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Quality assessment of mine water in the West Bokaro coalfield area, India

Ashwani Kumar Tiwari, Prasoon Kumar Singh and Mukesh Kumar Mahato
Indian School of Mines, India

West Bokaro coalfield plays an important role in Indian coal production. Coal is exploited by both opencast as well as underground mining methods and during this process, a huge quantity of water is discharged from coal mines to the natural drainage to facilitate safe mining. The discharged mine water varies greatly in the concentration of contaminants present, and in some cases it may even meet the drinking water specification. A geochemical study of mine water in the West Bokaro coalfield has been undertaken to assess its quality and suitability for domestic, industrial and irrigation uses. For this purpose, fifteen mine water samples collected from different mining areas of West Bokaro coalfield were analysed for pH, electrical conductivity (EC), major cations (Ca^{2+} , Mg^{2+} , Na^+ , K^+), anions (F^- , Cl^- , HCO_3^- , SO_4^{2-} and NO_3^-) and trace metals. pH of the analyzed water samples varied from 6.6 to 8.3 and the average pH was found to be 7.7 indicating mildly acidic to slightly alkaline nature. SO_4^{2-} and HCO_3^- are dominant in the anion and Ca^{2+} and Mg^{2+} in the cation chemistry of mine water. The drinking water quality assessment indicates that number of mine water samples have high TDS, total hardness and SO_4^{2-} concentrations. Concentrations of some trace metals (i.e., Fe, Mn, Ni) were found to be above the levels recommended for drinking water. However, the mine water is good to permissible quality and suitable for irrigation, except at some sites, where higher salinity and Mg-ratio restrict its suitability for irrigation at some sites.

Biography

Ashwani Kumar Tiwari is the youngest researcher in the field of Environmental Hydrogeochemistry, Water Resources Management and GIS. He is pursuing PhD research work entitled "GIS Based Aquifer Vulnerability Assessment and Qualitative Analysis of Water Resources in a Coal Mining Area, Jharkhand" at Indian School of Mines (ISM) Dhanbad, Jharkhand. He has done MSc and MPhil in Environmental Science with first class. He has worked as a Research Fellow about one & half years at Central Institute of Mining and Fuel Research (CIMFR), Dhanbad, Jharkhand, India. He has published eight research papers in peer-reviewed international and national journals. He has also contributed four chapters in a research book and edited the proceeding of a National Seminar.

ashwani.enviro@gmail.com