

Hazard from soil contamination in the gold mining district of Kedougou (Senegal, Africa)

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Background and methods

Our study aimed to detect and discriminate anthropogenic versus geogenic elemental enrichment in soils of the Kedougou region (Senegal). Ninety-four soil samples were collected over an area of 6,742 km² and analysed by ICP-MS for 53 elements. Mapping and geostatistical methods were used to identify elemental footprints associated with mineralisations and mining activities. Multivariate methods (fractal plots, regression plot and robust factor analysis) together with interpretative indices (Enrichment factor -EFs- Index of Geoaccumulation -I_{Geo}- and the robust compositional contamination index -RCCI) were used to interpret variables correlation and the underlying geochemical processes.

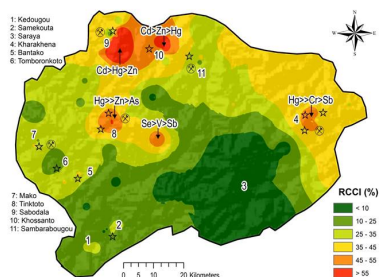


Figure 1. RCCI Interpolated map of the 15 considered Potentially Harmful Elements (PHEs).

Discussion of Results

Discrete areas of significant contamination levels corresponding to Artisanal Scale Gold Mining (ASGM) activities were established, highlighting the importance of complementary approaches to identify contamination related to potentially harmful elements (PHE). These areas need further and more detailed investigation to achieve a comprehensive human and ecological risk assessment.