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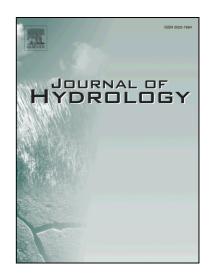
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Surface – ground water interactions and hydrogeochemical evolution in a fluvio-deltaic setting: The case study of the Pinios River delta

Ioannis Matiatos^{a1}*, Vasiliki Paraskevopoulou^b, Konstantinos Lazogiannis^a, Fotini Botsou^b, Manos Dassenakis^b, George Ghionis^a, John D. Alexopoulos^a, Serafim E. Poulos^a

Keywords: Deltaic aquifer; Hydrogeochemistry; Principal Component Analysis; Water Quality Index; Water interactions.

Abstract

River deltas sustain important ecosystems with rich biodiversity and large biomass, as well as human populations via the availability of water and food sources. Anthropogenic activities, such as urbanization, tourism and agriculture, may pose threats to river deltas. The knowledge of the factors controlling the regional water quality regime in these areas is important for planning sustainable use and management of the water resources. Here, hydrochemical methods and multivariate statistical techniques were combined to investigate the shallow aquifer of the Pinios River (Thessaly) deltaic plain with respect to water quality, hydrogeochemical evolution and interactions between groundwater and surface water bodies.

Water quality assessment indicated that most of the river and groundwater samples fully comply with the criteria set by the Drinking Water Directive (98/83/1EC). The river is recharged mainly from springs of the Tempi valley and the shallow aquifer, and to a lesser degree from precipitation, throughout the year. The hydrogeochemical characteristics indicated a cation (Ca, Mg, and Na) bicarbonate water type, which evolves to calcium-chloride, sodium-bicarbonate and sodium-chloride water type, in the northern part of the delta. Calcite and dolomite dissolution determined the major ion chemistry, but other processes, such as silicate weathering and cation exchange reactions, also contributed. In the northern part of the plain, the interaction with the deeper aquifer enriched the shallow aquifer with Na and Cl ions.

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