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Assessing major factors affecting shallow groundwater geochemical evolution in a highly urbanized coastal area of Shenzhen City, China

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Abstract

Groundwater is the most important alternative drinking water source in the coastal urban area of Shenzhen City, China. Understanding the main geochemical factors affecting groundwater chemistry is vital for sustainable water resource management in the long term. Seawater intrusion has been a serious problem, but the situation seems to have recently improved with the establishment of a water supply system and land reclamation. However, total dissolved solids (TDS) concentrations in the groundwater have increased. To determine major factors controlling groundwater geochemical evolution, studies were carried out in the area in Shenzhen most vulnerable to seawater intrusion. Along the groundwater flow path from the bedrock outcrop area to the coastal plain, groundwater evolution processes were studied using multiple hydrogeochemical analyses. Piper plots and hydrochemical facies evolution diagrams show the aquifer vulnerable to seawater intrusion is currently dominated by fresh groundwater of Ca-HCO₃ or Ca-Na-

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