

Seasonal variability in the water table of the Adiaké aquifer in hydraulic interaction with Aby Lagoon and the Atlantic Ocean (south-east of Côte d'Ivoire)

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Surface water and groundwater deserve particular attention as they form an interconnected hydrological system. Understanding the hydrodynamic behaviour of aquifer systems is an essential prerequisite for implementing effective groundwater conservation strategies. The aim of this study is to characterise the hydrodynamic behaviour of the Adiaké aquifer. To this end, a differential GPS levelling survey was carried out to determine the elevation of the piezometric points, prior to the two piezometric level measurement campaigns conducted during low water (April 2024) and high water (June 2025). The method for producing piezometric maps involved first determining the piezometric levels and then selecting a plotting technique. These maps were produced using Surfer 11 software, employing the kriging technique and a grid spacing of 3 metres. The piezometric maps produced indicate that groundwater in the Adiaké district flows mainly towards Aby Lagoon in the north-east and towards the Atlantic Ocean in the south. They show a consistent pattern, indicating that flow directions remain stable over time despite seasonal variations in piezometric levels. However, there are occasional instances of seawater intrusion into the Aby lagoon in the far south-east of this map. The results show that the Adiaké aquifer is subject to seasonal fluctuations. The piezometric levels show an average value of 10.61 m in 2024 and 9.87 m in 2025. However, this aquifer is not replenished automatically whenever it rains; it takes between one and four months for the water level to rise. A detailed analysis of the relationship between rainfall and water table levels could therefore demonstrate their influence on the hydrodynamics of the groundwater in Adiaké.

Keywords: Coastal aquifer, piezometry, Aby Lagoon, Adiaké, Ivory Coast