

## **Experimental Mapping of the Saltwater/Freshwater Mixing Zone**

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### **ABSTRACT**

The mixing zone between freshwater and seawater is of extreme importance for reactive transport processes and seawater recirculation. The amplitude of this mixing zone is proportional to the dispersion coefficients. Therefore, actual detailed measurements of the mixing zone would help to evaluate the dispersion coefficients. Experiments have been widely used to map the seawater intrusion wedge. However, none effort has been devoted to actually map the mixing zone. Here, we proposed a methodology based on the visualization of the mixing between an alkaline freshwater solution and acidic seawater by means of a pH indicator. Depending on the pH of the ending solutions, different portions of the mixing zone can be mapped. The experiments carried out in a 2D tank at a lab scale (50 x 20 x 2.2 cm) show a thin but measurable mixing zone. The experimental results have been used to calibrate a numerical model of the experiment and allowed us to quantify the dispersivity values of the system. In particular, we evaluated the transverse dispersion coefficient since mixing occurs basically perpendicular to the flow direction.

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