

# HEAVY METALS IN THE SEDIMENTS OF TWO SPANISH COASTAL SYSTEMS AND THEIR TRANSFER TO THE FOOD CHAIN

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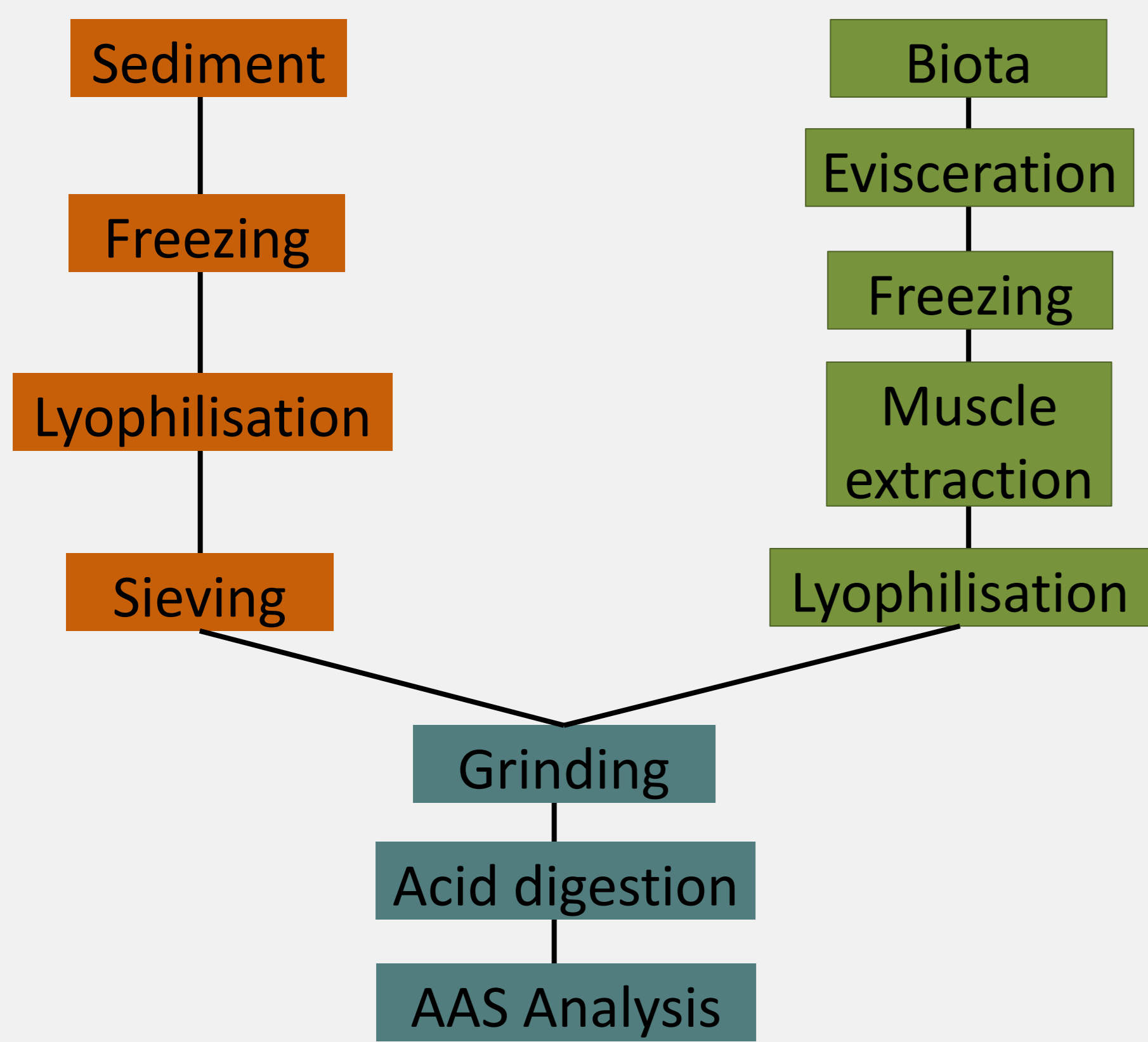
## INTRODUCTION AND STUDY AREA

Trace metals are one of the group of pollutants considered in the European Directives (WFD) and the Marine Strategies as potential toxicants and their levels should be controlled in the environment. These elements reach coastal systems through different pathways both natural and anthropogenic and depending on the human activities carried out in each area, different metals will appear in the environment. The sediments are the final reservoirs where these pollutants are deposited and concentrated and once there, they can be transferred to the food chain.

In the present study, trace metal levels were measured in the sediments of two Spanish coastal systems with different sources of pollution, the Ría of Vigo in the Atlantic part is mainly affected by maritime transport and port industrial activities and the Mar Menor lagoon in the Mediterranean area with an important input coming from the mining district located in the southern mountain chain.

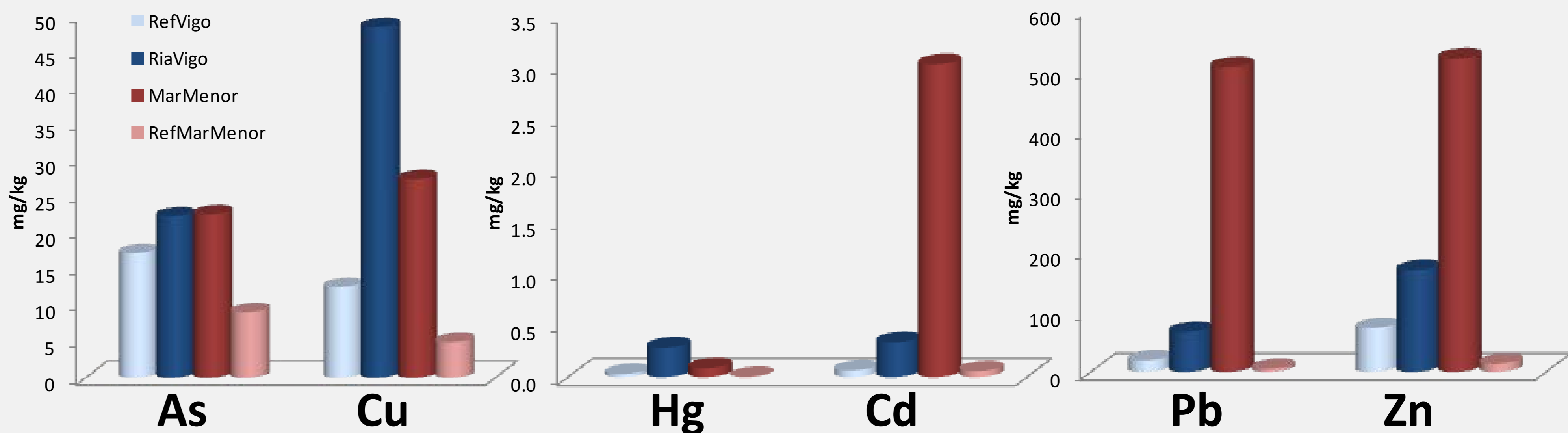
In addition, organisms from different trophic levels were sampled in order to study the transfer of these metals to the food chain. Two of these species were the sea snail (*Murex trunculus*) and the cockle (*Cerastoderma glaucum*) its main nourishment.

## MATERIAL AND METHODS

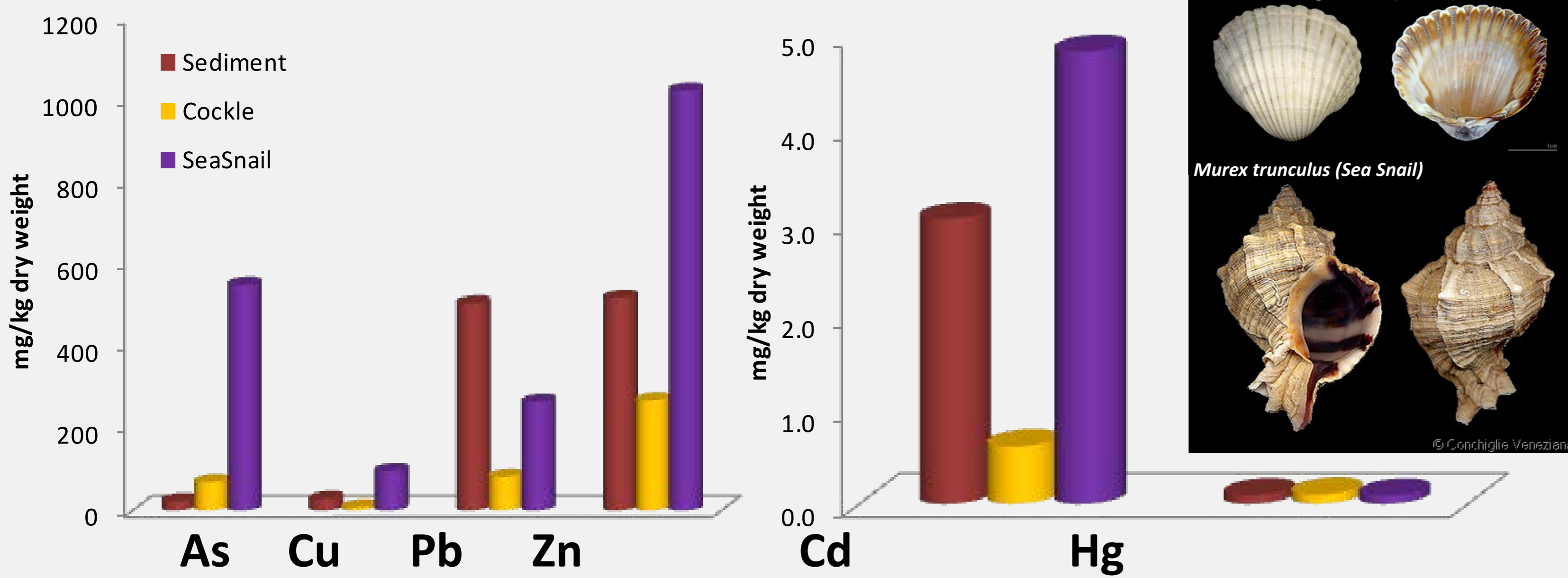


## RESULTS AND DISCUSSION

**Levels in sediments.** Mean heavy metal concentrations in the Ría of Vigo and Mar Menor sediments and comparison with the reference stations located far away from the anthropogenic sources.

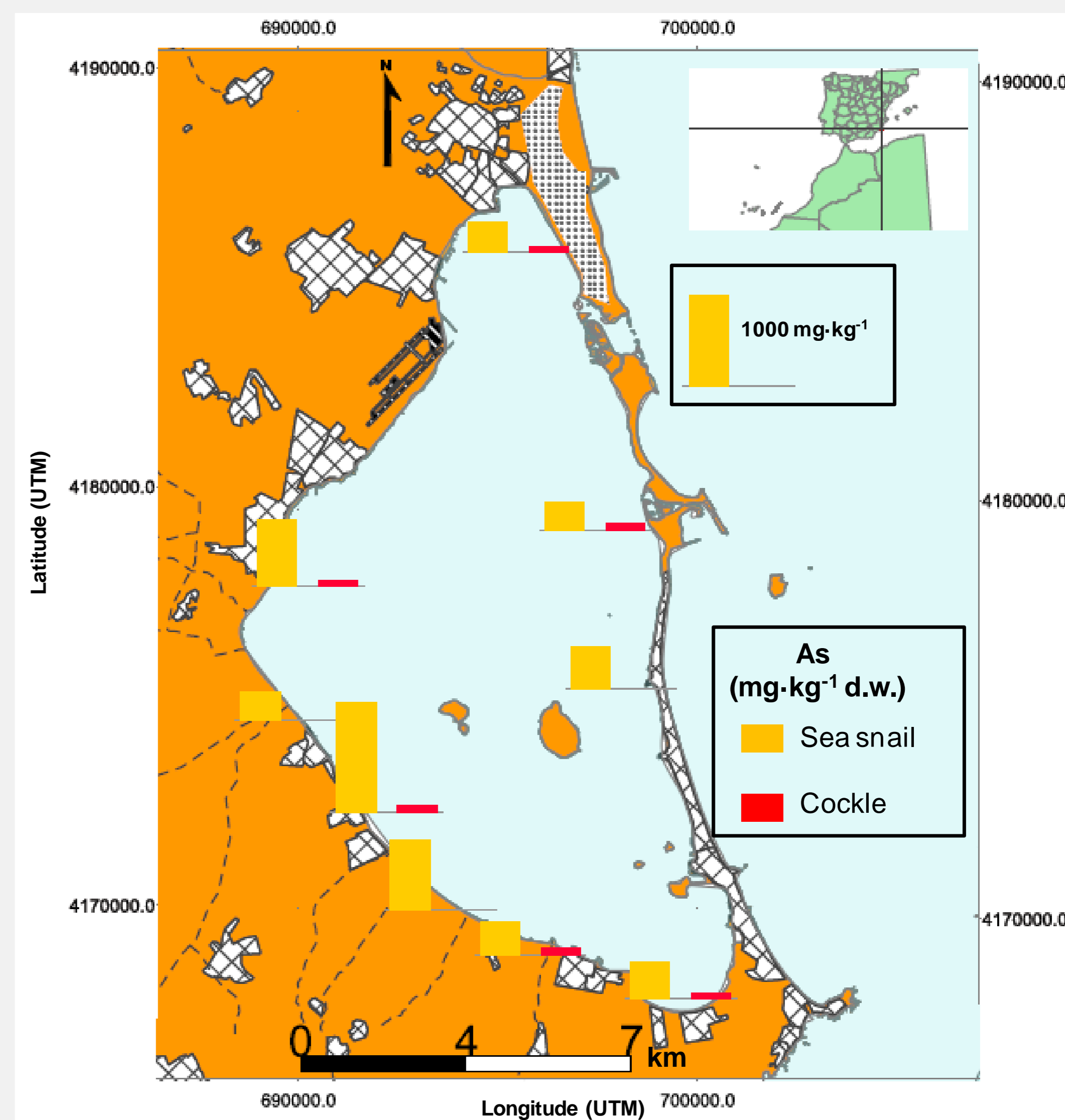


**Levels in Biota.** Mean heavy metal concentrations in the cockle and sea snail (mg/kg dry weight) sampled in the Mar Menor and comparison with the mean concentrations in the sediments of this lagoon.



**Biomagnification Factor.** Heavy metal concentrations in sea snail to heavy metal in cockle ratios.

	As	Cd	Cu	Hg	Pb	Zn
BMF	8.2	9.9	13.9	0.80	13.4	5.5



Arsenic concentrations in cockle and sea snail in the different stations of the Mar Menor lagoon.

## CONCLUSIONS

- All the metals but Cd, exceed Effect Range Low (ERL) levels in the Ría of Vigo sediments.
- Arsenic and Cd surpass ERL levels in the Mar Menor sediments while Pb and Zn exceed Effect Range Medium (ERM) levels.
- Biomagnification factors (BMF) in sea snail from cockle in the Mar Menor were higher than 5 for trace metals with the exception of Hg. Concretely BMF was higher than 10 for Cu and Pb and between 5 and 10 for As, Cd and Zn.
- Sea snail has been proved as a good indicator of metal and persistent organic pollutants in Mar Menor lagoon.

## References:

- EPA (2002). Mid-Atlantic Integrated Assessment (MAIA) Estuaries 1997-98. Summary Report. Environmental Conditions in the Mid-Atlantic Estuaries. U.S. Environmental Protection Agency.
- OSPAR Commission (2009). Background Document on CEMP Assessment Criteria for QSR 2010. In: Monitoring and Assessment Series. OSPAR Commission, London.
- Quelle, C.; Besada, V.; Andrade, J.M.; Gutierrez, N.; Schultze, F.; Gago, J.; González, J.J. (2011). Chemometric tools to evaluate the spatial distribution of trace metals in surface sediments of two Spanish rías. *Talanta*, 87: 197-209.

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