Geophysical Research Abstracts
Vol. 12, EGU2010-1879, 2010
EGU General Assembly 2010

Negative effects of land-use changes in the karst setting of Apulia, southern Italy

Mario Parise

Institute of Research for Hydrogeological Protection, National Research Council, Bari, Italy (m.parise@ba.irpi.cnr.it, +39 080 592 9611)

Apulia is an almost entirely carbonate region in south-eastern Italy, representing the heel of the boot-shaped Italian peninsula. Due to its location in the heart of the Mediterranean basin, and its geographical configuration, which in some way connects the Italian territory to the eastward lands, it had a long history of human settlements, as shown by the many remarkable prehistoric findings that have been recorded in this area during the last century. The flatness of the region, derived from the geologic origin of Apulia as the undeformed foreland of the Southern Apenninic Chain of Italy, together with its NW-SE oriented peninsula configuration and the long coastlines, are at the origin of the good-continuity occupation by man during the different phases of human history.
The original karst landscape, characterized by absence of surface runoff, due to rapid infiltration of surface water into the network of karst conduits and fissures within the carbonate rock mass, was with time modified by man. Agriculture initially developed in the narrow strips of land where the presence of residual deposits (terre rosse) allowed the establishment of thin soil layers, and/or in small depressions where water was able to be kept for a longer time within the epikarst. Outside of these sites, the karst landscape typically consisted of stony plateaus and subdued rounding hills. To gain further space to agricultural practices, part of the surrounding stony areas was cleared of rocks: the latter were extracted by hand, and used to build dry stone walls to delimitate the properties, and/or to act as a barrier to soil erosion or to work as terrace walls in the sectors with higher gradients. At the same time, extraction and re-use of carbonate rocks originated some of the typical rural architecture common in Apulia, from “trulli” to “pagliare” and, later on, to “masserie” (the old countryside mansions).
In the last decades of XX century, thanks to the use of modern technologies and machineries, and favoured by discutable policy of subsidies from the European Community, stone clearing was intensively performed. Wide sectors of Apulia were affected by land use changes, resulting in destruction of the epikarst (Williams, 2008), and of the karst ecosystems therein present as well, through removal of the stones, even of large size, crushing and production of a gravel-size field where to establish crops such as wheat or vineyards. Loss of the natural karst landscape had therefore to be registered over wide territories in the region (Parise & Pascali, 2003). In addition, removal of the original soil had as direct consequence an increase in the erosional processes on the occasion of the main rainstorms, even at those sites characterized by low to very low gradients. Stones of larger size were often piled near cave entrances, or dumped into caves and swallow holes, thus producing a serious danger to cavers, and sometimes impeding the access to important karst caves. All the above changes resulted in heavy degradation of karst, and especially promoted severe erosion in many areas of the region. In some cases, formation of erosional features combined to persistent droughts, thus developing a tendency toward desertification (Sharma, 1998), as already observed in other areas of the Mediterranean basin (Yair, 1983; Atalay, 1999; Geeson et alii, 2002).

References

Atalay I. (1999) Land use in the karstic lands in the Mediterranean region. Int. J. Speleol., vol. 26B(1/4), p. 111–118.
Geeson N.A., Brandt C.J. & Thornes J.B. (Eds.) (2002) Mediterranean desertification. John Wiley & Sons, 440 pp.
Parise M. & Pascali V. (2003) Surface and subsurface environmental degradation in the karst of Apulia (southern Italy). Environmental Geology, vol. 44, p. 247-256.
Sharma K.D. (1998) The hydrologic indicators of desertification. J. Arid Environ., vol. 39, p. 121–132.
Williams P.W. (2008) The role of the epikarst in karst and cave hydrogeology: a review. International Journal of

Speleology, vol. 37 (1), p. 1–10.
Yair A. (1983) Hillslope hydrology, water harvesting and areal distribution of some ancient agricultural systems in the northern Negev Desert. J. Arid Environ., vol. 6, p. 283–301.