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EVALUATION OF GROUND WATER QUALITY AND HYDROCHEMICAL CHARACTERISTICS OF PALAEOCHANNEL AND ITS ENVIRONS OF WESTERN KRISHNA DELTA, GUNTUR DISTRICT ANDHRA PRADESH, INDIA

B. Umamaheswara Rao[1], P.N. Rao[2] and S.K.G. Krishnamacharyulu[3]
[1&2]Central Ground Water Board, Southern Region, Bandlaguda, Hyderabad
[3]School of Earth Sciences, SRTMU, Nanded
E-mail: raobur@yahoo.com and pnrao_1960@yahoo.co.in

Abstract

Groundwater chemistry has been studied to examine hydrochemical processes and evaluate suitability of groundwater for drinking and irrigation purposes in palaeochannel and its environs of Western Krishna delta, Guntur district, Andhra Pradesh. Based on ionic concentrations and different ionic ratios of Cl^{-}/ HCO_3^{-}, TA/TH, and Ca^{2+}/Mg^{2+} three distinct water zones viz, fresh, brackish and saline are delineated. Fresh/saline water contact is quite sharp. Groundwater is generally fresh in palaeochannel aquifers and saline in flood plain reflecting the imprint of geomorphic evolution of delta on groundwater. Palaeochannel aquifers are observed to be contaminated in some parts of the area. The relative abundance of cations is $Na^{+}>Mg^{2+}Ca^{2+}>K^{+}$, In uncontaminated palaeochannel aquifers, the order of abundanceof anions is $HCO_3^{-}>Cl^{-}> SO_4^{-2}> NO_3^{-2}$., while in flood plain and certain parts of palaeochannel where contamination is seen, it is $Cl^{-}> HCO_3^{-}> SO_4^{-2}> NO_3^{-2}$. High content of nitrate are suggests anthropogenic influence on groundwater. The dominant geochemical facies of the groundwater is Na^{+}-K^{+}-Cl^{-}-SO_4^{2-}. Groundwater in palaeochannel is suitable for drinking, and irrigation purposes, while in palaeochannel environs (flood plain/basin) it is unsuitable for drinking and irrigation purposes except for salt resistant crops. In contaminated palaeochannels suitability of the groundwater for drinking and irrigation purposes depends on its degree of contamination. The study helped to understand the hydrogeochemical characteristics and quality of deltaic aquifer systems, and to suggest suitable steps to protect further contamination of this valuable groundwater resource.

Keywords: Groundwater quality, Hydrogeochemical characteristics, Palaechannel, Krishna delta, Andhra Pradesh, India.