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Hydrogeological asset of the Supramonte region (central-east Sardinia, Italy): analysis of new data

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Recent combined speleological and hydrogeological surveys have brought to important scientific results in the carbonatic massif of Supramonte (Central-East Sardinia).

From a geological point of view Supramonte is characterised by a Mesozoic sedimentary sequence covering a crystalline Palaeozoic basement composed of granites and metamorphic rocks. The Mesozoic sequence starts with transitional alluvial-lacustrine conglomerates, sandstones and marls of the Genna Selole Formation (Bajocian-Bathonian) immediately followed by greyish dolostones, fossiliferous limestones and oolithic limestones, deposited in more or less shallow water characterised by coral reefs, back- and fore-reef and inner continental shelf environments (Bathonian- Berriasian).

The whole Mesozoic sedimentary sequence has been folded and faulted during tertiary according to main N-S and NE-SW directions. The overall structure of Supramonte greatly influences the hydrogeological asset, showing a general tendency for underground water to flow from South to North, confined towards the East and the West by the permeability threshold of the Palaeozoic basement located at higher altitude. Also towards the North this carbonate aquifer is confined by a threshold of Palaeozoic basement forcing water to flow out of the system through several resurgences, the most famous of which is Su Gologone spring. The other main outflow of the system, San Pantaleo spring, is presently submerged by the high water level of the dam on Cedrino river.

Besides direct infiltration in the carbonate aquifer, much of the water is allogenic, coming from the Palaeozoic Gennargentu mountains to the South and introduced in

the karst system through several sinkholes, the most important of which are Funga ‘e s’Abba and s’Edera caves. These sinkholes are part of a unique hydrogeological system as demonstrated by dye tests in the late 60’s and by cave exploration in the summer of 2004.

Underground water flow is believed to follow an almost S-N direction, following the natural inclination of the impervious substratum, from Edera cave to Gologone spring, covering an aerial distance of 21 km. Dye tests in June 1999 and in May-June 2002 have confirmed the hydrogeological connection without giving, though, useful data on the possible path used by the main drain.

Cave surveys, carried out in the very deep canyon of Flumineddu that crosses obliquely the hypothesised path of this main drain, have enabled to discover several active and deep shafts that intercept secondary branches of the system and the main drain, as proved by several dye tests.

This paper resumes the hydrogeology of this important aquifer based on past researches and on the new data derived both from cave surveys and from dye tests.