

Environ Monit Assess. 2010 Oct;169(1-4):553-68. doi: 10.1007/s10661-009-1196-y. Epub 2009 Oct 27.

Study on the hydrogeochemical characteristics in groundwater, post- and pre-tsunami scenario, from Portnova to Pumpuhar, southeast coast of India.

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Abstract

Natural hazards cause great damage to humankind and the surrounding ecosystem. They can cast certain indelible changes on the natural system. One such tsunami event occurred on 26 December 2004 and caused serious damage to the environment, including deterioration of groundwater quality. This study addresses the groundwater quality variation before and after the tsunami from Pumpuhar to Portnova in Tamil Nadu coast using geochemical methods. As a part of a separate Ph.D. study on the salinity of groundwater from Pondicherry to Velankanni, water quality of this region was studied with the collection of samples during November 2004, which indicated that shallow aquifers were not contaminated by sea water in certain locations. These locations were targeted for post-tsunami sample collection during the months of January, March and August 2005 from shallow aquifers. Significant physical mixing (confirmed with mixing models) within the aquifer occurred during January 2005, followed by precipitation of salts in March and complete leaching and dissolution of these salts in the post-monsoon season of August. As a result, maximum impact of tsunami water was observed in August after the onset of monsoon. Tsunami water inundated inland water bodies and topographic lows where it remained stagnant, especially in the near-shore regions. Maximum tsunami inundation occurred along the fluvial distributary channels, and it was accelerated by topography to a certain extent where the southern part of the study area has a gentler bathymetry than the north.