

## **Enhancing the freshwater lens volume of an island by reducing the hydraulic conductivity of the exterior region**

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### **ABSTRACT**

Sufficient precipitation recharge across an inland would result in a freshwater lens with freshwater floating above denser saline groundwater. The volume of this freshwater lens determines the availability of groundwater resources. We present here an approach for enhancing the volume of the freshwater lens by artificially reducing the hydraulic conductivity of the exterior region of an island. We apply the analytical method to develop the solutions for a circular and strip island, respectively. The analytical solution for the location of the freshwater-seawater interface of a strip island is verified through a sand-tank experiment. We demonstrate in this study that the reduction of the hydraulic conductivity of the exterior region of an island will lead to a decrease of seawater intrusion and an increase of freshwater lens volume. The analytical solutions developed can be used for design purposes.