CHRONOLOGY OF METAL POLLUTION IN GOLDEN HORN ESTUARY ISTANBUL, DERIVED FROM ^{210}PB AND ^{137}CS DATING

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Introduction

Untreated discharges of over 500 factory settled in the catchment area and untreated domestic wastewater posed to risk of metal pollution in Golden Horn estuary over 50 years (Coleman et al., 2009). In the current study chronology of metal pollution which occurred during the twenty century was determined by using ^{210}Pb and ^{137}Cs dating techniques.

Methods

Sediment core sample was taken by using a 150 cm gravity corer. The core (totally 122 cm) were cut into 2 cm thick sections. Pb-210 activities were measured in each slices by using alpha spectrometry, assuming secular equilibrium with ^{210}Po. Cs-137 activities in each 2 cm section were measured by using gamma spectrometry. The concentrations of essential and toxic metals (Ag, Al, As, Cd, Co, Cr, Cu, Fe, K, Mn, Ni, Pb, Sn, V and Zn) were measured by using ICP-MS (Inductively Coupled Plasma – Mass Spectrometer) after microwave digestion.

Results

The chronologic accumulation of Ag, Al, As, Cd, Co, Cr, Cu, Fe, K, Mn, Ni, Pb, Sn, V and Zn were determined in the core samples. The chronologic accumulation of Cd, Cr and Cu concentrations in the Golden Horn were illustrated in Fig.1 (Not all of the measured metal due to the page constraint. All result will be released in the presentation).

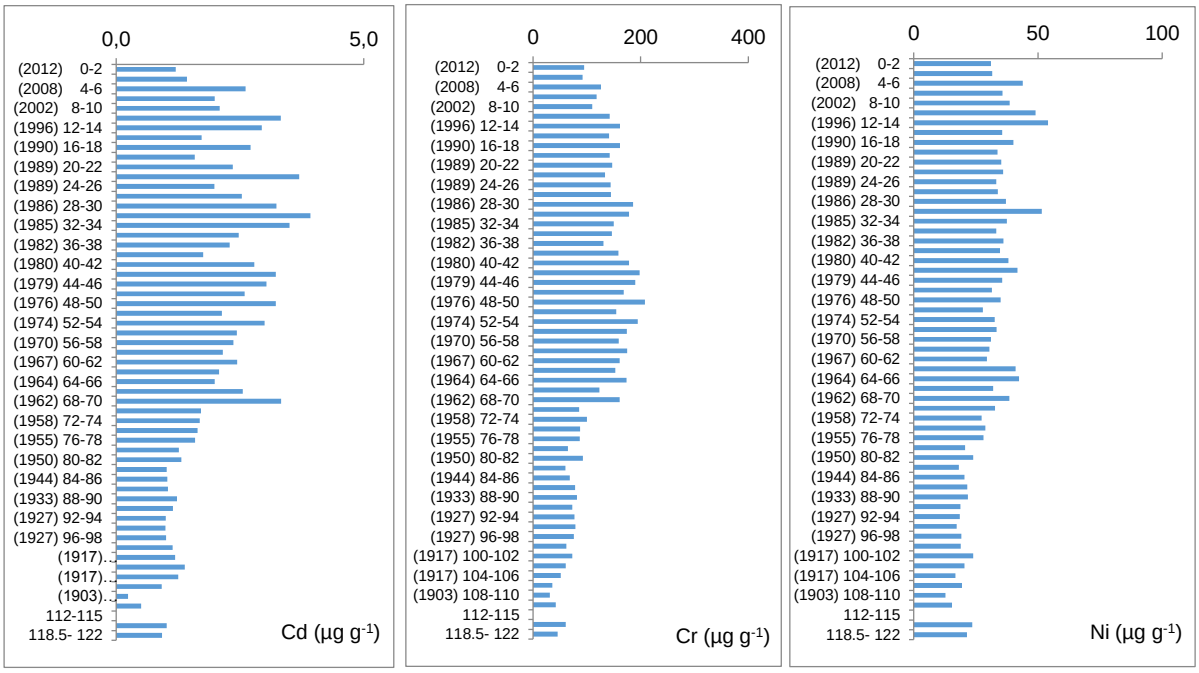

Figure 1. Chronologic record of Cd, Cr and Cu in Golden Horn estuary

Conclusion

It was seen that the concentrations of As, Cd, Cu, Cr, Mo, Ni, Zn which are the element that have potential to enrich artificially have increased 1955 to 1985 corresponding to increasing of industrial activities and population in the catchment area. The depth profile of lead displayed opposite trend which may be clarified with intensive exploiting of Golden Horn as well as before 1920 with military and transportation purposes. Haliç Naval shipyard which has been serving since Ottoman Empire might also have caused to increased lead concentrations before the massive urbanization and industrialization in Istanbul. The concentrations of lithogenic elements Al, Co, Fe, K, Mn, Na did not variated substantially but Al and Co.

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References

Coleman, Heather M.; Gurdal Kanat,; F. Ilter Aydinol Turkdogan. (2009). Restoration of the Golden Horn Estuary (Halic)." *Water Res.*, 43.20, 4989-5003.