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Seawater intrusion risk analysis under climate change conditions for the Gaza Strip aquifer (Palestine)

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Seawater intrusion (SWI) has become a major threat to coastal freshwater resources, particularly in the Mediterranean basin, where this problem is exacerbated by the lack of appropriate groundwater resources management and with serious potential impacts from projected climate changes. A proper analysis and risk assessment that includes climate scenarios is essential for the design of water management measures to mitigate the environmental and socio-economic impacts of SWI. In this study a methodology for SWI risk analysis in coastal aquifers is developed and applied to the Gaza Strip coastal aquifer in Palestine. The method is based on the origin-pathway-target model, evaluating the final value of SWI risk by applying the overlay principle to the hazard map (representing the origin of SWI), the vulnerability map (representing the pathway of groundwater flow) and the elements map (representing the target of SWI). Results indicate the important role of groundwater simulation in SWI risk assessment and illustrate how mitigation measures can be developed according to predefined criteria to arrive at quantifiable expected benefits.

Keywords: Climate change, coastal aquifer, seawater intrusion, risk analysis, simulation/optimization model.

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