# ARTIFICIALGEOMORPHIC TEXTURE CAUSE COPPER AND ZINC ACCUMULATION: CASE STUDY AT RUDONG

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## Introduction

Salt marshes are considered as effective sinks of metals(Reboreda & Caçador, 2007). In China, many artificial constructions created by reclamation projects have cause some ecological impacts on the salt marshes, which arouse contrary issues between economic development and environment protection(Ma et al., 2014). Cu and Zn are metals with biological effects depending on exposure that essential for growth at low concentration but toxic at high concentration.In the present study we analyze the content of Cu and Zn in sediments around a discarded dam, in order to determine the effect of artificial geomorphic textureon the sequestration of these two metal. This would broaden the knowledge on the environment impact of the reclamation projects.

## Methods

Sediment samples were collected in April, July, and November, 2013. Sites were selected around a discarded dam at Rudong with 3 different locations, i.e. background (across the saltmarsh), debris accumulation (with a distance <50m to the discarded dam, liptocoenosis accumulation observed), and without vegetation (with a distance <50m to the discarded dam, but no plant colonization).Samples were ground to powders and passed through a 100 mesh sieve.Organic C concentrations were obtained by analyzingthe samples using elemental analyzer(Elemental Analyser Vario EL III) after treated with 1M HCl to remove carbonate.The content of Al, Cu, and Zn was analysis using ICP-MS (Agilent 7700x) after pressurized acid digestion with a mixture of $HNO_3/HClO_4/HF$.

The geo-accumulation index (Igeo) and enrichment factor (EF) were used as indicators to compare Cu and Zn accumulation levels across the sites.The geo-accumulation index was calculated using the following equation:$I_{geo} = \log_2(C_n/1.5B_n)$,where $C_n$ is the concentration of the special element in sediment and $B_n$ is the geochemical background value.EF is computed using the equation:$EF = \frac{C_n/C_{ref}}{B_n/B_{ref}}$,where $C_n$ is the special element concentration in the sample, $C_{ref}$ is the concentration of the reference element in the sample, $B_n$ is the geochemical background value of this element and $B_{ref}$ is the background value of the reference element. of engin

## Results

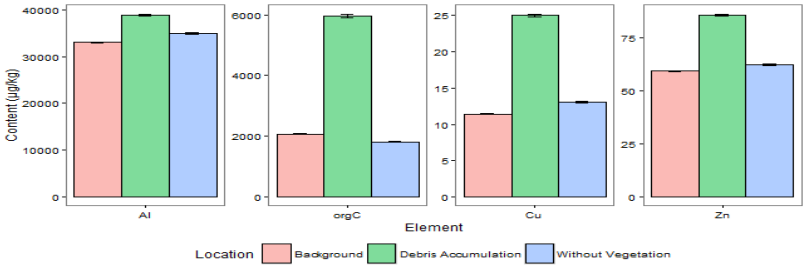


**Figure**.Selected element contents on different sites. Error bars represent the standard error of the data

**Table.**The geo-accumulation index and enrichment factor of element Cu and Zn with the standard error

| Location | Season | n | Geo-accuulation Index | | Enrichment Factor | |
|---|---|---|---|---|---|---|
| | | | Cu | Zn | Cu | Zn |
| Background | Apr | 15 | -0.730 ± 0.0187 A | -0.666 ± 0.00993 A | 0.931 ± 0.00958 A | 0.963 ± 0.00301 A |
| | Jul | 18 | -0.815 ± 0.0275 A | -0.6439 ± 0.0137 A | 0.897 ± 0.01149 A | 0.986 ± 0.00356 A |
| | Nov | 17 | -0.713 ± 0.0276 A | -0.6000 ± 0.0115 A | 0.942 ± 0.0165 A | 0.984 ± 0.00380 A |
| Debris Accumulation | Apr | 6 | 0.396 ± 0.0164 B | -0.196 ± 0.01506 B | 1.737 ± 0.02496 B | 1.151 ± 0.01092 B |
| | Jul | 6 | 0.412 ± 0.0436 B | -0.0817 ± 0.0340 B | 1.675 ± 0.02251 B | 1.187 ± 0.00818 B |
| | Nov | 6 | 0.482 ± 0.0209 B | -0.0275 ± 0.0155 B | 1.815 ± 0.0276 B | 1.273 ± 0.01405 B |
| Without Vegetation | Apr | 3 | -0.366 ± 0.0476 A | -0.553 ± 0.01339 A | 1.072 ± 0.03734 A | 0.938 ± 0.01017 A |
| | Jul | 8 | -0.561 ± 0.0291 A | -0.5660 ± 0.0219 A | 0.981 ± 0.00864 A | 0.976 ± 0.00389 A |
| | Nov | 8 | -0.522 ± 0.0237 A | -0.5523 ± 0.0157 A | 1.009 ± 0.0113 A | 0.985 ± 0.00312 A |

**Conclusion**
The accumulation of plant liptocoenosis caused by man-made construction might be the reason for the accumulation of Cu and Zn.Both geo-accumulation index and enrichment factor increased at the debris accumulation sites, implying the role of the artificial construction on the metaltransportation. Our study highlights the accumulation of organic matter with coastal zone constriction will lead to metal accumulation and element Cu might be sensitive for this process.

**Keywords:** Coastal development; Copper; Zinc; Geo-accumulation index; Enrichment factor