling 2001), structure associated with the faults play an important role in the fluid circulation and in particular in the development of the karst. In this study, conducted in the karst area of Fasano (south Italy) it was verified that the karst tends to develop along tectonic stylolites formed by compression.

The analysis performed (structural, XRD, on permeability) are allowing us to take the first considerations on the importance of stylolites in the development of karst. The relationship between stylolites, karst and fluid circulation is nowadays very important and of great interest in the study of carbonate reservoirs.

Indeed, the aquifers represent about 40% of sources of drinking water and their importance will increase in coming years due to the progressive deterioration of the quantity and quality of groundwater as a result of phenomena exploitation and pollution. Therefore, the future water supply will be increasingly dependent on these sources, so the importance of these studies.

Currently we are continuing to work on this in other areas Italian and Swiss.

REFERENCES

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