

SPATIO-TEMPORAL RELATIONSHIPS OF CATIONS-ANIONS, F, Fe, & Pb WITH As CONTAMINATED WATER OF KAUDIKASA, CHATTISGARH, INDIA

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Water chemistry presents a widely research area where interactions at rock-water interfaces play a major role in governing the water quality. Elements that are not available in the rock minerals in contact with the water cannot be expected to be present in the final solution. All water contains inorganic contaminants but presence of arsenic has posed a great threat to human health. In recent years lots of work has been done on arsenic in groundwater of India, but its origin is not well established till now. The water sampling carried out in three consecutive years (2006, 2007, and 2008) from Kaudikasa area show high As contamination (max. 4.05 ppm or mg/L) along with high Fe (max. 22.23 mg/L), F (max. 1.85 mg/L) and Pb (max. 0.15 mg/L) well exceeding the WHO limit. Various plots (Piper, Durov, Schoeller) indicate that water belongs to fresh type of shallow zone which has not travelled a long distance according to Chebotarev sequence. There exists a good inverse relationship of cations-anions (except K) with As, Fe and Pb while a direct positive relationship occurs with F. The spatial variation plots show bimodal characteristics for nearly all elements, indicating the presence of a NW-SE boundary. Arsenic, having its source in felsic rocks, gets emplaced in N-S trending quartz reefs; it is leached out to groundwater at this NW-SE boundary. This arsenic is localized in this area, as shown by depth vs. distance and arsenic profile. Hence as one goes away from this hotspot, the arsenic concentration decreases. Thus the interactions of geochemical relationships play a major role in arsenic dispersion in this area.

Keywords: Arsenic, Lead, Spatio-Temporal Relationship, Groundwater Pollution, Kaudikasa, Chattisgarh