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Frédérick Gal, Laurent André, Emmanuelle Petelet-Giraud, Arnaud Wuilleumier

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Aquifer sampling using ball check-valves system: what about sample representativeness?

ABSTRACT n° 1426

Authors :

Name	Email	Country
Gal Frederick	f.gal@brgm.fr	France
André Laurent		France
Petelet-Giraud Emmanuelle		France
Wuilleumier Arnaud		France

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ABSTRACT [271 Words]

Deep aquifer monitoring is a challenge in terms of representativeness of the sample. Such monitoring is often done when pumping is not adequate due to: 1) too deep water table level, 2) no willing to add disturbance to the aquifer (low recharge rate) or 3) too difficult management at surface of discharge waters. Deep sampling may rely on the use of sampling bottles but these have a fixed volume and need to lower and to remove the bottle each time a sample is needed.

Ball check-valves and pressure gas drive samplers have been developed to overcome this bias such as the US U-tube system. Here we present investigations with a system developed by the BRGM (GazOGaz, patent FR1259214), relying on similar functioning but having more flexibility in the use. Such a system allows the collection of a virtually unlimited volume of water at any depth in the water column.

Nevertheless, there is a frequent question about the use that may be done of waters collected using deep sampling. Site managers or public authorities wonder about the comparisons that can be made with samples obtained using classical pumping methodology.

The present survey has been designed in that objective. By carefully describing physico-chemical parameters along the water column and by performing both in-situ deep sampling and pumping at fixed depth, characteristics of waters existing in 2 boreholes located near Castres (Tarn, France) are investigated in details with specific focus on the dissolved elements. Conclusions on how deep sampling may be used and useful for aquifer characterization are presented together with the limits of applicability of such a sampling procedure.