

**Presentation Type:**

Poster Preferred

**Track:**

Environmental or Analytical Chemistry

**Session:**

Effect-directed analysis (EDA) / toxicity identification and evaluation (TIE)

**Abstract Title:**

Magnitude and Characterization of Toxicity in Sediments from Several Ukrainian Estuaries

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**Abstract:** (note: 2500 character limit)

During the Soviet era, Ukraine was one of the most important industrial and agricultural regions of the Soviet Union. A consequence of this industrial and agricultural activity was the contamination of several areas of the country, including the estuaries, with pollutants including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, and metals. While the extent of chemical contamination has been investigated, the possible bioavailability and resulting toxicity to estuarine organisms of these contaminants has not been fully reported. The objective of the current study was to quantify acute toxicity to organisms exposed to whole sediments from several estuaries along the Ukrainian Black Sea coast. In the most toxic sediments, toxicity identification evaluations (TIEs) were performed to characterize causes of toxicity. Based on the salinity of the estuarine systems, sediments toxicity was evaluated using an estuarine amphipod (*Echinogammarus olivii*), euryhaline midge (*Camptochironomus pallidivittatus*) or freshwater daphnid (*Daphnia magna*). Systems investigated included the mainland estuaries Dnieper and Boh and the Danube River Delta, the Crimean peninsula bays of Sevastopol and Balaklava, as well as several offshore stations in the Black Sea near the investigated estuaries. Surface sediments were collected annually in October for three years: 2006, 2007 and 2008. Despite some of the heaviest contamination, stations from the Crimean estuaries had only one sediment out of 87 total sediments demonstrating significant toxicity to amphipods ( $12 \pm 8\%$  survival). In contrast, sediments from the mainland estuaries manifested several instances of significant toxicity. In the 83 sediments tested, approximately 30% were significantly toxic to the midge with survival ranging from 13% to 73% in these samples. Daphnids tested with these same sediments, showed survival ranging from 40% to 60% in the six

stations found to be significantly toxic. Phase I TIEs indicated nonpolar organic contaminants and metals were the primary contributors to observed toxicity. These data will be used to determine which areas of the estuaries represent the greatest risk to the natural and economic resources of Ukraine.

Key Words: Ukraine; sediment toxicity; toxicity identification evaluations (TIE); estuarine; contaminants