

Evaluating the incidence of polychlorinated naphthalenes and their associated risks in Markman Canal, Eastern Cape Province, South Africa.

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ABSTRACT

Persistent organic pollutants (POPs) such as polychlorinated biphenyls, organochlorine pesticides, polybrominated diphenyl ethers and many more have been broadly reported across the globe, but studies relating to the occurrence of polychlorinated naphthalenes (PCNs) in South Africa environment are still scarce. Hence, PCNs were evaluated for the first time in water and sediments collected from Markman Canal (MMC). The sum of eight PCNs congener's $\sum_8$ PCNs in water and sediment samples varied from 0.035-0.699 $\mu\text{g/L}$ and 0.260-6744.16 $\mu\text{g/kg dw}$ respectively.

Key words: Persistent organic pollutant, polychlorinated naphthalene, Markman Canal, toxic equivalency, remediation.

INTRODUCTION

- PCNs are organochlorine chemicals listed as POPs in May 2015 at the Stockholm Convention because of their hazardous, bioaccumulation and persistent tendencies in the environment (UNEP, 2015).
- They were manufactured to be applied as flame retardants in consumer products, and as insulators for capacitors among other applications (Agunbiade *et al.*, 2020).

OBJECTIVE

The main objective of this research is to determine pollution status of MMC

METHODS

Physicochemical parameters (PPs) were determined following standard methods. PCNs in water and sediments were extracted with solid phase extraction (SPE) and soxhlet methods as described by Marti and Ventura (1997) and Mahmood *et al.*, (2014), respectively.

RESULTS

➤All the water PPs are within the acceptable limits except electrical conductivity, total dissolved solids and turbidity. The temperature was least in winter when compared with other two seasons.

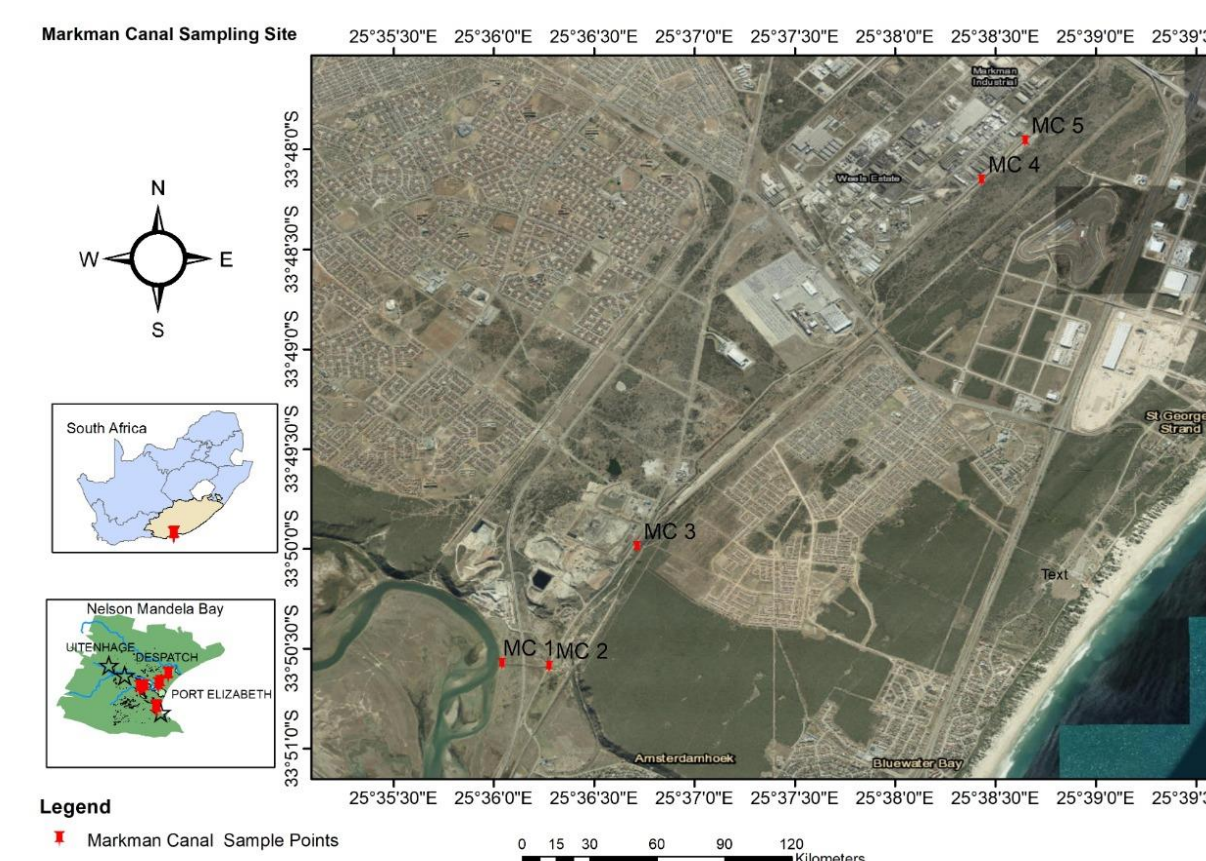


Figure 1: Map of Markman Canal

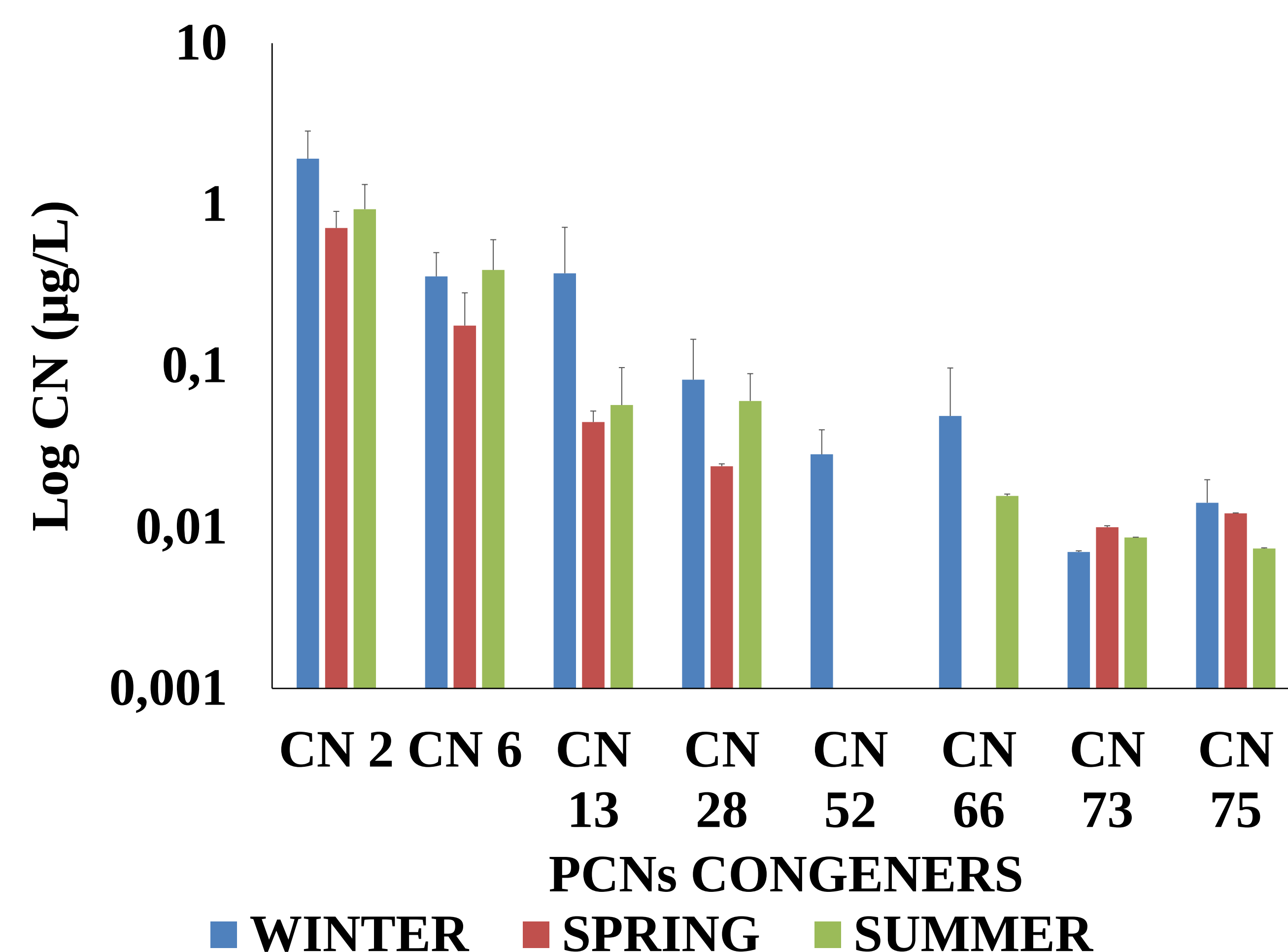


Figure 2: Seasonal variations of PCNs in MMC water samples

CONCLUSIONS

- ❖The results from this study have established the extent of pollution of this waterbody in relation to PCN concentrations.
- ❖Seasonal evaluations showed that water PCNs were higher in winter than the remaining two seasons, while sediment samples composed of elevated PCNs during wet seasons.

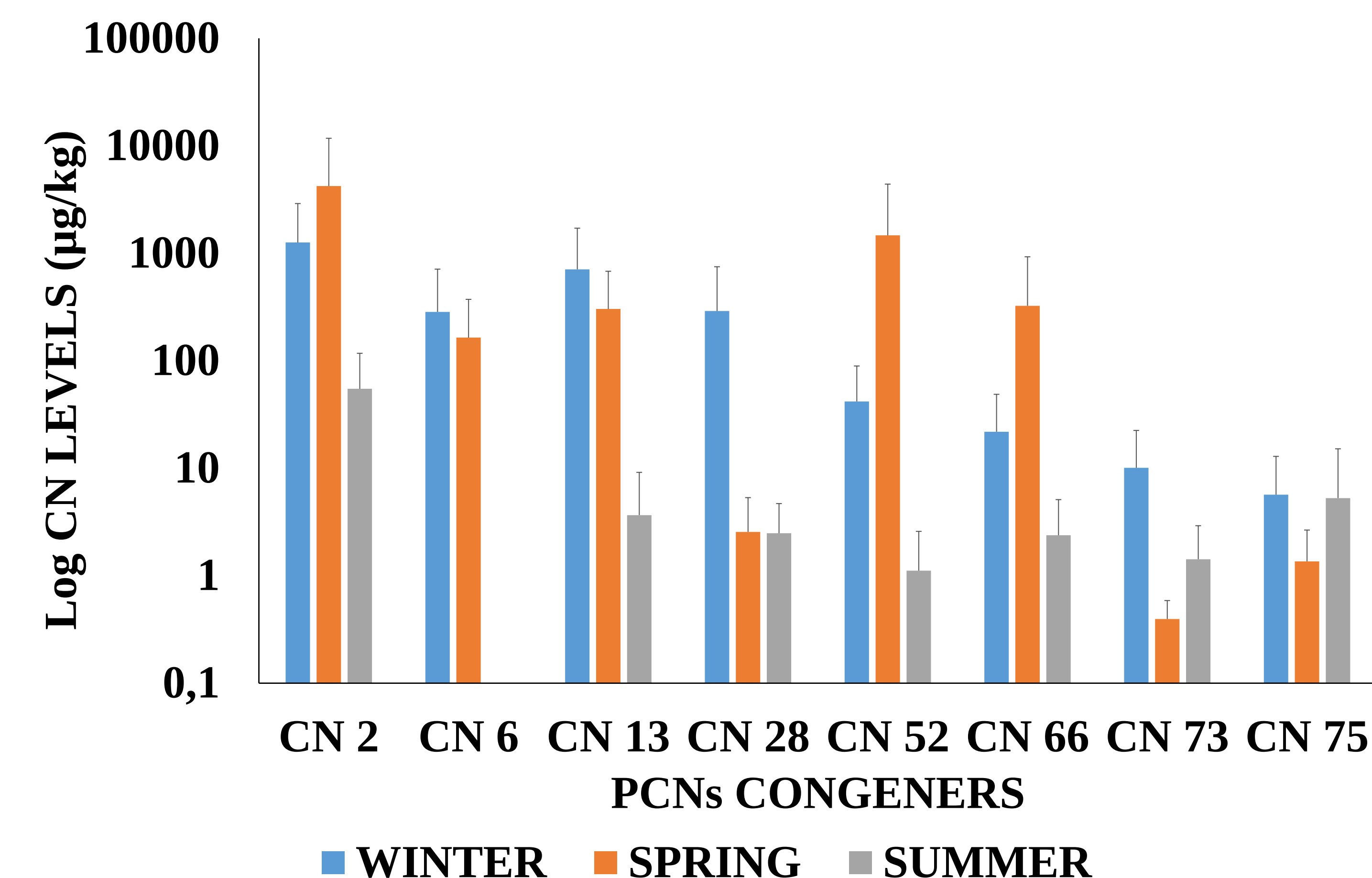


Figure 3: Seasonal variations of PCN levels in MMC sediments

It is believed that this study is in line with one of the seventeen (17) United Nations Sustainable Development Goals, which is clean water and sanitation. The United Nations has emphasized that access to pure water and sanitation is every individual's fundamental right.

REFERENCES

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ACKNOWLEDGEMENTS



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