

# VERTICAL DISTRIBUTION OF LEGACY AND CURRENT USED PESTICIDES IN MARINE INTERSTITIAL WATER FROM EIGHT IBERIAN MEDITERRANEAN AREAS

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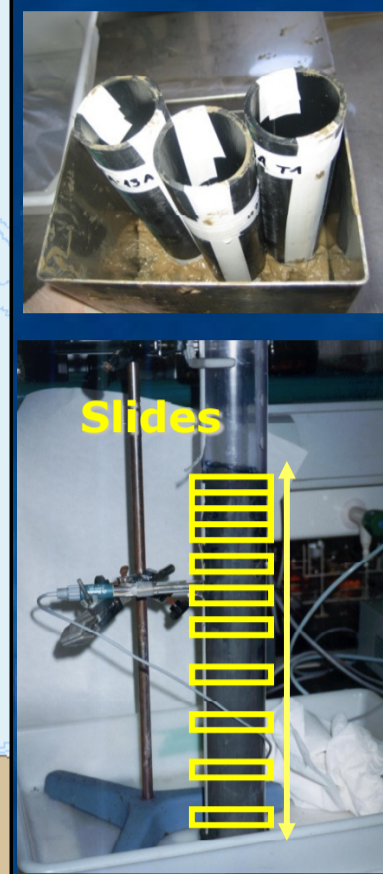
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## INTRODUCTION

Organochlorinated and current used pesticides (CUPs: organophosphorus pesticides, triazines and others) concentrations were determined in interstitial water of sediment cores from eight Iberian Mediterranean coastal areas (Barcelona, Tarragona, Ebro Delta, Valencia, Castellón, Cartagena, Almería and Málaga). This matrix was selected due to their relevance in the bioavailability of the chemical pollutants, particularly for demersal species.

## MATERIAL AND METHODS

### STUDY AREA AND SAMPLING PROCEDURE



#### SAMPLING

Two campaigns were carried out: autumn 2007 and 2008. 3-5 Sediment cores were sampled with box corer per point and area.

#### SAMPLE TREATMENT

Slides (1 cm thick): 0-1,1-2, 2-3,3-4,5-6,8-9,12-13,16-17 cm

Interstitial water was obtained by centrifugation and each samples from every site and depth were pooled.

### PESTICIDE ANALYSIS

#### EXTRACTION METHOD AND ANALYSIS

CUPs analysis in interstitial water was performed by stir bar sorptive extraction (SBSE) coupled to GC/MS (Moreno-González et al., 2013).

This method was validated for 17 organochlorinated pesticides (OCPs), 17 organophosphorus pesticides (OPPs), 13 triazines, 10 different insecticides and fungicides and tributylphosphate.

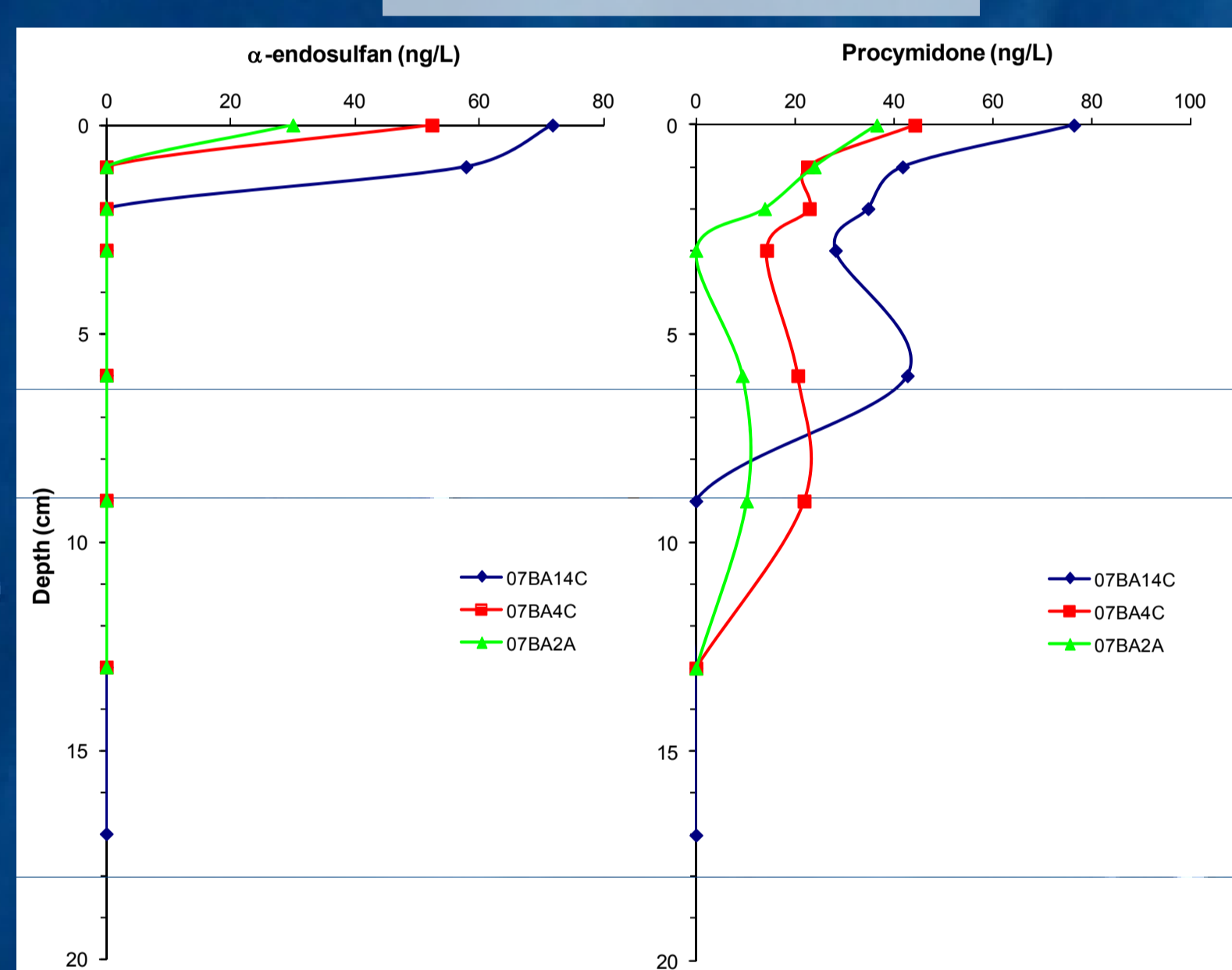
## RESULTS AND DISCUSSION

### PRESENCE OF PESTICIDES IN INTERSTITIAL WATER

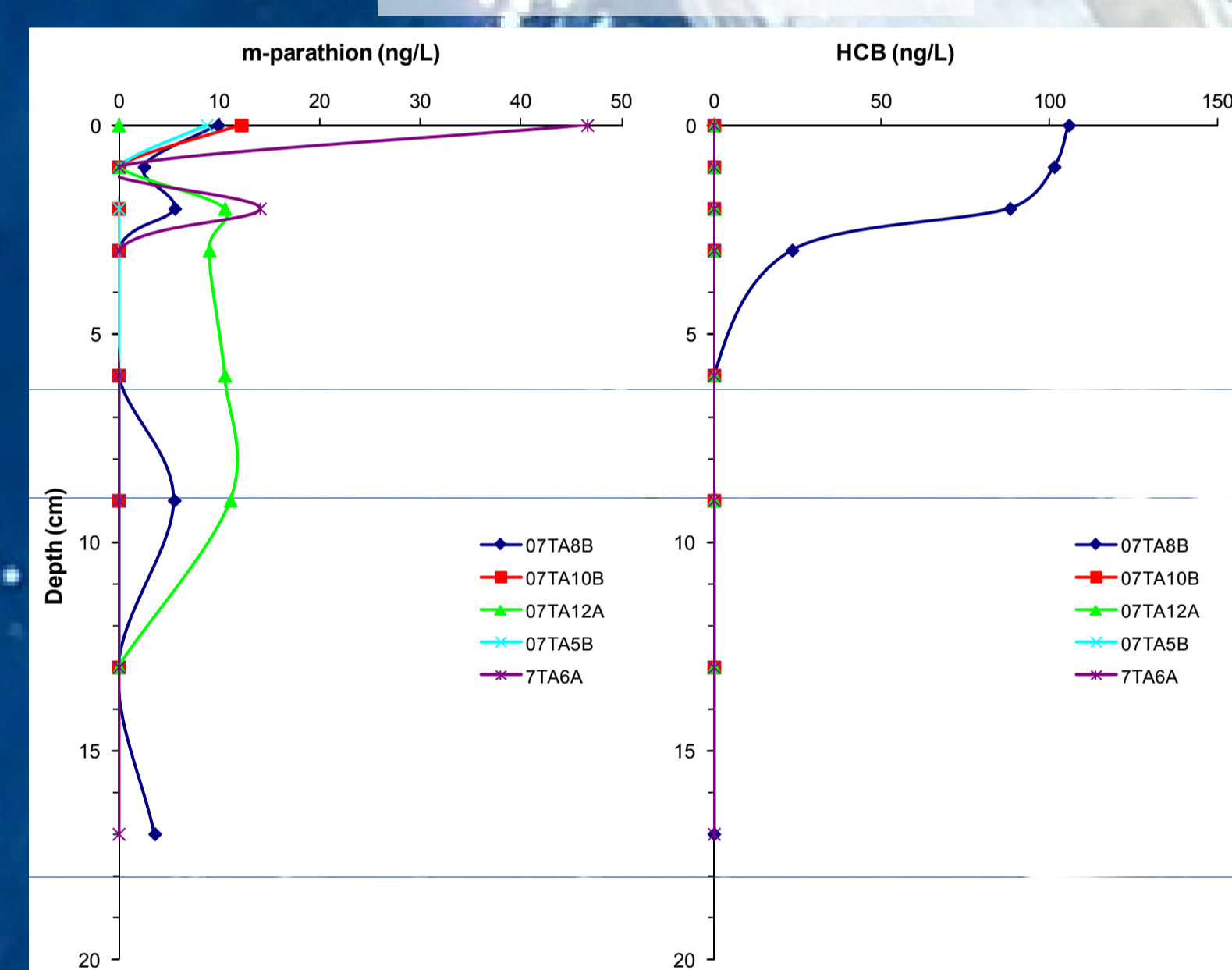
Considering all studied areas 36 compounds were detected in interstitial water: 8 OCPs ( $\alpha$ -endosulfan, p,p'-DDE, alachlor, HCB, lindane,  $\delta$ -HCH, isodrin and endrin), 12 triazines (simazine, atraton, secbumeton, propazine, atrazine, terbutryn, prometon, simetryn, terbuthylazine, terbuthylazine-desethyl, ametryn and terbumeton), 10 OPPs (diazinon, etoprophos, chlorpyrifos, fenclorophos, disulfoton, tokuthion, trichloronate, m-parathion, chlorpyrifos-methyl and chlorfenvinphos) and 6 different pesticides and additives (tributylphosphate, procymidone, propyzamide, pendimethalin, chlorthal-dimethyl and propoxur).  $\alpha$ -endosulfan, p,p'-DDE, m-parathion, tributylphosphate, procymidone and propyzamide were found in all areas.

### VERTICAL DISTRIBUTION OF PESTICIDES IN INTERSTITIAL WATER

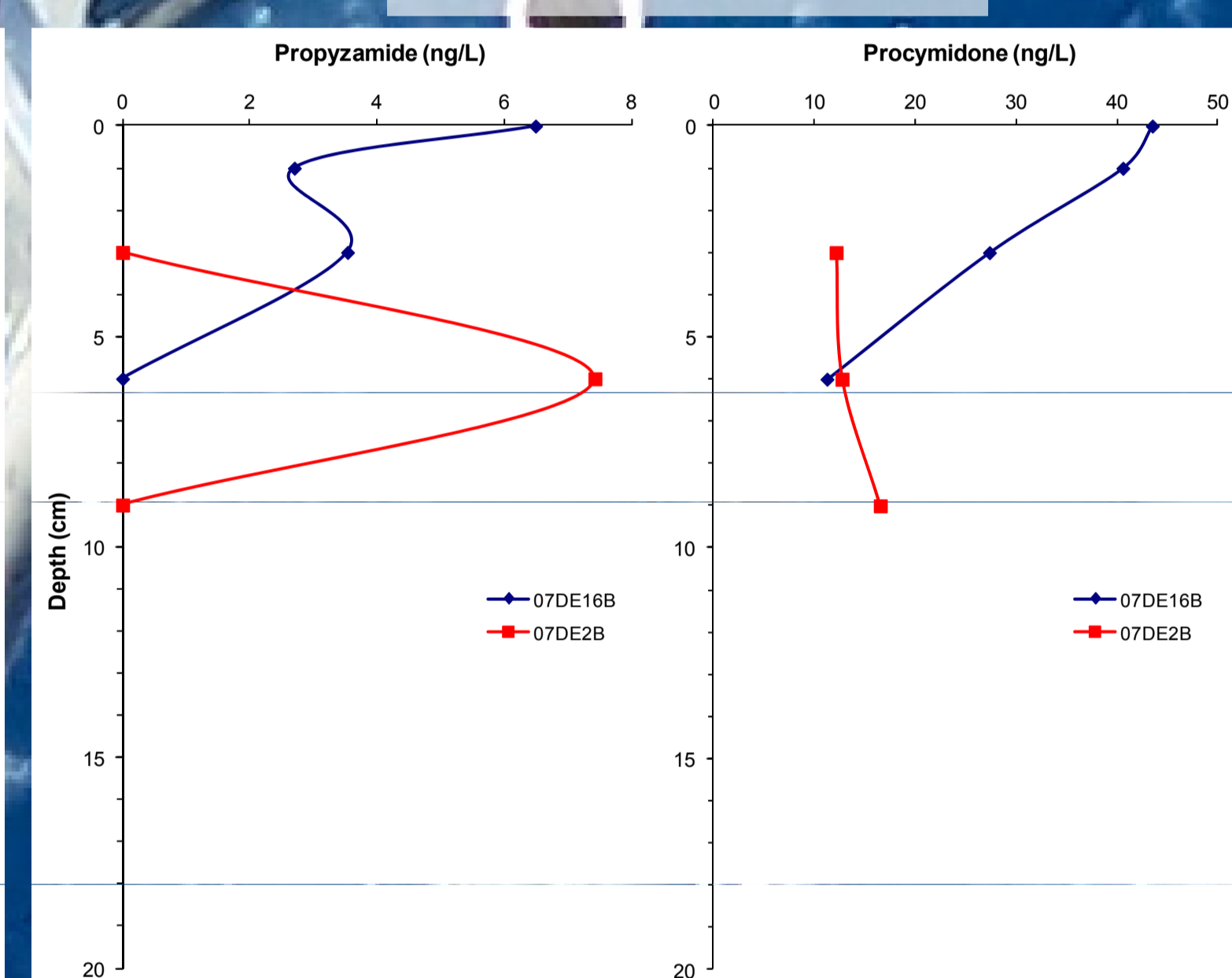
#### BARCELONA



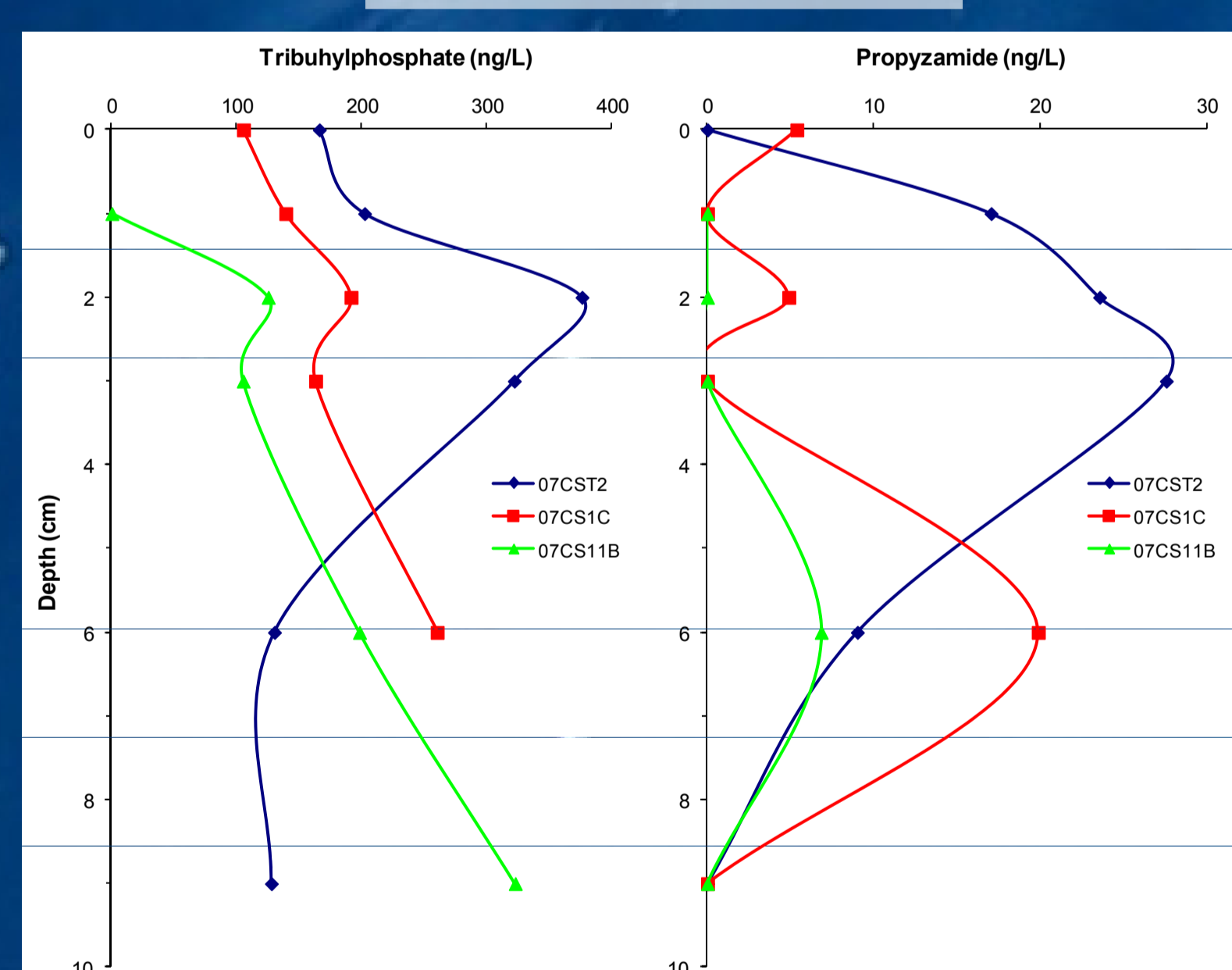
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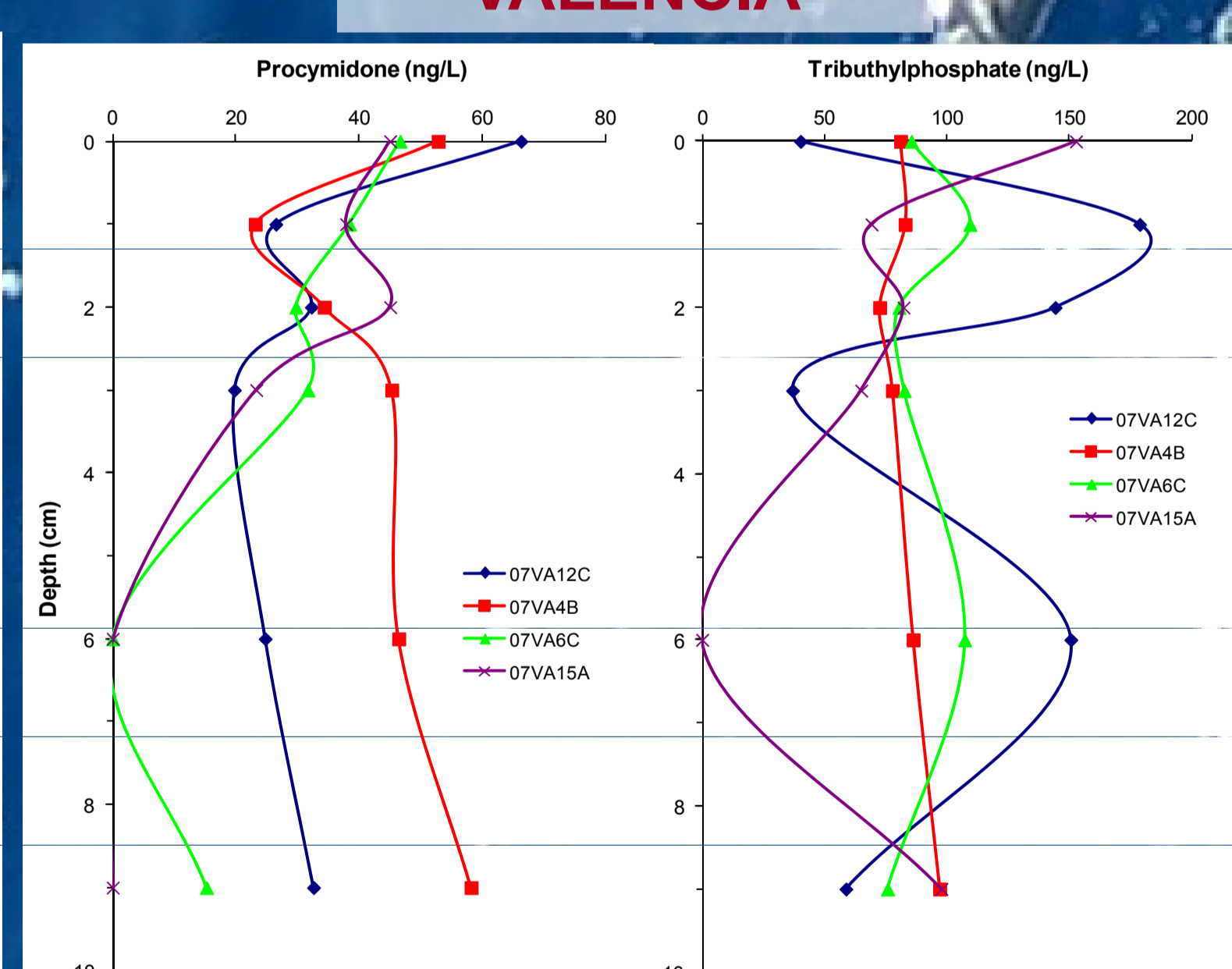
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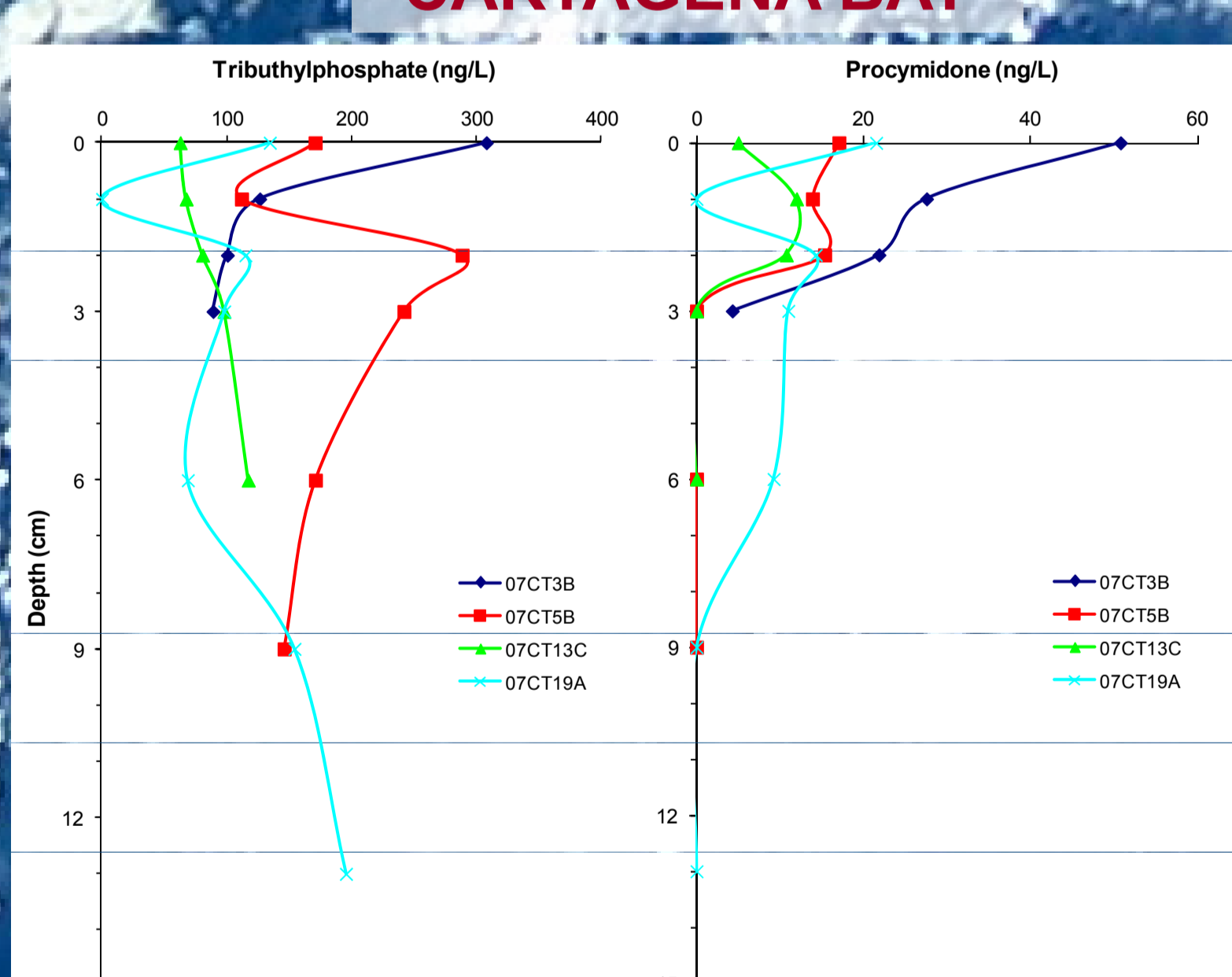
#### CASTELLÓN



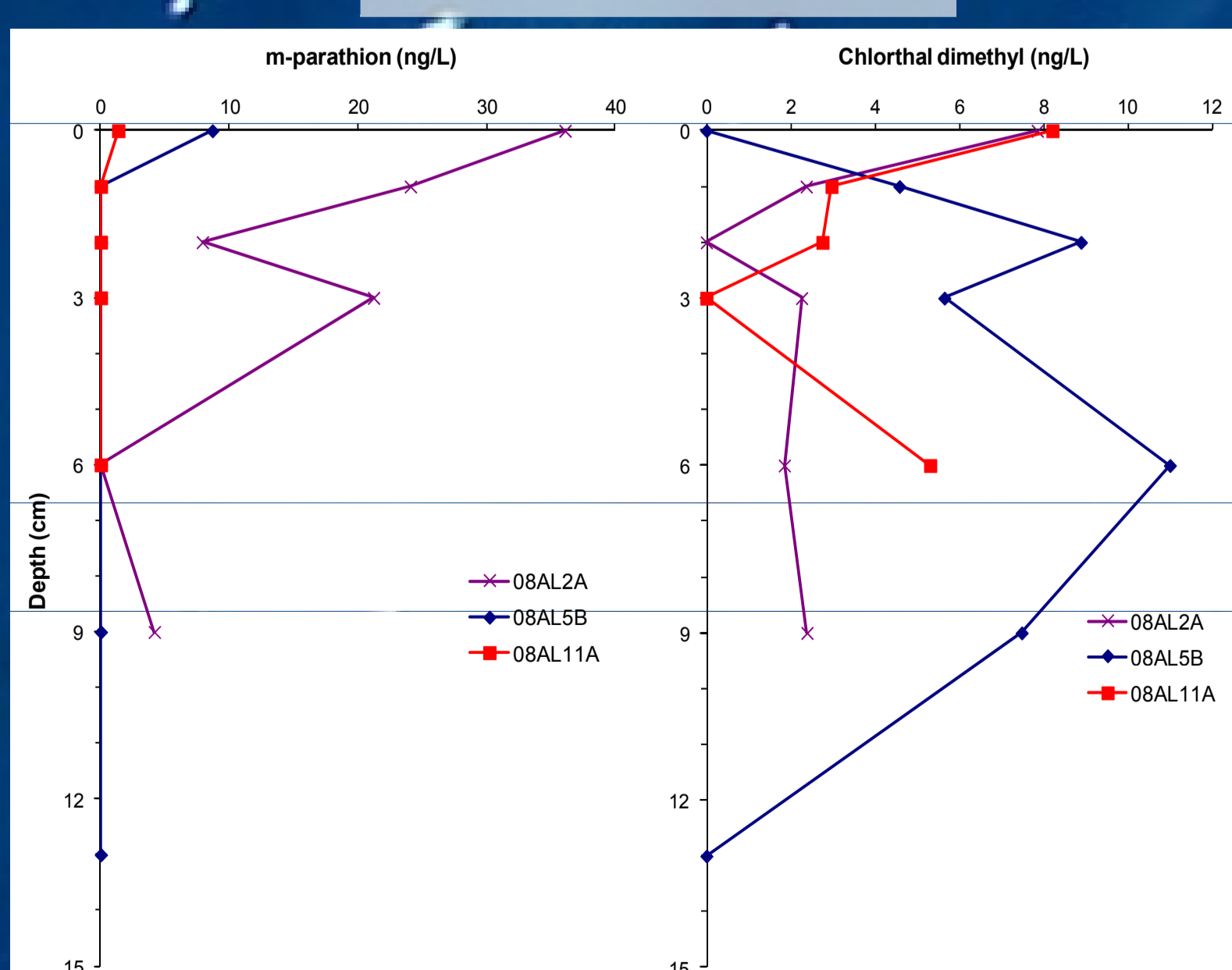
#### VALENCIA



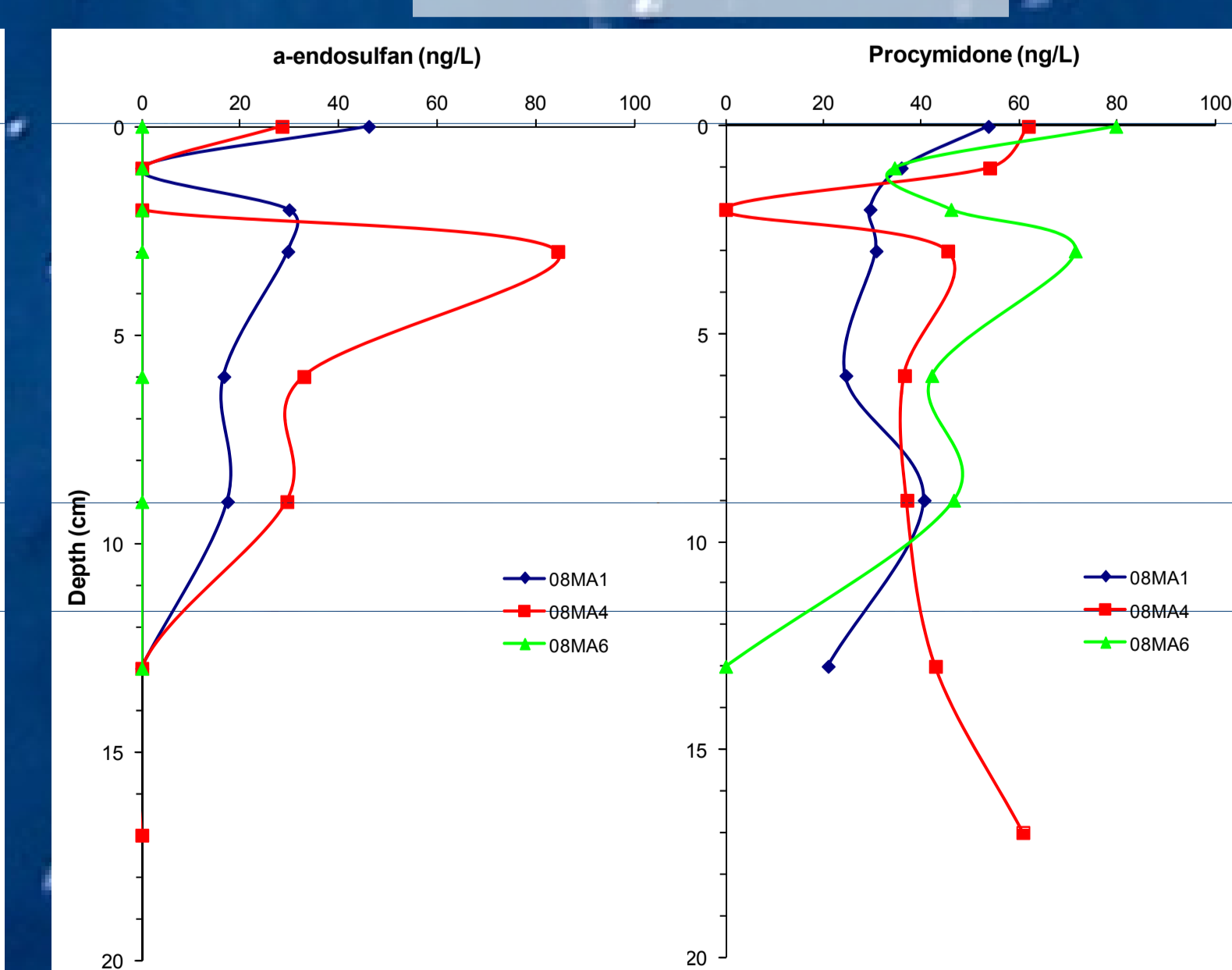
#### CARTAGENA BAY



#### ALMERÍA BAY



#### MÁLAGA BAY



Vertical legacy and current used pesticides distribution in interstitial water were not homogeneous, maximum concentrations were found mainly in upper layers and a sharp concentration decrease was observed at deeper layers for the majority of compounds.

The analysis of 3 different cores per area have also confirmed the spatial variability per area, probably related with the sediment properties and hydrodynamic of each sampling point.

The vertical distribution observed for many of the studied compounds have confirmed CUPs presence in continental shelf sediments and their capacity to diffuse through the interstitial water to deeper layers, depending on sediment properties (TOC, granulometry, etc.).

## CONCLUSIONS

Triazines, organochlorinated pesticides, organophosphorus and other pesticides were found in interstitial water of the study areas. The total number of pesticides found per each area varied from 6 to 17 compounds. Procymidone and propyzamide were found in all areas at concentrations below 100 ng L<sup>-1</sup>. Other commonly detected compounds were  $\alpha$ -endosulfan, m-parathion, alachlor, chlorthal dimethyl, simetryn and propyzamide. Overall the concentrations of CUPs decreased with depth in the considered areas. However, the presence of some legacy pesticides, such as p,p'-DDE was mostly detected in deeper layers. These data confirm the presence of organochlorinated and current-use pesticides in continental platform sediments and support the use of interstitial water as an indicator of this more bioavailable fraction, particularly for demersal species.

## ACKNOWLEDGEMENTS

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## REFERENCES

•Moreno-González, R., Campillo, J.A., León, V.M. 2013. Marine Pollution Bulletin, 77, 400-411.