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Heavy metal Contamination in Industrial Area in and around Hyderabad City; Hydrogeolgical and Hydrogeochemical Studies of the Chinnaeru River basin, Sub - Basin of Musi River in the Northern Parts of Nalgonda District, Telangana State, India.

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The Balanagar Industrial Area (BIA) within the city and The Chinnaeru River basin is situated 30 km east of Hyderabad city and its area covers 250 square kilometers and falls in the Survey of India Toposheet No. 56 K/15.

The Shamerpet vagu originates at Shamirpet catchment areas and it becomes Chinnaeru River after joining other streams in the Northern part of the basin and it flows from NW^n to SE^n direction to join the Musi River at Sangam in Nalgonda district.

The hydro-geochemical characters of the water and soils have been dealt with comprehensively to pursue the quality of water and soils for irrigation and drinking purposes. Groundwater in granites and gneisses occurs along the weathered zones and fracture zones. The maximum depth of the weathered zone is about 10-25 feet but majority of the wells that are encountered falling in the depth range of 26-35 feet.

The Red, black and loamy soils are the prominent soil horizons in the study area. The geology of the area in general comprises of granites and gneisses of Peninsular gnessic complex of Archean age. Field and petrographic characteristic of the rocks from the study area suggest that the rocks have undergone multiple fracturing, shearing and extensive alterations by intensive weathering.

Groundwater and surface water samples were collected from the entire basin during pre- & post-monsoon periods respectively. Ninety Two samples were collected for cations and anions analysis. The results of chemical analysis for pre-monsoon and post-monsoon periods are presented. Classification of Groundwater (GW) and Surface water (SW) of the basin was made by applying various accepted Chemo-graphical methods such as Piper trilinear diagram, Kelley's Ratio, etc.

There are about 19 to 20 samples from Balanagar Industrial area and from Chinnaeru River basin 44 soil samples are analyzed for trace-elements (heavy metals) by XRF at NGRI, Hyderabad. The Concentrations of toxic / heavy metals such as As, Pb, Zn, Ni, Co, Cr, V, Cu, Rb, Sr, Ba, Zr, Y, Zn and Mo were studied in samples of the Balanagar Industrial area and Chinnaeru river basin to understand the geochemical characteristics of soil samples and to determine the contamination levels in the area. The objective of the present study is (a) to assess the levels of soil contamination with reference to average concentrations of toxic metals in the region, (b) to find out the contamination factor between the different toxic elements, and (c) to draw levels of concentration of metals through their spatial distribution in the study area. The soil contamination was estimated on the basis of Index of geo-

accumulation (I_{geo}), Enrichment Ratio (ERn) or Enrichment Factor (EF), Contamination Factor (CF) and Degree of contamination (C_{deg}). The analytical data indicate that the majority soils of the study area are significantly non contaminated [1], showing lower concentration of toxic elements and are shown in various geochemical parameters / or functions as I_{geo}., EF., CF and C_{deg}.

The overall scenario of hydrochemical evolution of the basin indicates that the basin was slightly affected by the anthropogenic and geogenic influences. The soils along the NH. 202 in the northern part of the basin are polluted by arsenic, Pb, Cu, Mo and Cr, Co and Ni compounds due to impact of automobile emissions, locomotive dumps and municipal waste. The present scenario of the basin may be more affected in future due to urbanization and industrialization, [1] since the basin is adjacent to the Hyderabad city.

Keywords: Water, Soils, Hydrochemical, Heavy Metals, Balanagar, Chinnearu River Basin

References: [1] Machender, G. Dr.[1] (2011, 12, 13&14)) Environ Earth Sci (63) 945–953, (70)1021–1037, (71) 2885–2910, Arab J Geosci (2014) 7:513–525.