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Isotopic characterization of the Precambrian carbonate aquifers under the city of Bangui (Central African Republic)

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The city of Bangui, the capital of the Central African Republic, is located on the right bank of the Ubangi River which is the northernmost tributary of the Congo River. From its foundation in 1889 this city has always suffered from serious problems of water management. This is related to the specificity of the site configuration (steep hills surrounding a large swampy flat valley poorly drained) and to the urbanisation process responsible for the waterproofing of soils and the associated increased runoff processes under tropical humid condition.This paper presents the results of a geochemical and isotopic survey carried out in 2011 aiming at evaluating the type and chemical quality of the groundwater resources of the Bangui region. By combining geological, hydrogeochemical and isotopic data it appears that the underground of Bangui seems favourable to the development of a secured and sustainable water supply from groundwater provided that the conditions of exploitation would be constrained by the local authorities. The deep fractured (and locally kastified) Precambrian carbonate aquifers known as Bimbo and Fatima formations are identified as target resources considering the relatively good quality of the resource from the chemical point of view, and the semi-confined structure of the aquifer preventing the mixing with shallow aquifers already strongly impacted by domestic and industrial pollutions.