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Heavy metals in the unregulated groundwater supply of the Cotonou metropolis

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A continuous increase of the population and associated urban sprawl contribute to the deterioration of groundwater quality in the great metropolis of Cotonou (Benin). In the slums, shallow groundwater is widely exploited for various domestic uses and sometimes drinking water supplies by many individuals via the wells dug in the shallow Quaternary (Holocene) aquifer. However this water resource is not monitored or treated by government water authorities.

This study aims to evaluate the quality of this groundwater resource. In particular, we analyse the heavy metals and major ions of 30 groundwater wells sampled from three slums of Cotonou. The groundwater was collected during the wet and dry seasons from October 2016 to June 2018.

Our results show that groundwater in the city of Cotonou has very high nitrate concentrations (50-300 mg/l) and concentrations of heavy metals that exceed the Benin and WHO drinking water quality standard. The sources of this contamination are related to human activities and poor household waste management.