Identification of recharge process in coastal aquifers around Cuddalore region, Tamilnadu, south east coast of India – A geochemical approach

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The ions present in water slowly dissolve from soil particles, sediments, and rocks as the water travels along mineral surfaces in the pores or fractures of the unsaturated zone. They are referred to as *dissolved solids.* Some dissolved solids may also have originated from precipitation and from river water that recharges the aquifer. It is essential to have a clear idea about the recharge characteristics of the coastal aquifers for a proper management. The study area is chiefly composed by recent alluvium and Cuddalore sandstone. The annual average rainfall is around 900mm. A total of 80 groundwater samples were collected in two different seasons (Pre and Post Monsoons) from different locations of the study area. They were analysed for major ions, minor ions; stable isotopes of δ^{18} O, δ D, δ ^{13}C and Tritium. In the study three distinct types of water were identified such as, sub-modern, modern and mixing of modern and sub-modern. Among these the sub-modern waters were found to be fresh. The recharge identification was done by using different methods like chloride ion, stable isotopes and log pCO_2 values. The Statistical application to the geochemical data reveals the association of ions during the time of recharge. The geochemical characterization carried out by different plots shows the recharge nature in the study area. The overall observation from the study indicates the recharge process is active in this coastal aquifer of the study area.

Carbon and nitrogen stable isotopes as proxies for Late Pleistocene to Holocene environmental change in the Waipaoa Sedimentary System, New Zealand

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The stable C and N isotopic compositions of organic matter in continental margin sediments provide a useful, long-term record of environmental change. The Waipaoa River sedimentary system of New Zealand represents a system of interest due to its very large sediment supply and well documented, relatively recent history of anthropogenic disturbance. Radiocarbon measurements of three continental shelf cores taken aboard the RV Marion Dufresne in January 2006 offshore from the river mouth suggest a record extending into the late Pleistocene.

C and N isotope analyses in lower portions of the cores indicate limited environmental change and suggest slow shoreline progradation concurrent with global eustatic sea level rise. However, following the Taupo volcanic eruption (1718 years before present) environmental circumstances change, recorded in the cores as a positive δ^{13}C excursion. Concurrence of this excursion with a large volcanic eruption suggests possible dilution of riverine organic matter by organic matter poor volcanic material. An additional potential impact on this excursion is tributary capture, supported by the unique isotopic signature of soil profiles from disparate areas of the watershed. Above the excursion, in the upper 50 cm of the cores, C and N isotope values trend rapidly toward more terrestrial values suggesting hillslope destabilization and erosion potentially associated with increased anthropogenic activity.