

Modelling of Salinity and Temperature Effects Upon Ground Water in the Surficial Carbonate Aquifer, Yucatan Peninsula, Mexico

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In 1989, Sanford and Konikow undertook groundbreaking work on modeling the locations of the mixing zone between fresh water and salt water in the surficial carbonate aquifer in the eastern Yucatan Peninsula. Subsequent work in 1995 by Wicks and Herman demonstrated the importance of horizontal zones of high permeability upon mixing zone thickness. Recent modelling at the University of New Orleans has built on work by Stoessell and others, leading to improved models by incorporating 1) salinity data from sinkholes, 2) velocity estimates, 3) smaller vertical dispersivities, and 4) temperature profiles from sinkholes. The resulting models closely match field observations. However, numerical dispersion and stability continue to be an issue, particularly when temperature and salinity effects upon water density are incorporated simultaneously.

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