

## **A laboratory model of the evolution of an island freshwater lens**

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**Abstract** In this paper, a laboratory physical model was used to examine freshwater lens evolution. Groundwater recharge by rainfall was taken into account. The result shows that there is a direct relationship between freshwater lens thickness and cumulative rainfall infiltration. In the model, the lens thickness finally stabilized at 22 cm. The upconing movement process was also analysed for the case of groundwater exploitation. When pumping freshwater, the lower surface of the freshwater lens would rise gradually to form an upconing shape. Finally, the upconing moved into the pumping well which led to a breakdown of the freshwater lens. The result shows that the greater the exploitation rate the easier it is for the lens to break down.

**Key words** freshwater lens; laboratory simulation experiment; transition zone; up-coning