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Analysis of Tongatapu Island groundwater system using radiocarbon dating and hydrochemical data

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Groundwater, the world's critical freshwater resource, is currently facing significant challenges from overexploitation and depletion, particularly on small islands such as Tongatapu in the Kingdom of Tonga. This study aimed to analyze the groundwater system of the island by integrating radiocarbon dating and water quality analysis. Groundwater samples were collected from coastal areas and springs across the island to evaluate recharge processes and current water quality conditions. The age of the groundwater was estimated using radiocarbon analysis, and a detailed assessment of water quality parameters, such as pH and electrical conductivity, was conducted. This combined approach aims to provide an initial understanding of groundwater dynamics in Tongatapu, highlighting the age, recharge rates, and chemical properties of the aquifers. The results are expected to contribute significantly to the development of effective water management strategies for small carbonate islands, addressing the challenges related to water scarcity, pollution, and aquifer overexploitation.

Student Submission

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