

## Supplementary Information

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# A preliminary assessment of potential ecological risk and soil contamination by heavy metals around a cement factory, western Saudi Arabia

**Supplementary Table 1:** Geo-accumulation index ( $I_{geo}$ ) classes as classified by Müller [34].

$I_{geo}$ value	$I_{geo}$ class	Sediment quality
$I_{geo} \leq 0$	0	Uncontaminated (UC)
$0 < I_{geo} < 1$	1	Uncontaminated to Moderately contaminated (UMC)
$1 < I_{geo} < 2$	2	Moderately contaminated (MC)
$2 < I_{geo} < 3$	3	Moderately to heavily contaminated (MHC)
$3 < I_{geo} < 4$	4	Heavily contaminated (HC)
$4 < I_{geo} < 5$	5	Heavily to extremely contaminated (HEC)
$5 < I_{geo}$	6	Extremely contaminated (EC)

**Supplementary Table 2:** Classification criteria of ecological risk index ( $E_r^i$ ) and toxicity response index (RI) based on Håkanson [35].

Potential ( $E_r^i$ )	Toxicity (RI)	Ecological risk level
$E_r^i < 40$	$RI < 150$	Low risk (LR)
$40 \leq E_r^i < 80$	$150 \leq RI < 300$	Moderate risk (MR)
$80 \leq E_r^i < 160$	$300 \leq RI < 600$	Considerable risk (CR)
$160 \leq E_r^i < 320$	-	High-risk (HR)
$E_r^i \leq 320$	$600 \leq RI$	Very high risk (VHR)