- **TDSe cathodic stripping voltammetry method validation**

  The quantification method for determination of TDSe using the cathodic stripping voltammetry was validated. The calibration curve for a concentrations of 0.1, 0.5, 5, 10, 50, and 100 nM were plotted to investigate the linearity. The correlation coefficient of 0.9991 was obtained. The limit of detection (LOD) of 10 min deposition was calculated using seven standard solution of 0.10 nM (two times greater than published LOD) with triplicate. The LOD was calculated based on the 3s/m (which s represent the seven blank standard deviation, and m the calibration curve slope) formula. The LOD of 0.02 was obtained. Also, the limit of quantification (LOQ) was calculated based on the 10s/m. the LOQ of 0.06 nM was achieved. The precision of 6.70 % was obtained using the seven standard solutions measurements with triplicate of 0.10 nM. The accuracy was investigated using spiking and recovery approach. The solutions blank spiked by 1.0, 2.50, and 20.0 nM were measured. The average recovery of 121 % was obtained.

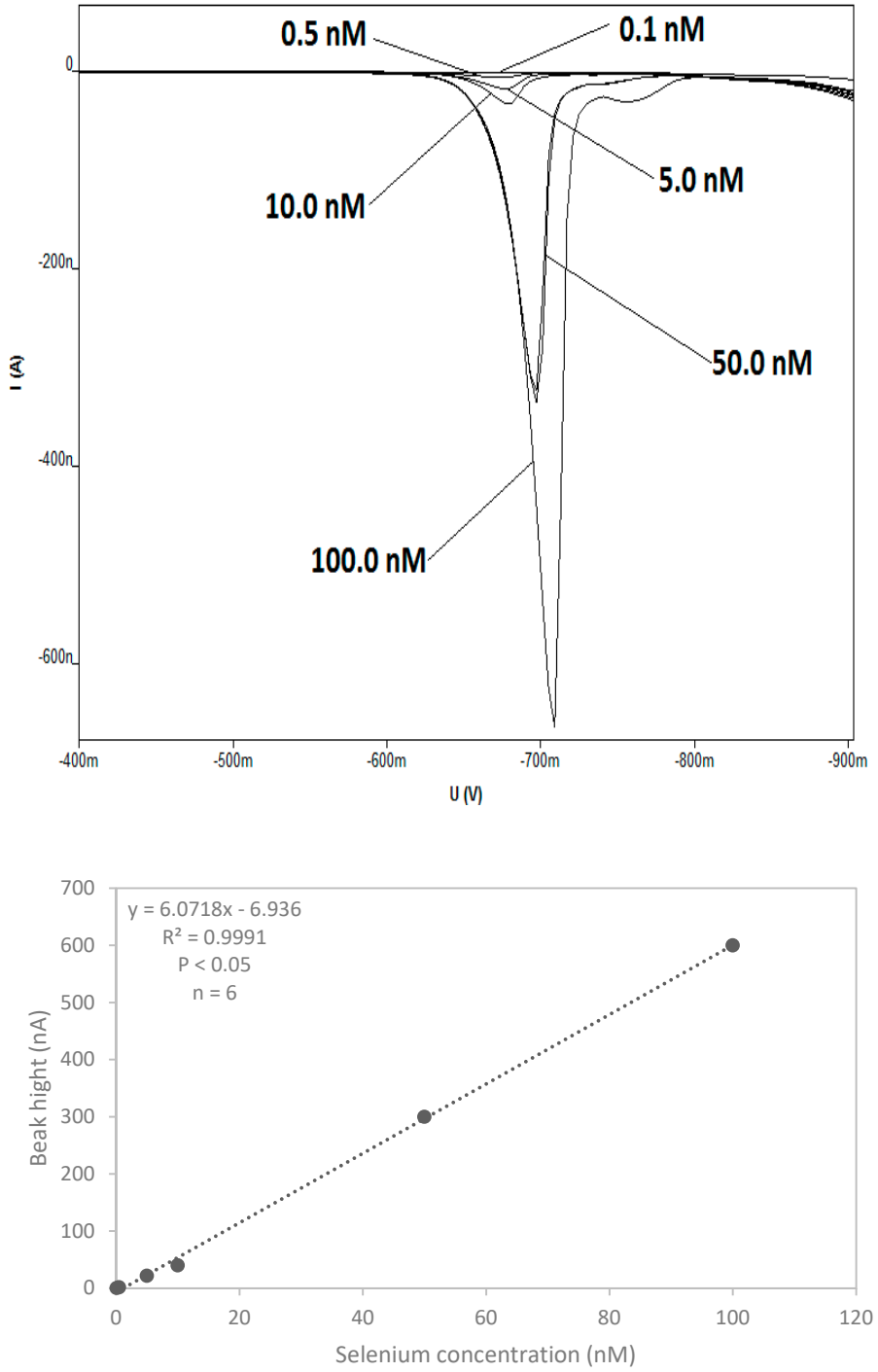
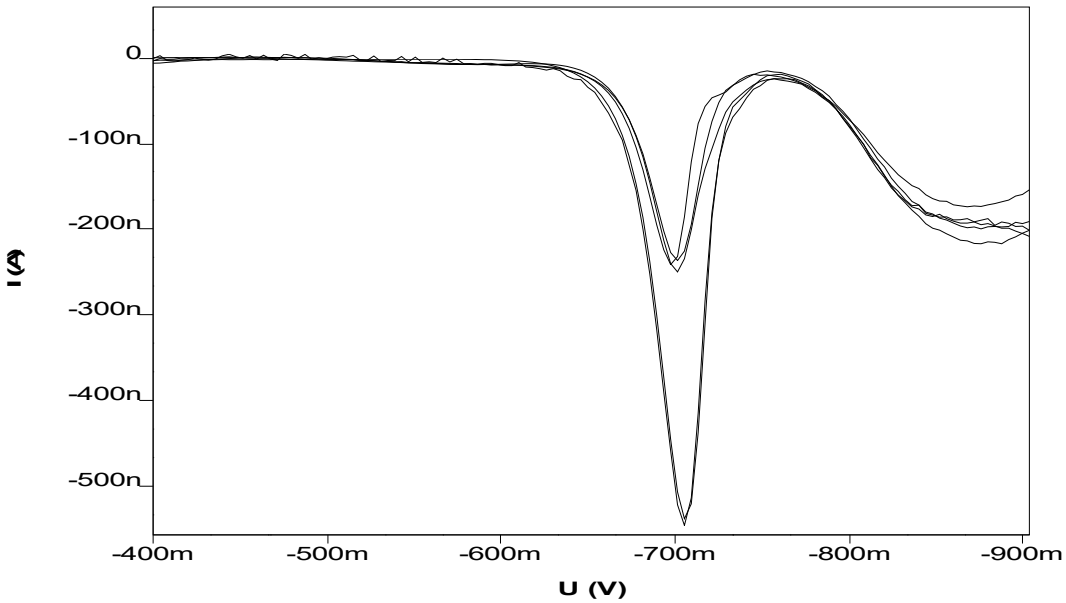


Figure S1: TDSe calibration curve using ultra-pure Milli Q water spiked by 0.1, 0.5, 5, 10, 50, and 100 nM using deposition potential and deposition time of -0.4 v and 10 min, respectively.

(a)



(b)

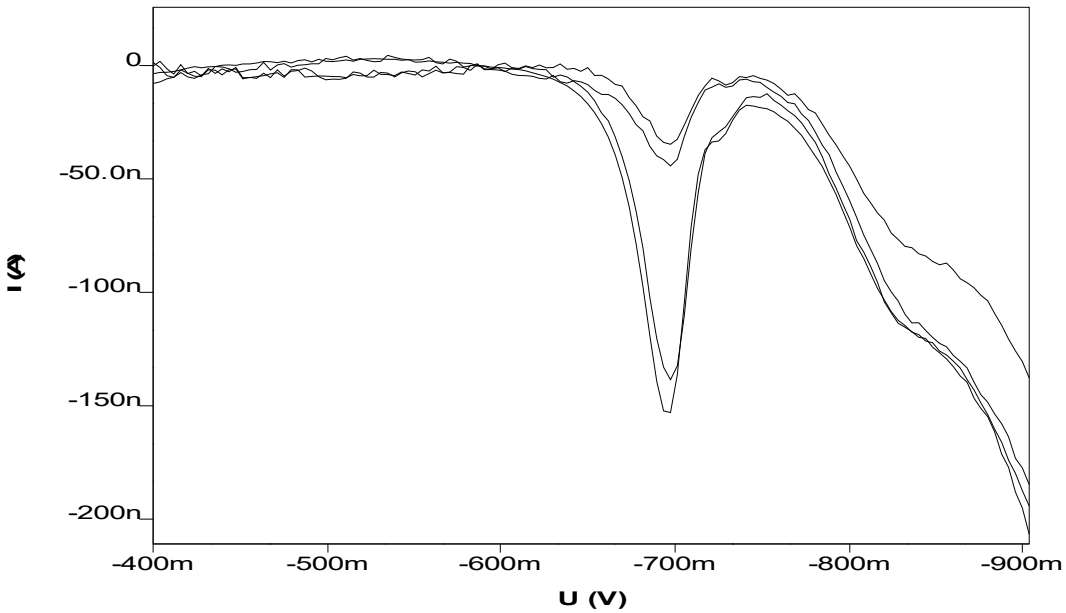


Figure S2: TDSe surface and bottom water voltammograms of station 4 at Al-Arbaeen Lagoon.

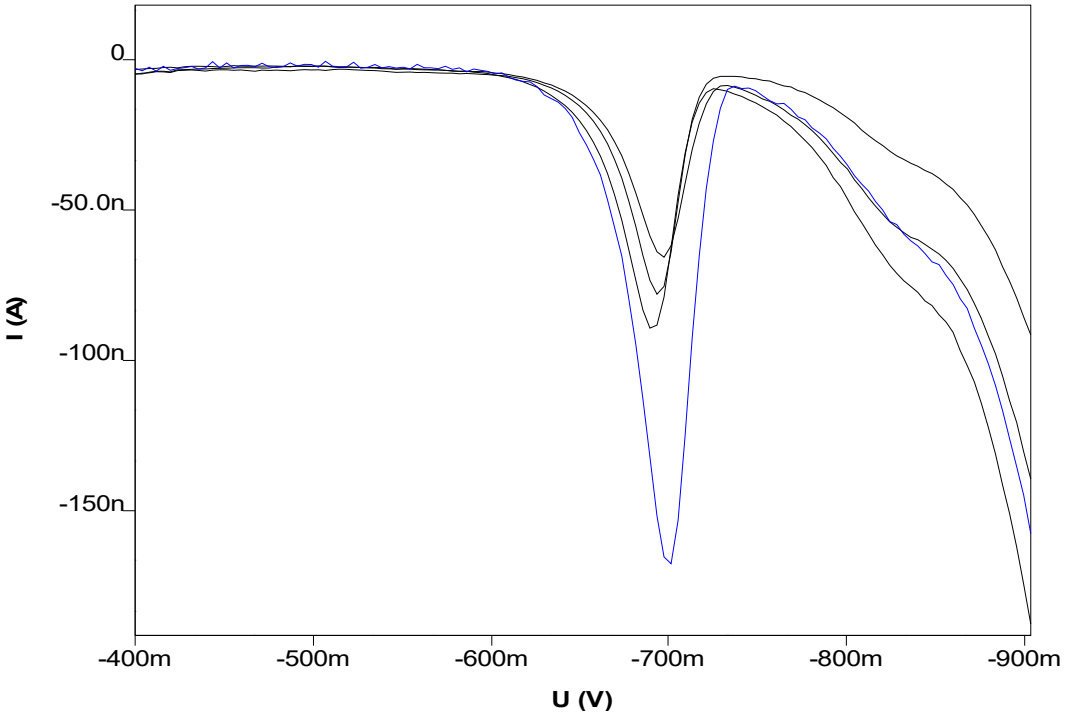


Figure S3: TDSe at 1 m voltammograms of station 6 in Sharm Obhur.

Table S1. The optimum cathodic stripping voltammetry parameters.

Purging time (High pure N_2 Gas)	300 s
Deposition potential	-0.4 v
Deposition time	600 s
Equilibration time	10 s
Pulse amplitude	0.025 v
Sweep rate	0.02 v/s
Mercury drop size	4 ~ 0.60 mm^2

Table S2. The optimum ICP-MS conditions (Element Symbol CASRNa Element Symbol, 2014).

Reaction gas	Helium (4 $ml.min^{-1}$)
Monitored masses	*m/z* 77, *m/z* 78, *m/z 76, and m/z 82*
Plasma power	1550 W
Nebulizer pump	0.1 rps

Figure S4: Al-Arbaeen and the open sea fish samples.