O25.8

Review and update of Hg, Cd, and Pb in sediments and water of the inner estuary Estero Salado, Gulf of Guayaquil-Ecuador

Franklin I Ormaza-González[1], Ruben Castro-Rendón[2], Ana Maridueña-Bravo[3], Nayiva Bobadilla-Cordova[1], Ivanna Ramos-Castañeda[1]

[1]ESPOL Polytechnic University, Ecuador. [2]Universidad de Guayaquil, Ecuador. [3]Subsecretaría de Calidad e Inocuidad, Ecuador

Abstract

The Gulf of Guayaquil (GG) is the most important estuary system of the eastern Pacific coast, it drains on average 1 654.5 m^3 s^{-1} fresh water. The main industrial city of Guayaquil (2.7 million inhabitants) lies in this basin and surrounds the inner estuary of the Estero Salado (ES). The ES has suffered from bad environmental management, it is definitely eutrophied, its fishery stocks dramatically diminished, and are affecting the Guayaquileño life. Potentially toxic metals such as Pb, Cd, and Hg in sediment and water have been sparsely studied, from 2010 to 2020. All average concentrations (as total, mg kg-1, dry weight) from 73 samples of water and sediments (and some fauna species) were: in water, 0.130, 0.038, and 0.0012; in sediments 42.97, 1.84 and 0.52; in fauna 13.01, 1.34 and <dl for Pb, Cd, and Hg respectively. Estuarine fauna was 13.01 and 1.34 for Pb and Cd respectively. All averages surpassed allowable National Regulation limits: 0.01, 0.005 and 0.0001; 35, 0.6, and 0.17 for water and sediments in the same order; and 0.3 (Pb) and 1.0 (Cd) for fauna. In 2020, results from a survey in the four most representative stations were: In sediments 41.93, 2.082, and 0.285, in the same order whilst in water all four stations had concentrations <dl. Also, Arsenic was also determined: 32.181 (sediments) and 0.007 (water). Maxima of 56.367, 6.079, and 0.158 and minima of 28.450, 0.285, and 0.078 were found. Compared to 2010-2018 averages, in the four stations Lead is not showing a statistical difference, Hg decreased 1.8 times, but Cadmium passed from 1.84 to 2.082. In the time series run, it was found a clear increase of Pb, while Cd and Hg seemed to decrease. There was not found any relationship between the studied elements. The estuary is badly contaminated by these metals.

Keywords

Estero Salado, Ecuador, Pb,Cd,Hg, Inner Estuary