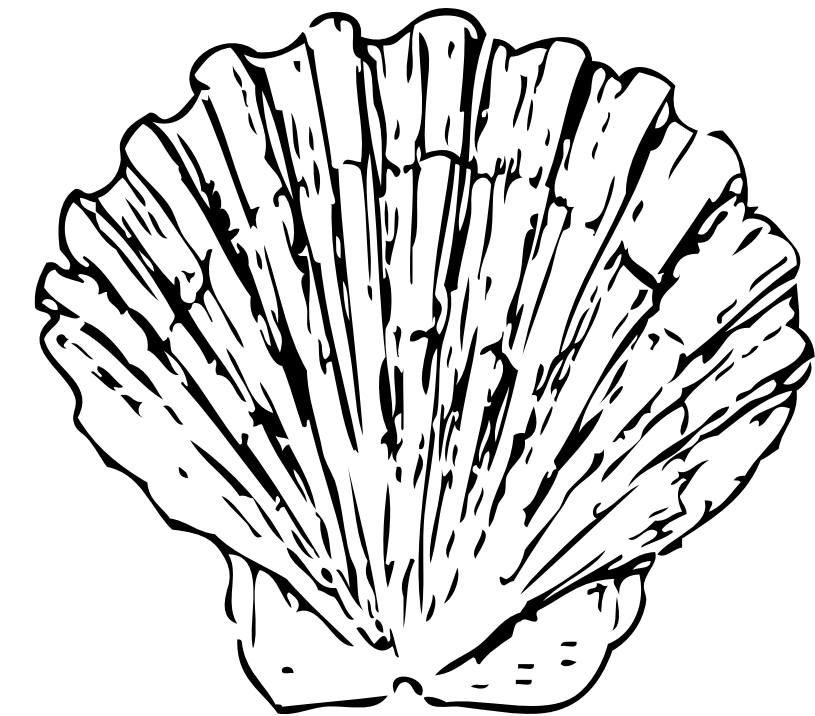
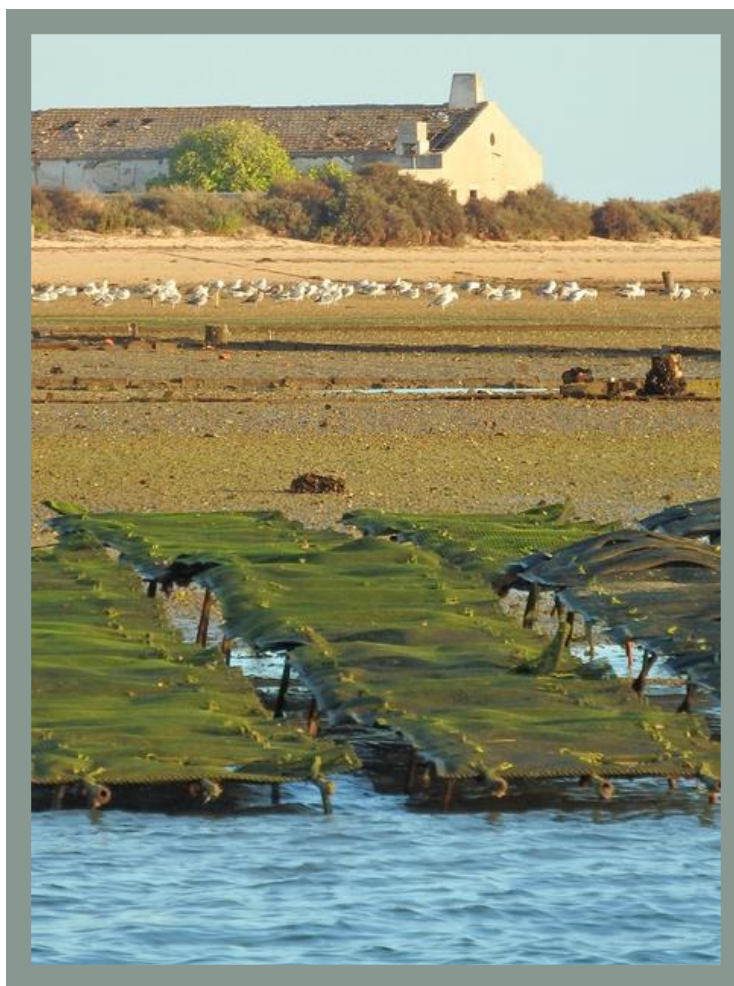


# NEAR SHORE HAB GENERATION MODELS



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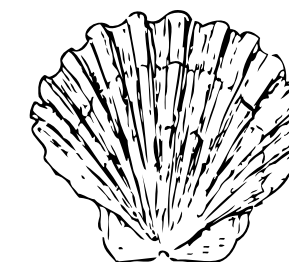
BÁRBARA VIANA DA SILVA  
PHD CANDIDATE AT INSTITUTO SUPERIOR TÉCNICO  
SUPERVISOR: RAMIRO NEVES



*Dinophysis acuminata*

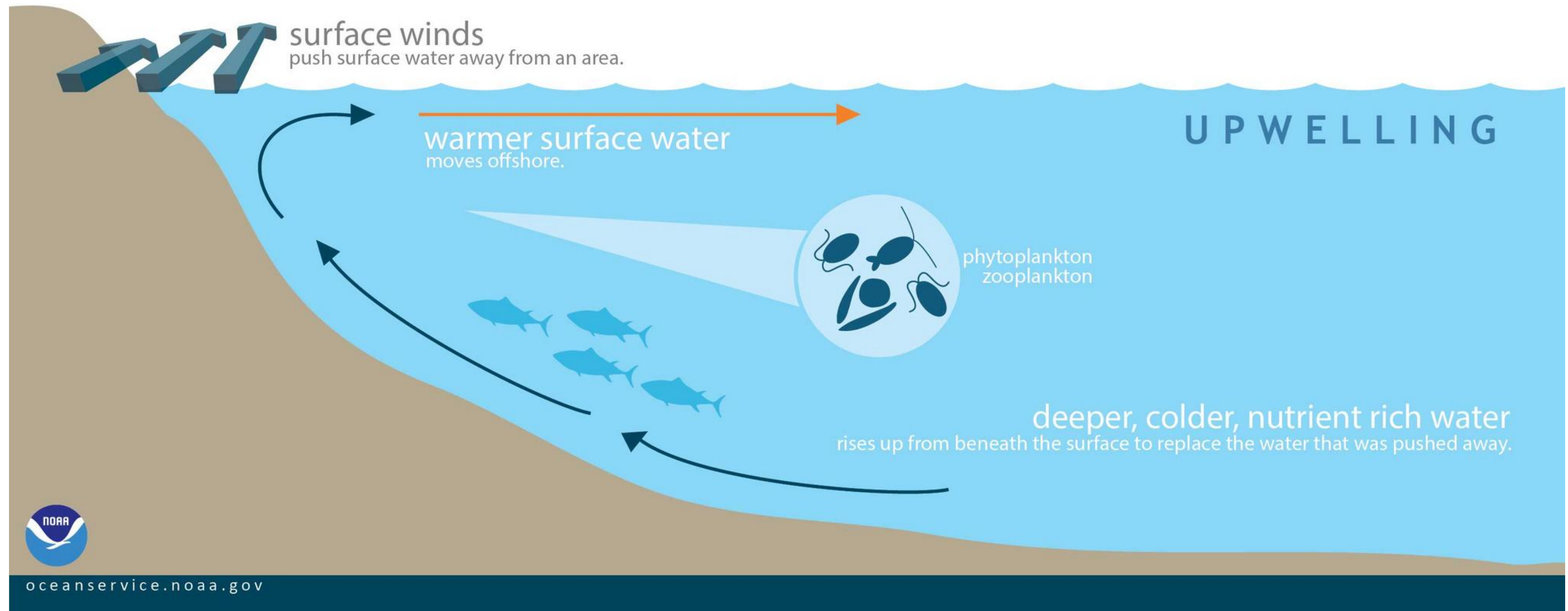
# INTRODUCTION

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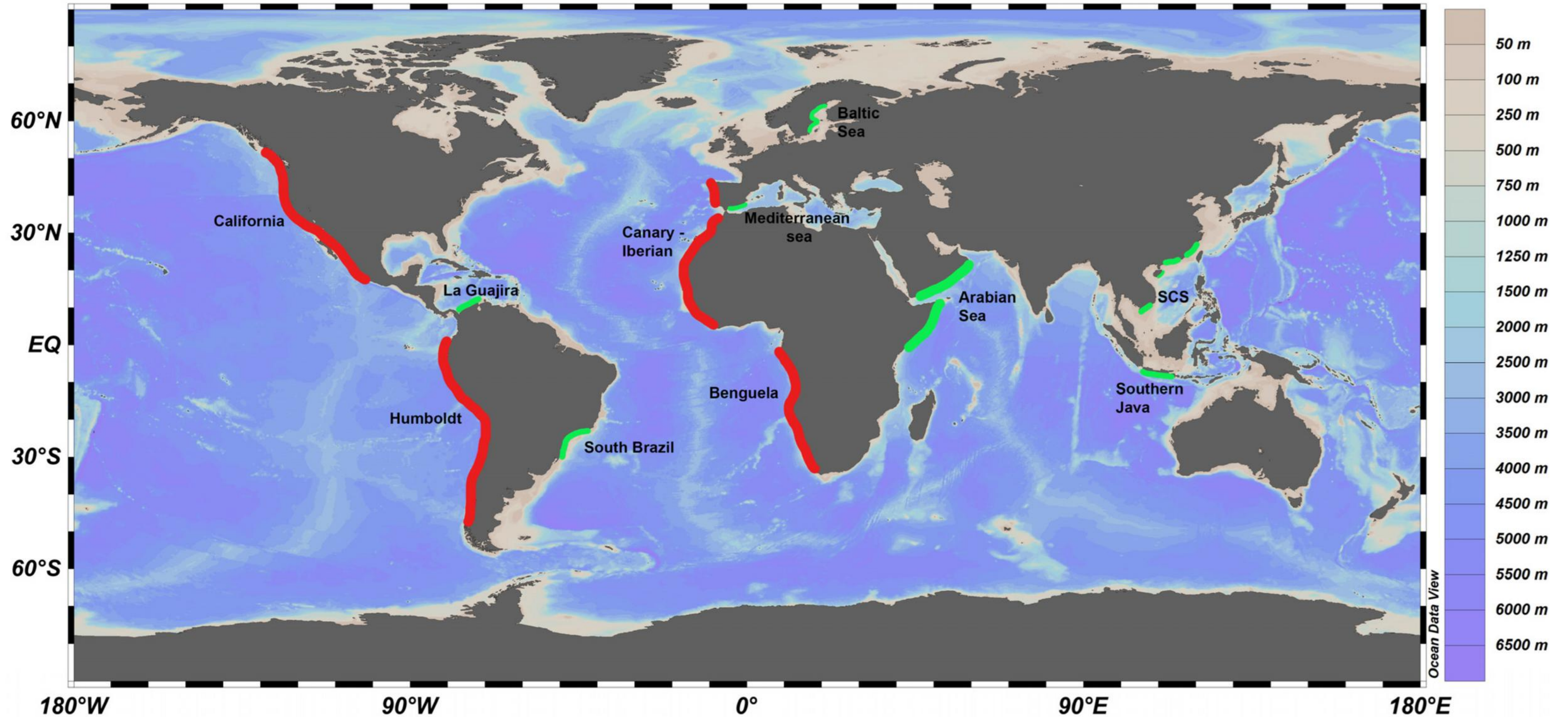


1. Phytoplankton and its relevance for the marine ecosystem.

# COASTAL UPWELLING SYSTEMS

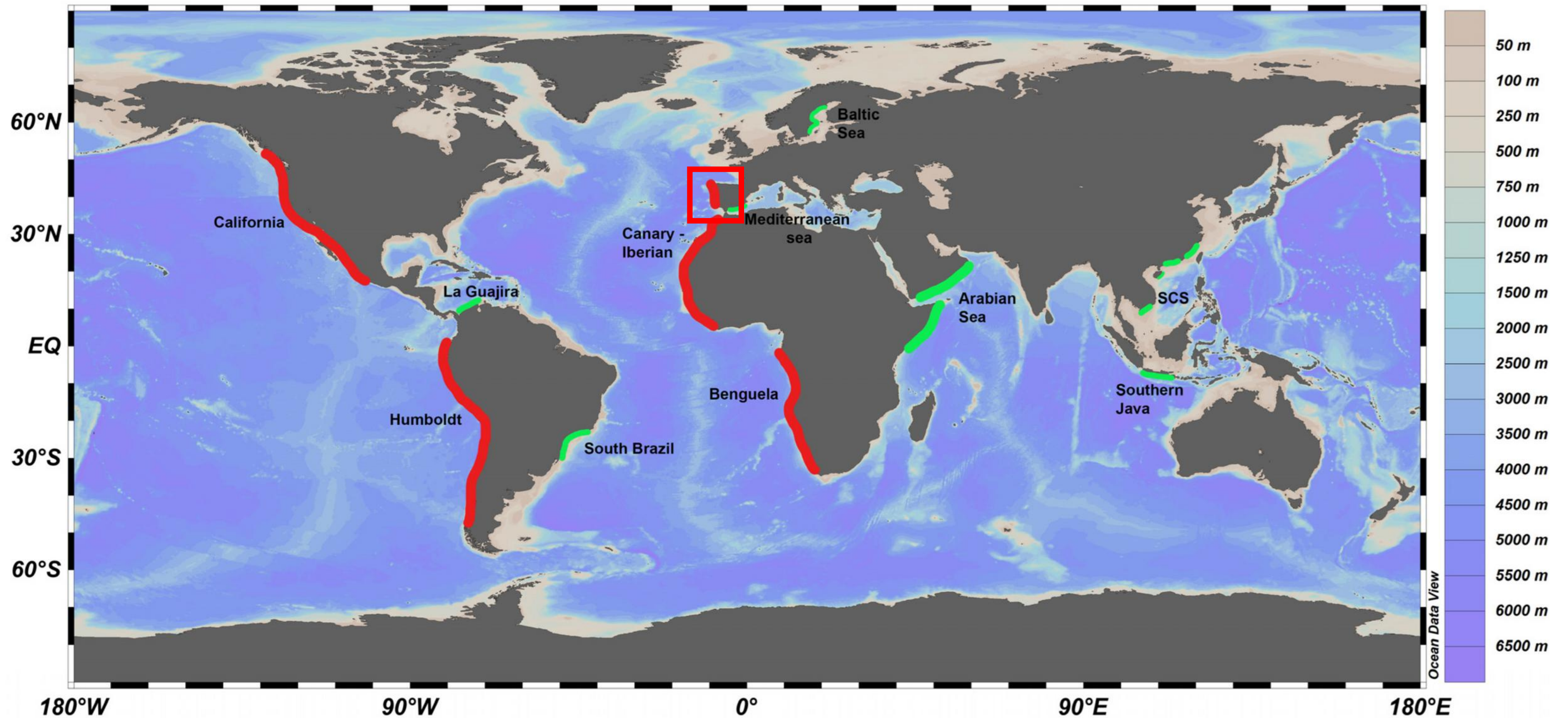


# COASTAL UPWELLING SYSTEMS

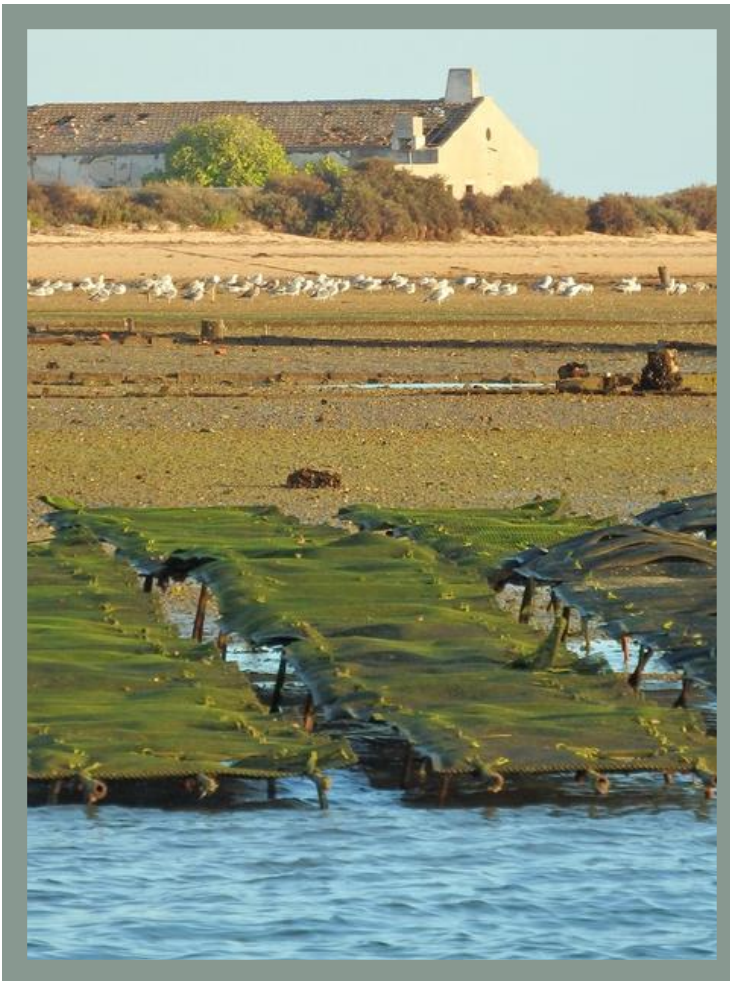


Red regions represent Eastern Boundary Upwelling Systems (EBUS), and green represents other upwelling regions.

# COASTAL UPWELLING SYSTEMS



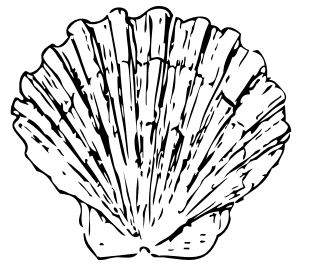
Red regions represent Eastern Boundary Upwelling Systems (EBUS), and green represents other upwelling regions.



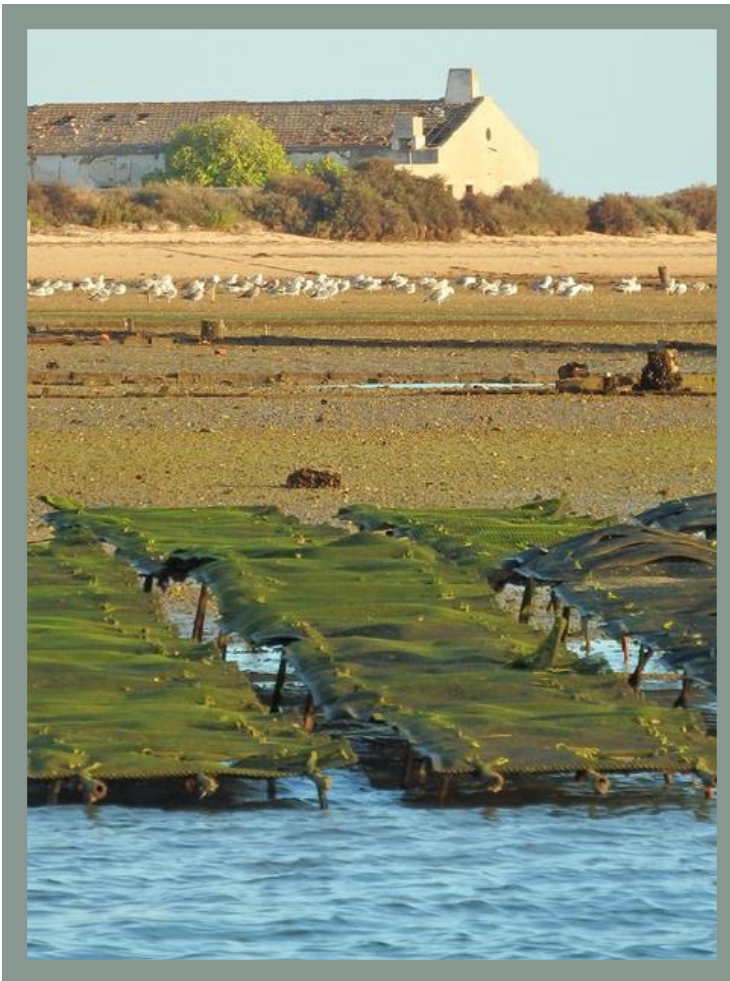
*Dinophysis acuminata*

# INTRODUCTION

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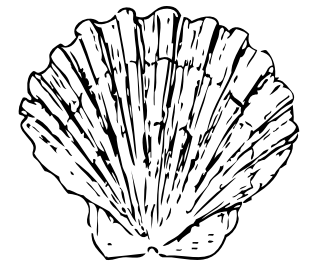
1. Phytoplankton and its relevance for the marine ecosystem.
2. Increases in toxic phytoplankton in the Iberian Coast.



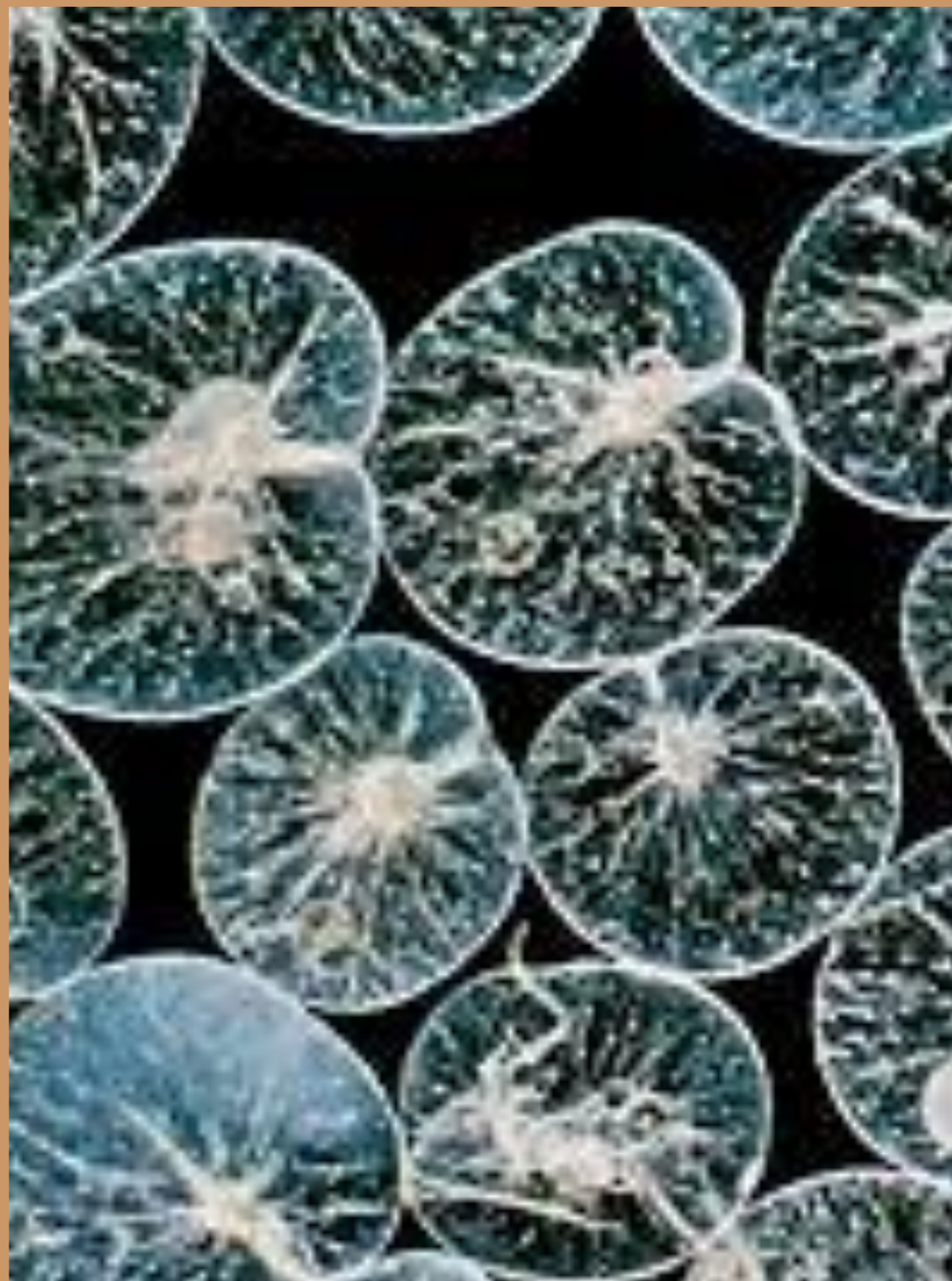
*Dinophysis acuminata*

# INTRODUCTION

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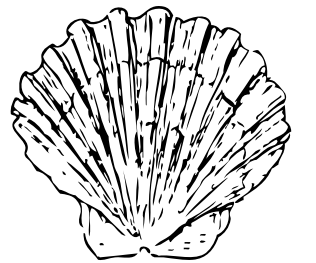


1. Phytoplankton and its relevance for the marine ecosystem.
2. Increases in toxic phytoplankton in the Iberian Coast.
3. Those toxic species affect the commercialization of molluscs, such as important bivalves, for example.



# INTRODUCTION

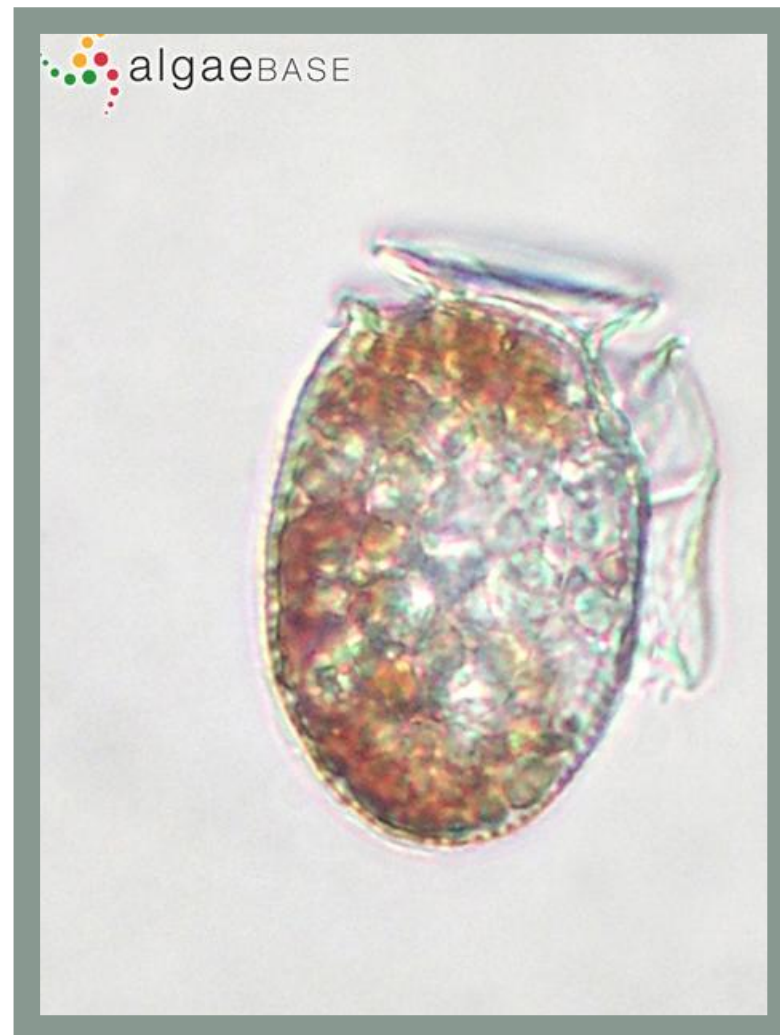
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It was observed that, by far, DSP has been the most common HAB syndrome causing impacts in the coastal regions of Portugal.

In the last three decades (33 years):

185 DPS related HAB events  
registered;



~5.6 per year

75 PSP associated HAB events  
in the same time window;

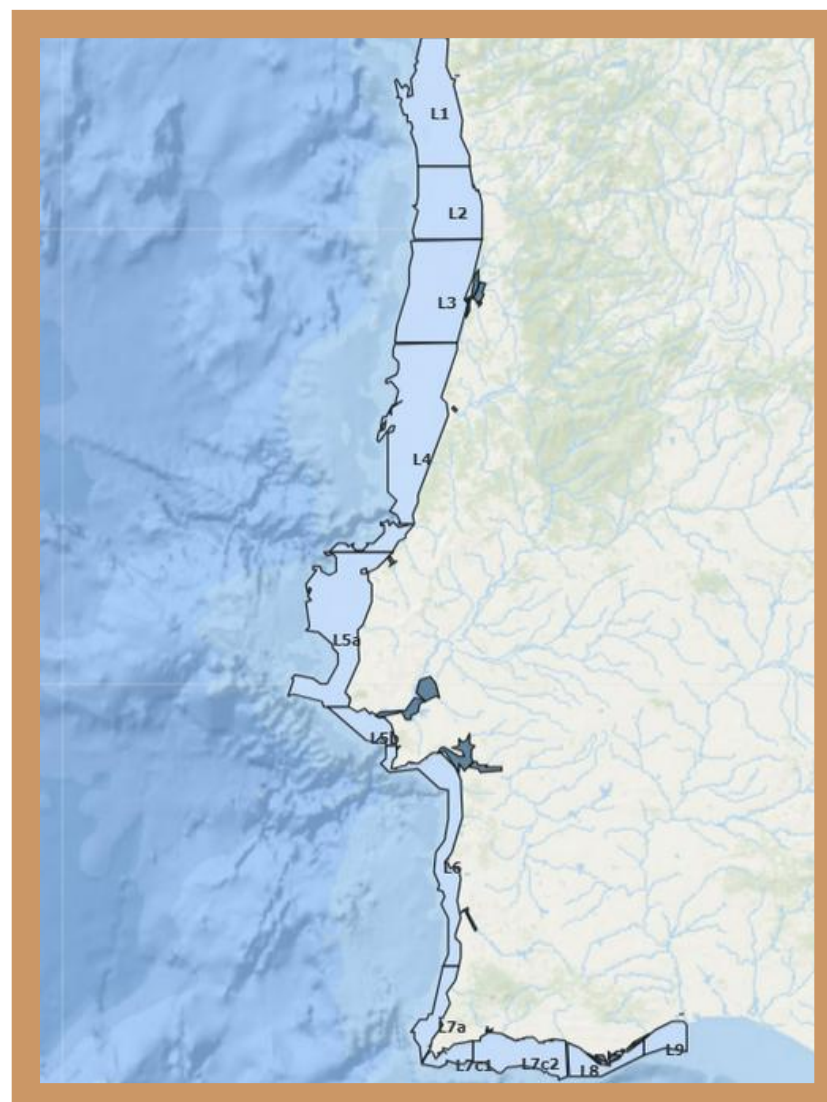
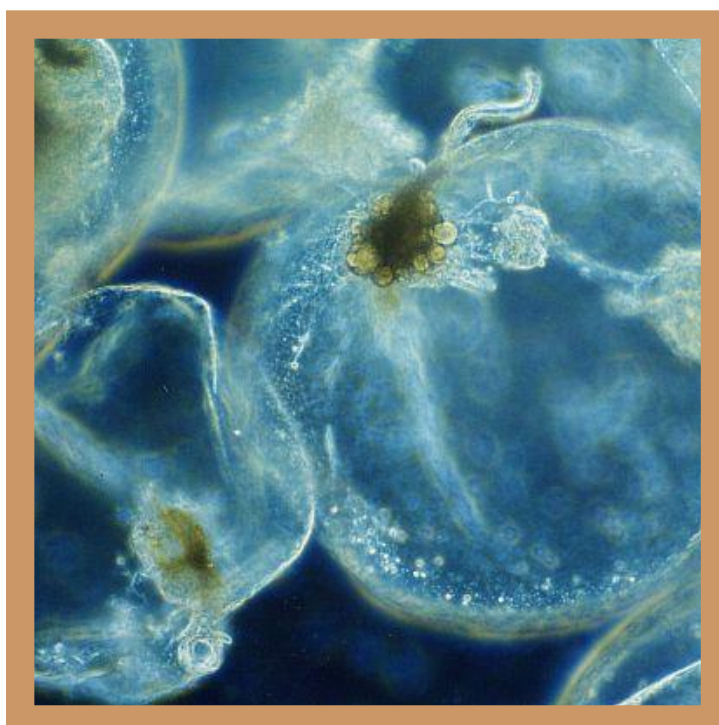


~2.3 per year

ASP related HAB events only  
registered a total of 28 events.



less than 1 per year



# MONITORING AND MODELING

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The IPMA, through the National Bivalve Mollusc Monitoring System (SNMB) monitor the water in specific spots, for the cell density of the toxic plankton, and toxin concentration in the molluscs.

What if we had a model that could predict the cell density, to affect less the molluscs production toxicity?

# THE MODEL

We can already model phytoplankton and, more specifically, Diatoms with the MOHID Water.

# THE MODEL

We can already model phytoplankton and, more specifically, Diatoms with the MOHID Water.

But to differentiate those harmful phytoplankton bloom, we need to include a different algal group: the dinoflagellates.

# OBJECTIVES

(1) Implement and validate a biogeochemical model to the study site (to identify nutrient stress and HAB);

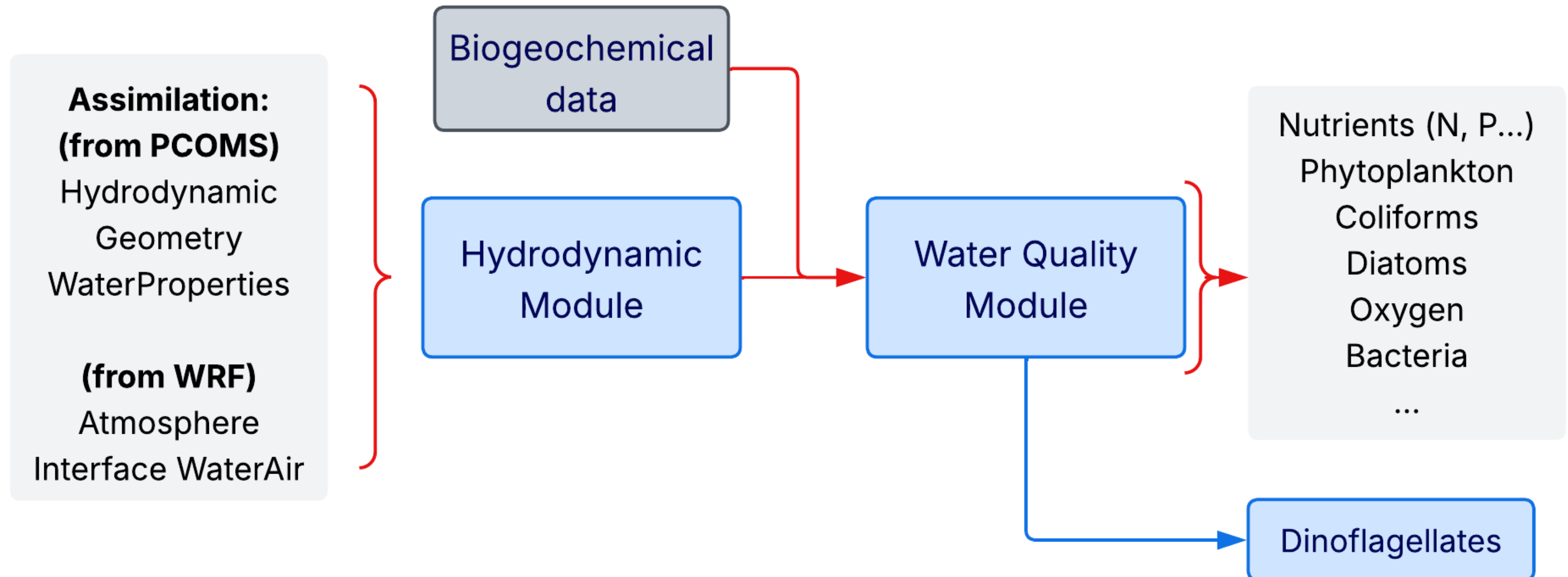
# OBJECTIVES

- (1) Implement and validate a biogeochemical model to the study site (to identify nutrient stress and HAB);
- (2) to use remote sensing and previous works data for model validation; and

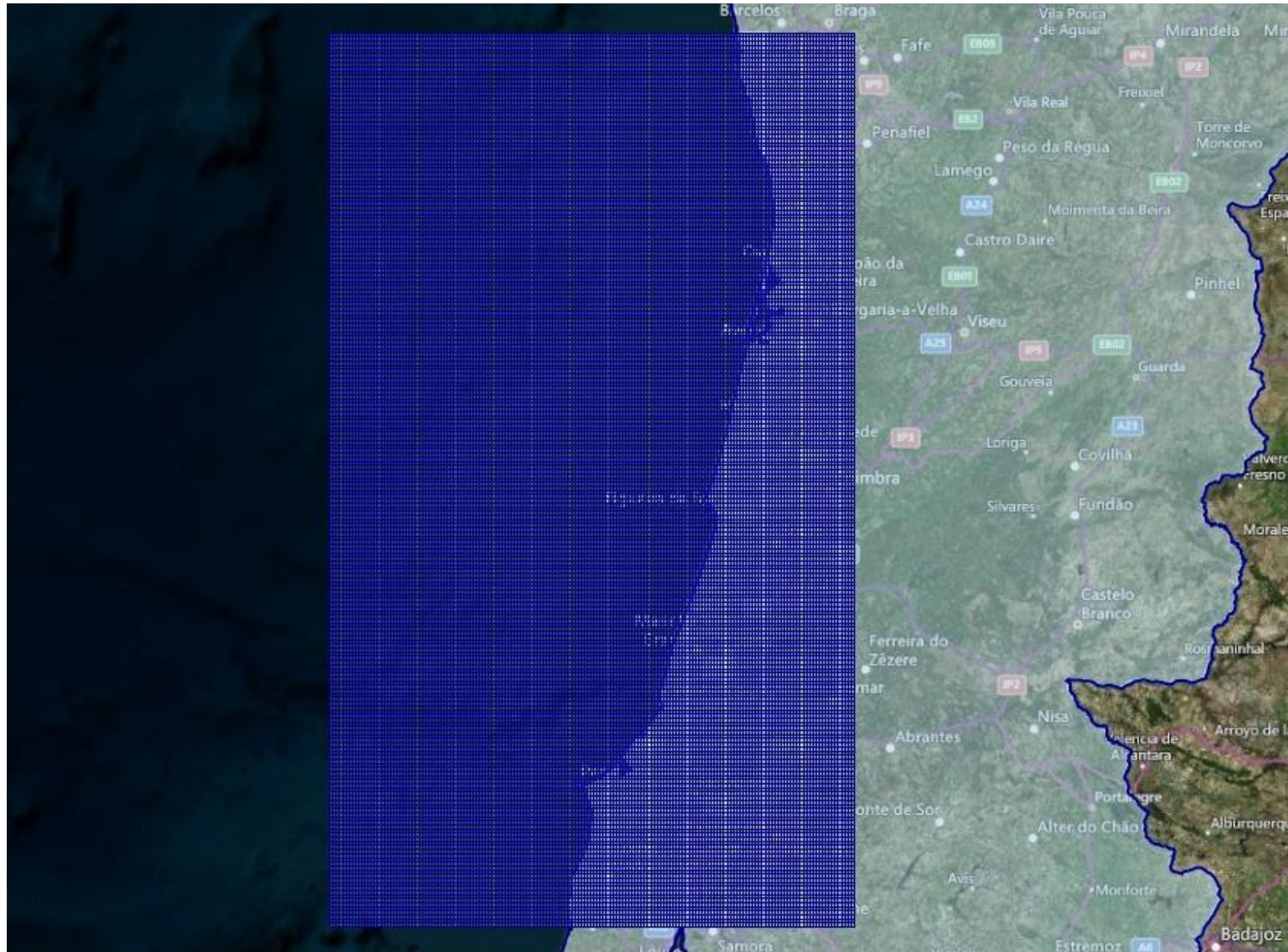
# OBJECTIVES

- (1) Implement and validate a biogeochemical model to the study site (to identify nutrient stress and HAB);
- (2) to use remote sensing and previous works data for model validation; and
- (3) The development of a probability of HAB occurrence (a HAB probability index).

# THE MOHID USAGE AND CHANGE



## What has been done:



Grid: 215 i X 165 j

## Uniform Grid

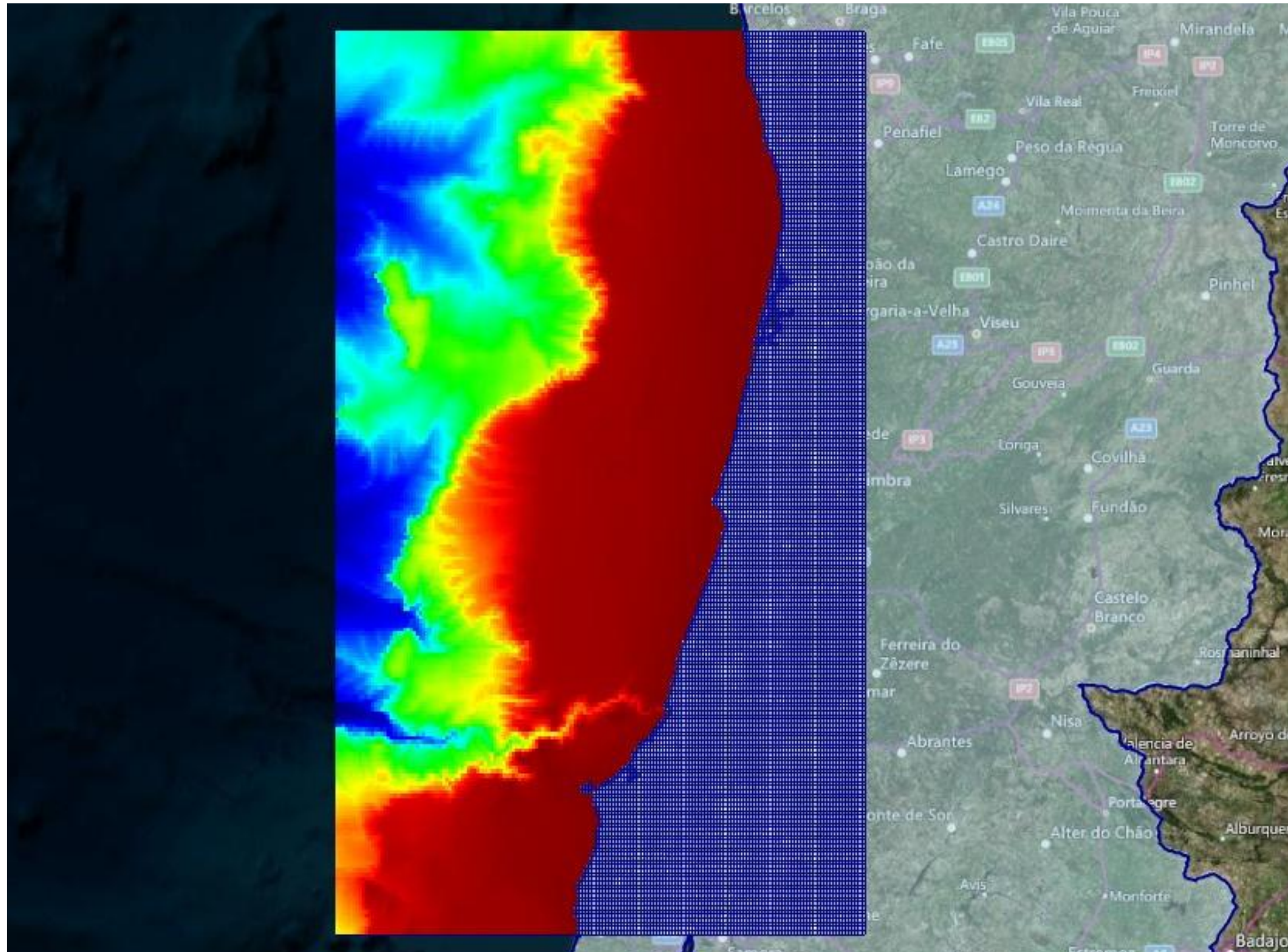
Horizontal resolution ~1300m  
(1:5 of the PCOMS grid)  
3D - 50 vertical layers

## Boundary Conditions

## Hydrodynamics: PCOMS

Atmosphere: WRF

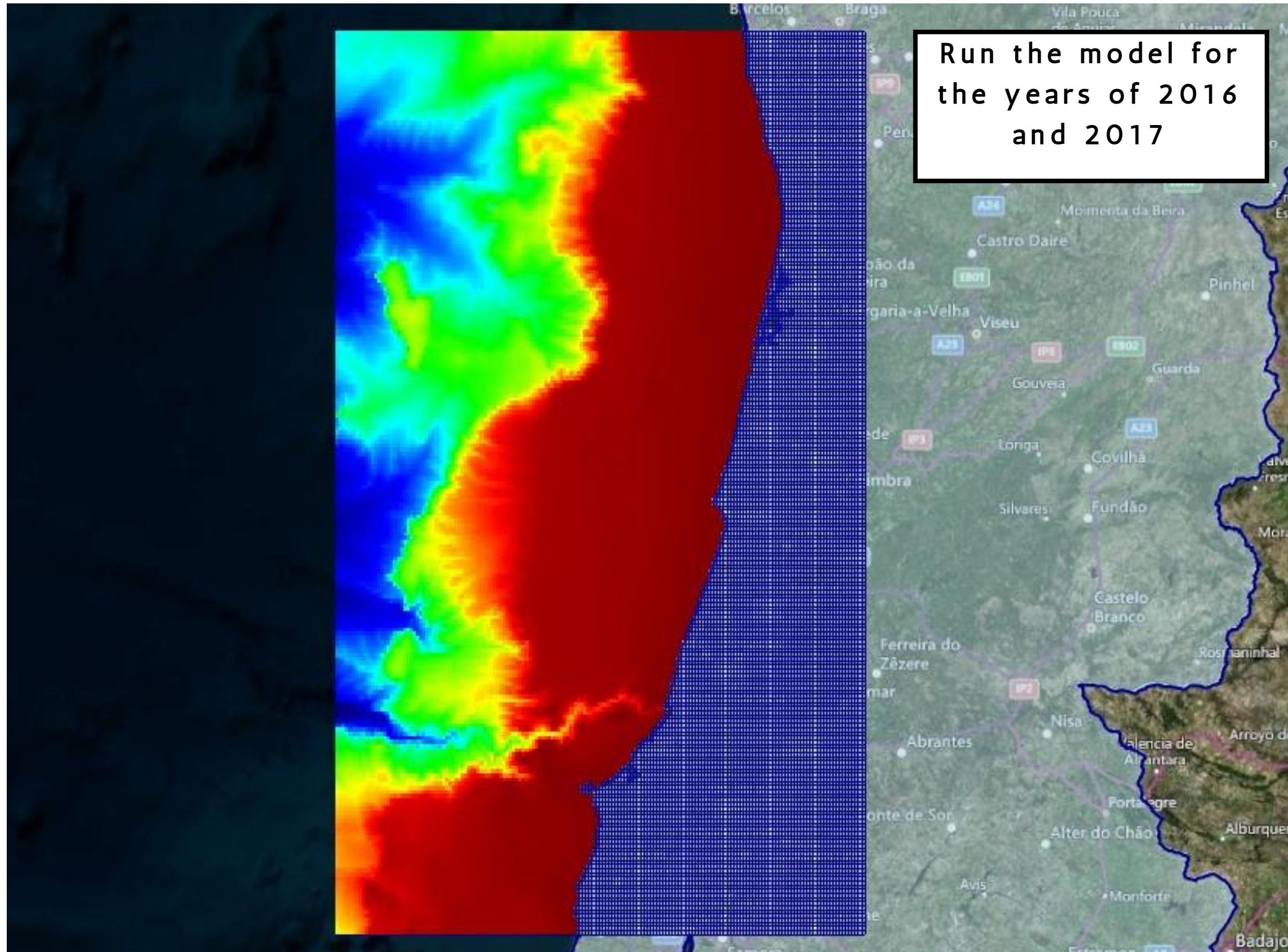
# What has been done:



Grid: 215 i X 165 j  
Uniform Grid  
Horizontal resolution ~1300m  
(1:5 of the PCOMS grid)  
3D - 50 vertical layers  
Maximum depth: 4398.36m

**Boundary Conditions**  
Hydrodynamics: PCOMS  
Atmosphere: WRF

What has been done:



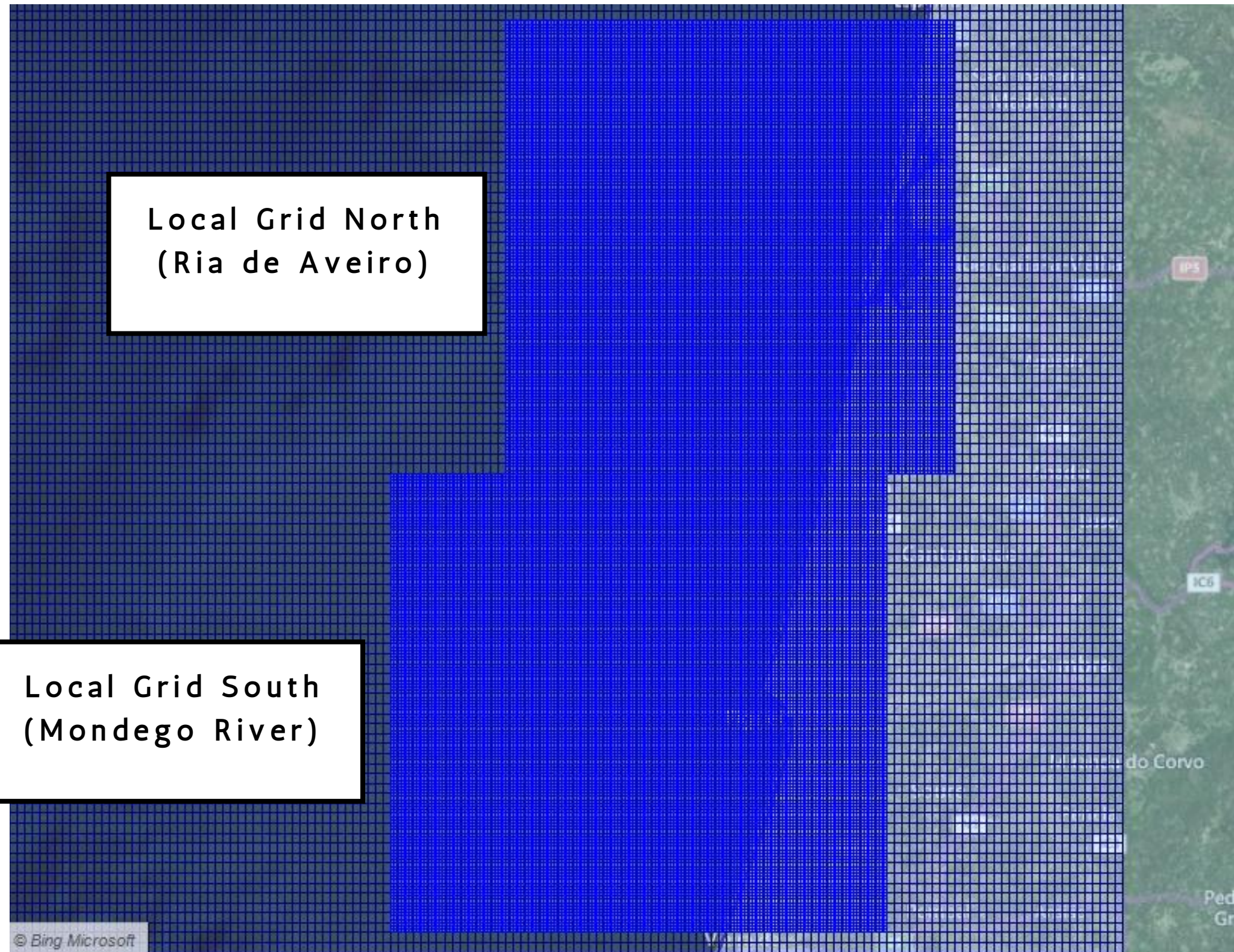
Grid: 215 i X 165 j  
Uniform Grid  
Horizontal resolution ~1300m  
(1:5 of the PCOMS grid)  
3D - 50 vertical layers  
Maximum depth: 4398.36m

### **Boundary Conditions**

Hydrodynamics: PCOMS

Atmosphere: WRF

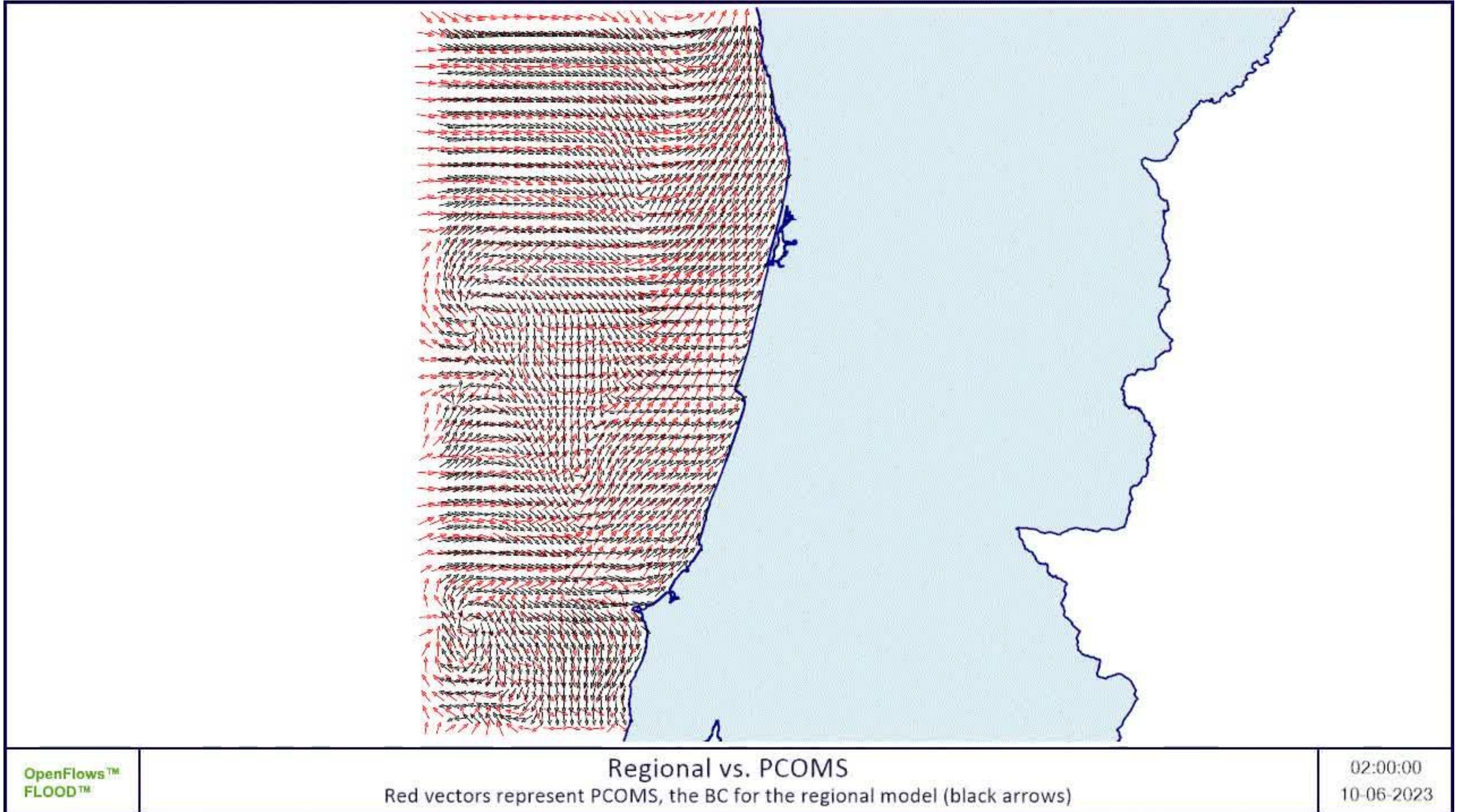
# What has been done:



Grid: (north) 135i X 176j  
(south) 138i X 195j  
Uniform Grid  
Horizontal resolution ~440m  
(1:3 of the Regional grid)  
3D - 50 vertical layers

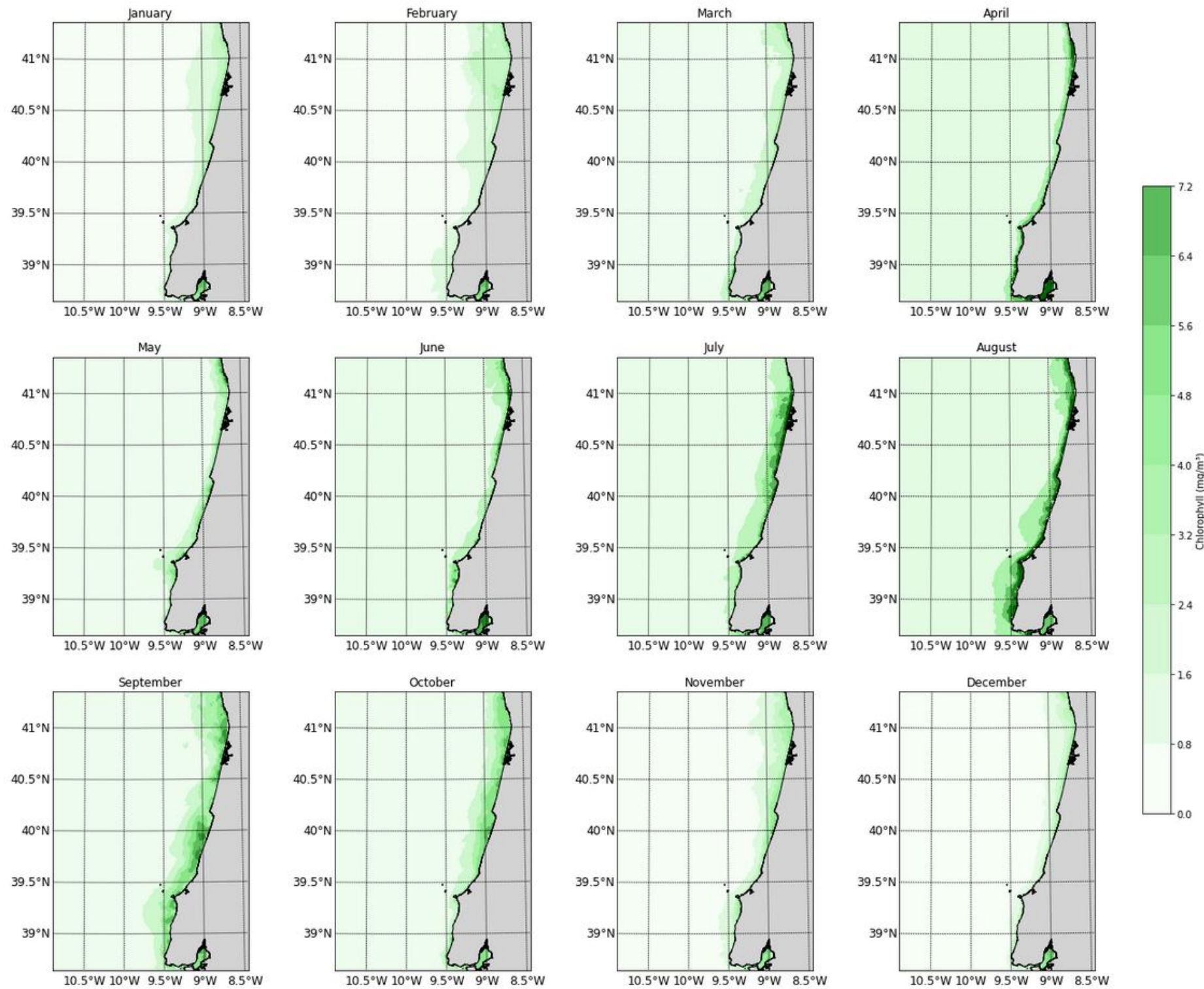
**Boundary Conditions**  
Hydrodynamics: Regional  
Atmosphere: WRF

# What has been done:



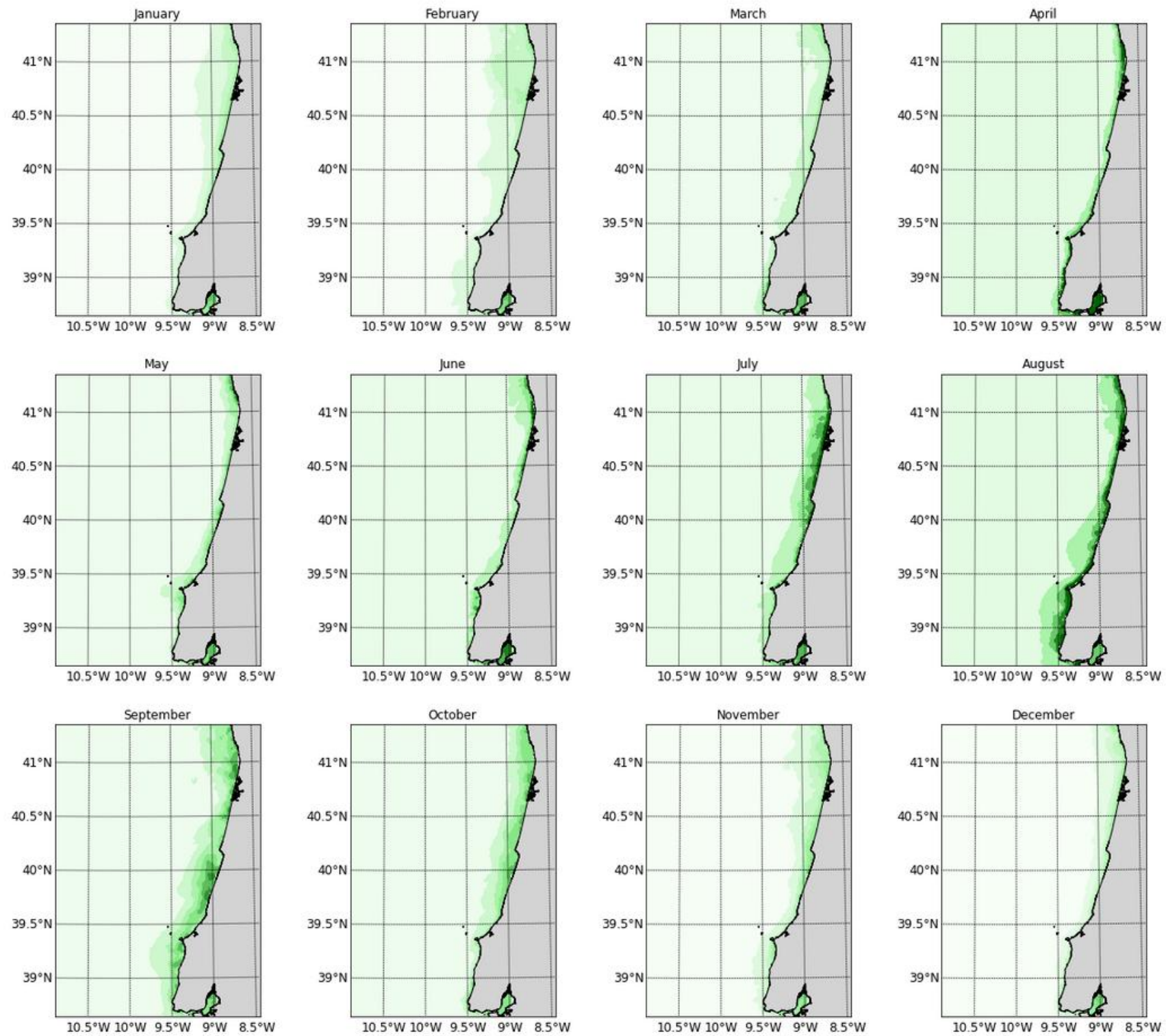
# What has been done:

Chlorophyll-a concentration (2016)

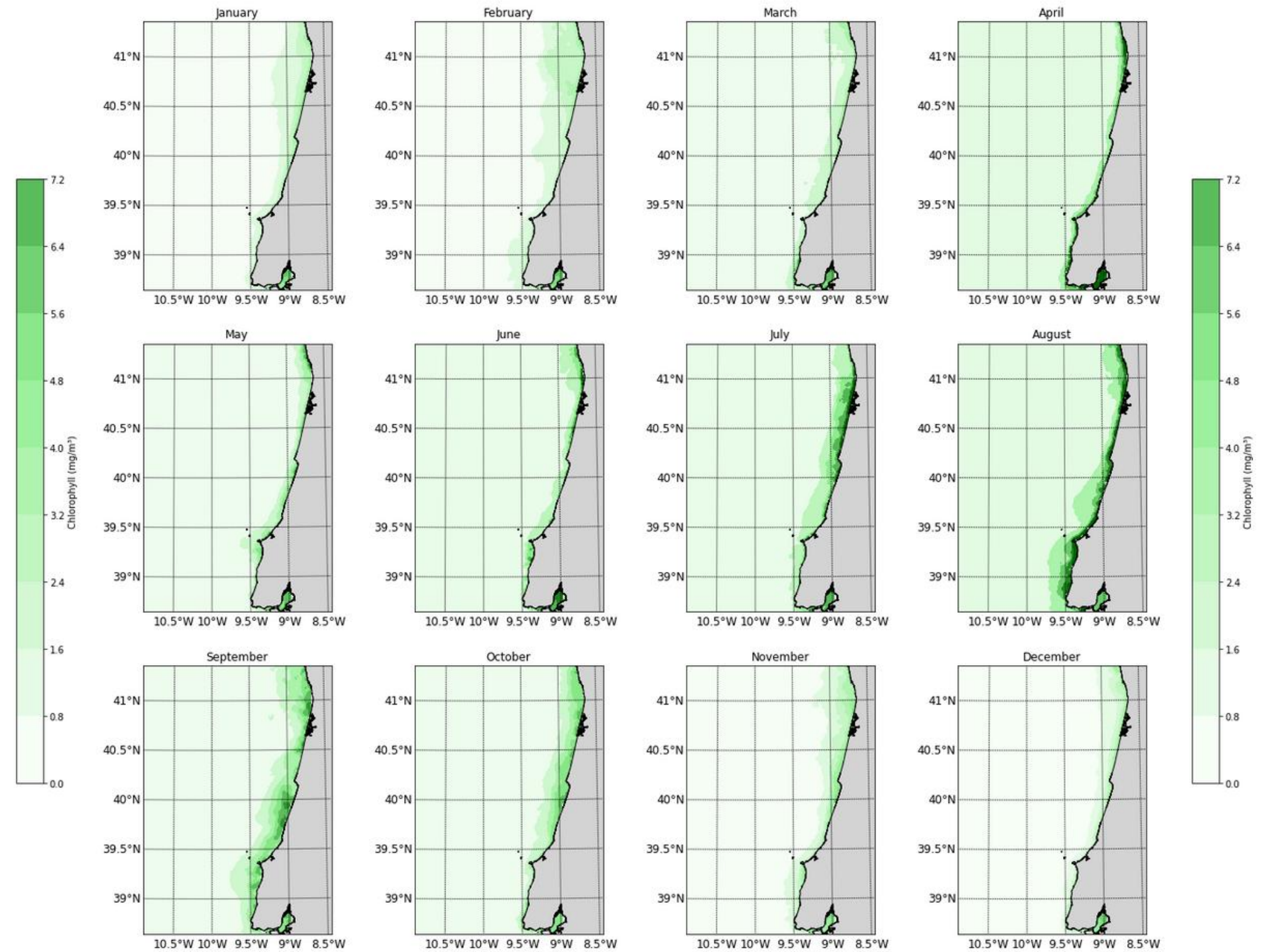


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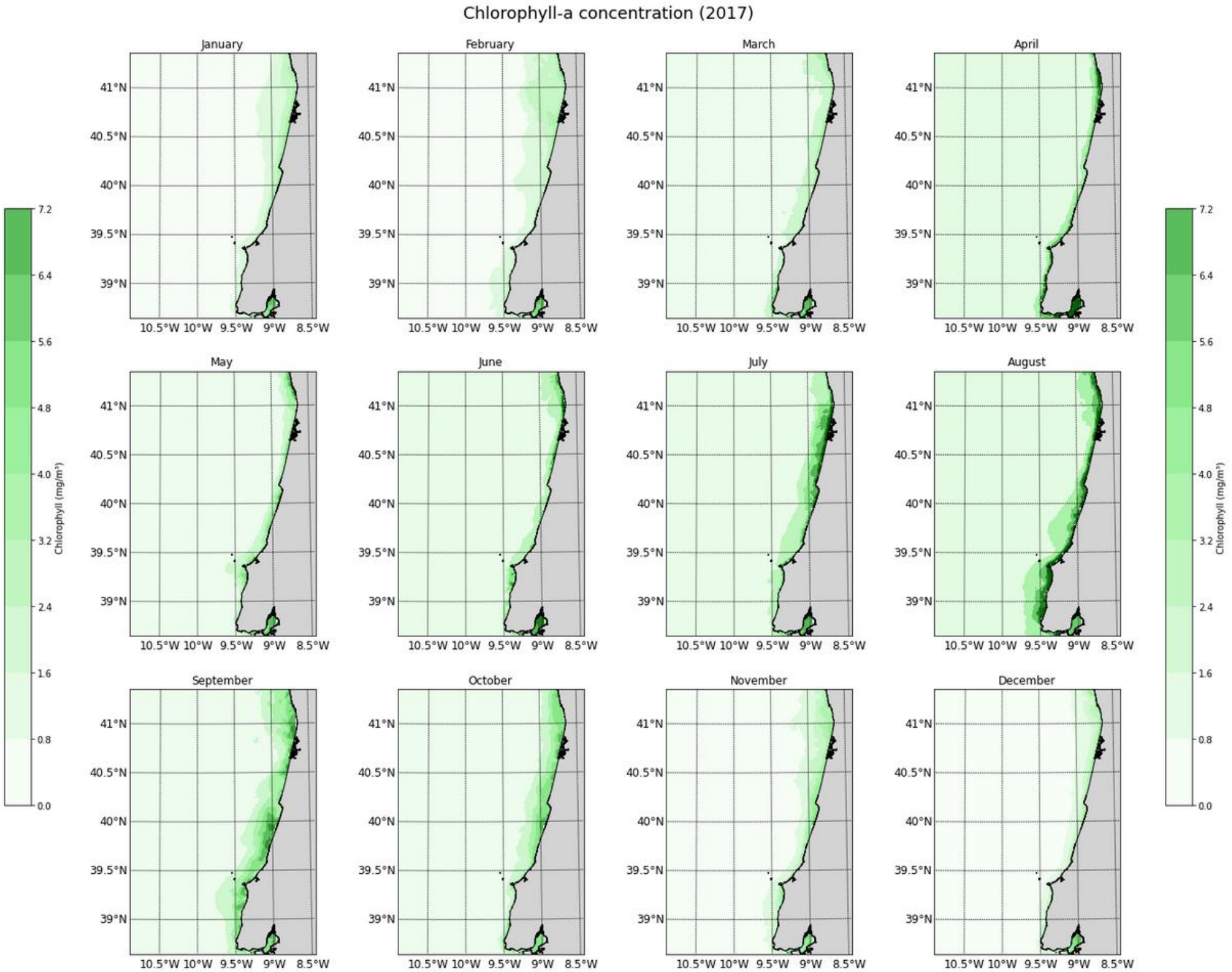
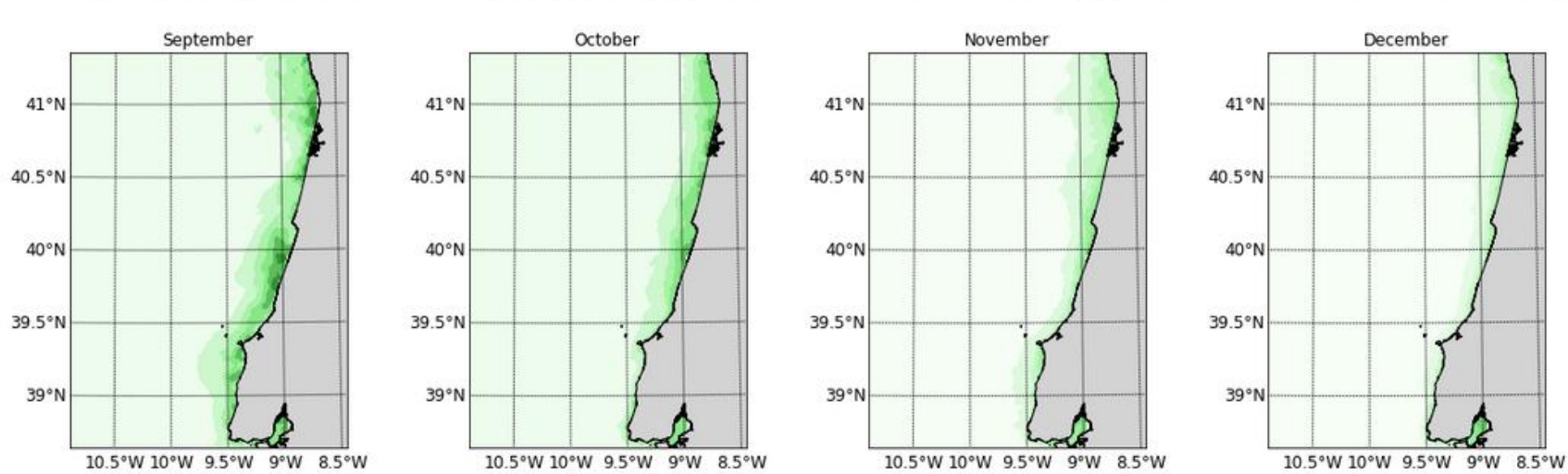
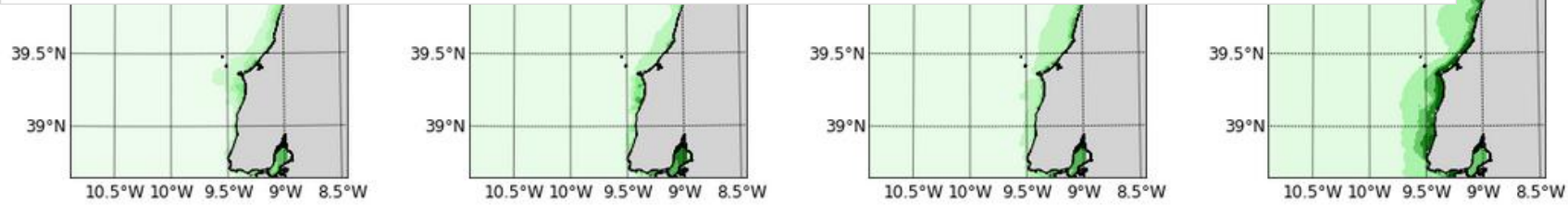
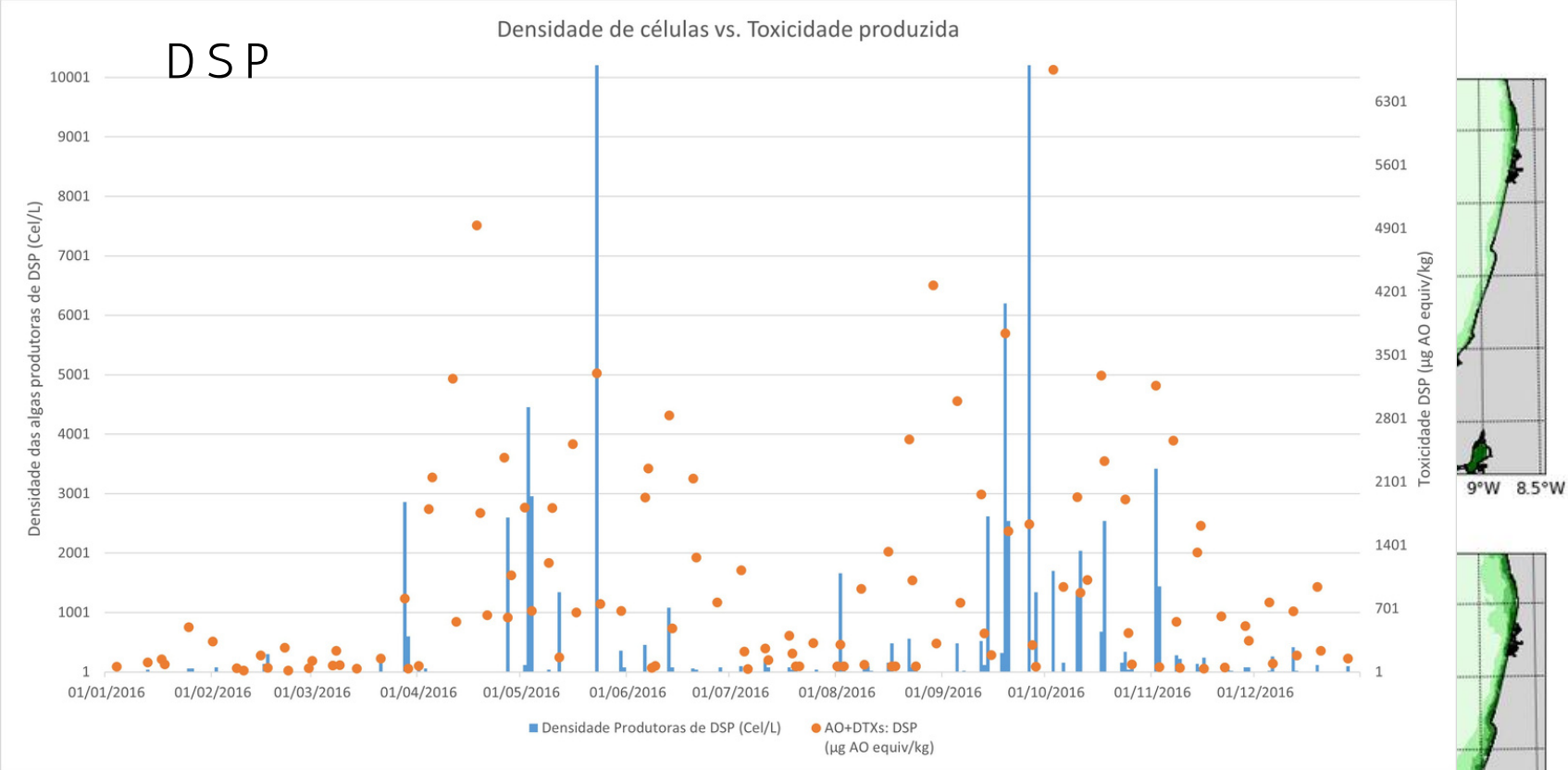
Chlorophyll-a concentration (2016)



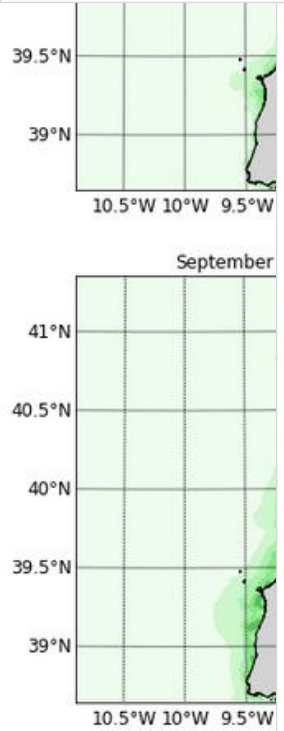
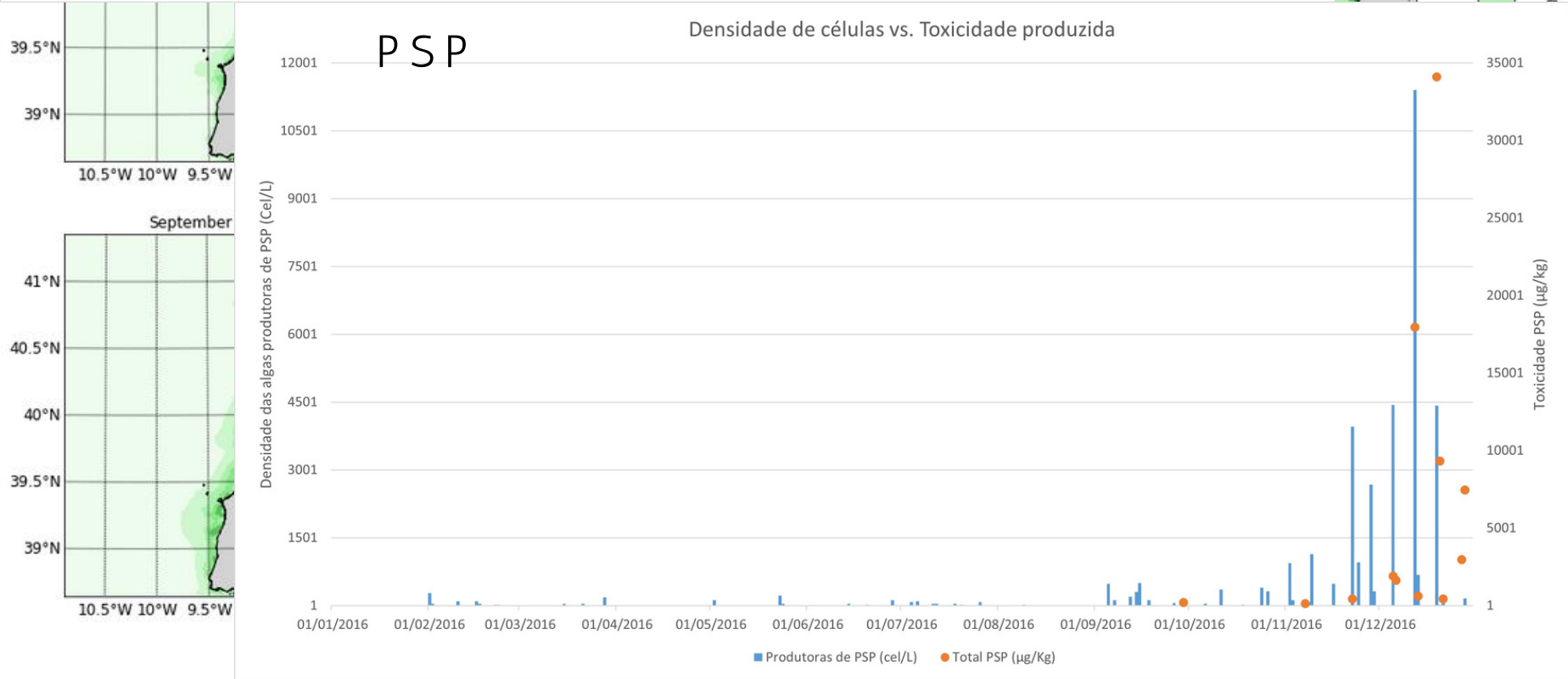
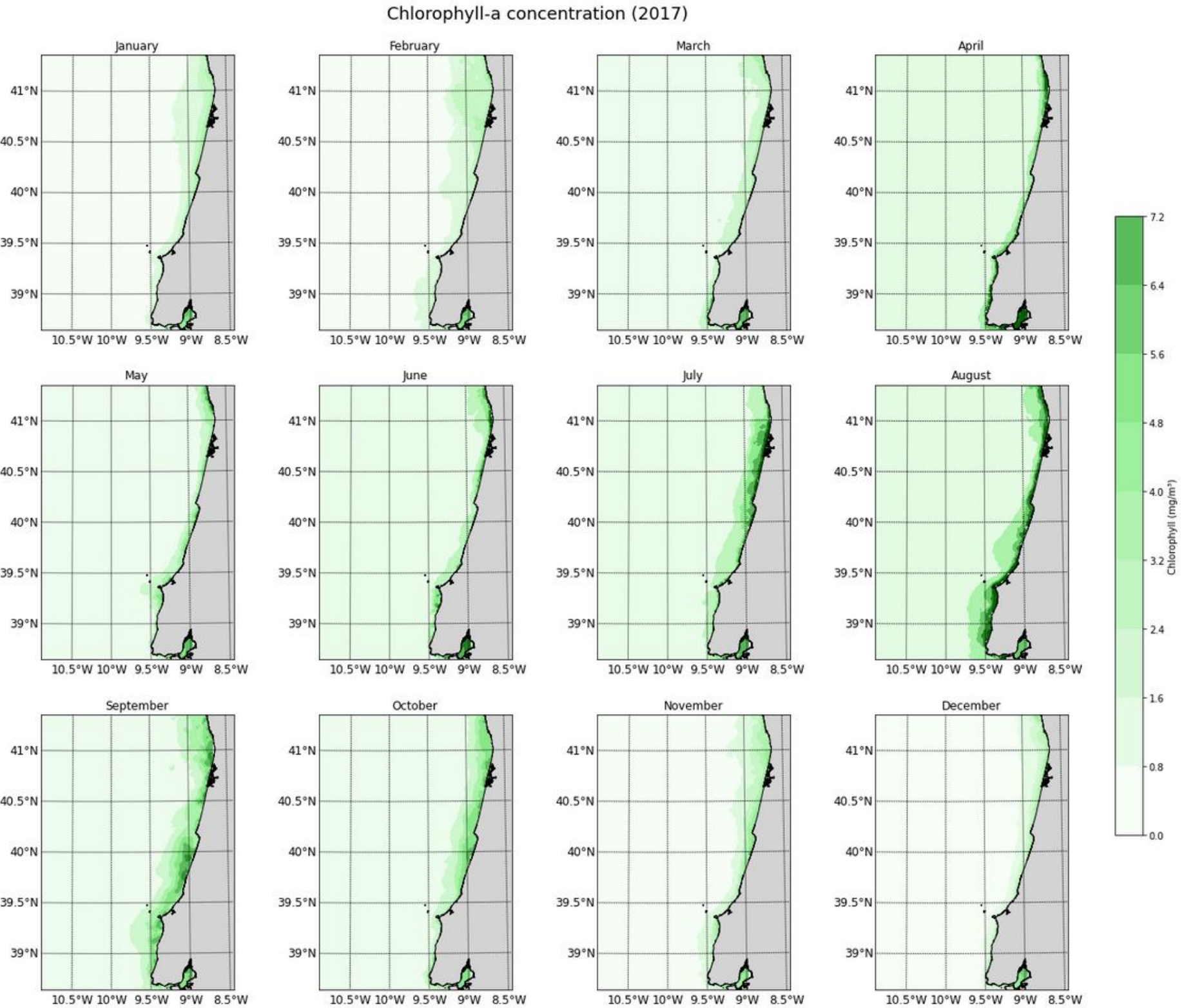
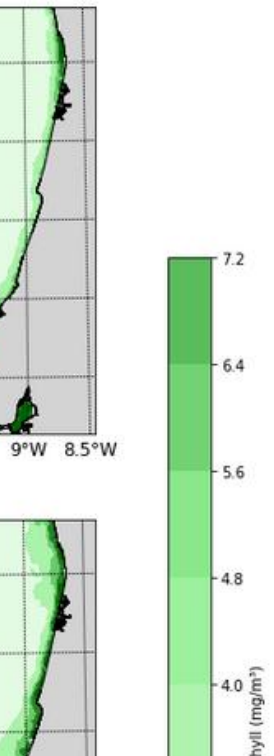
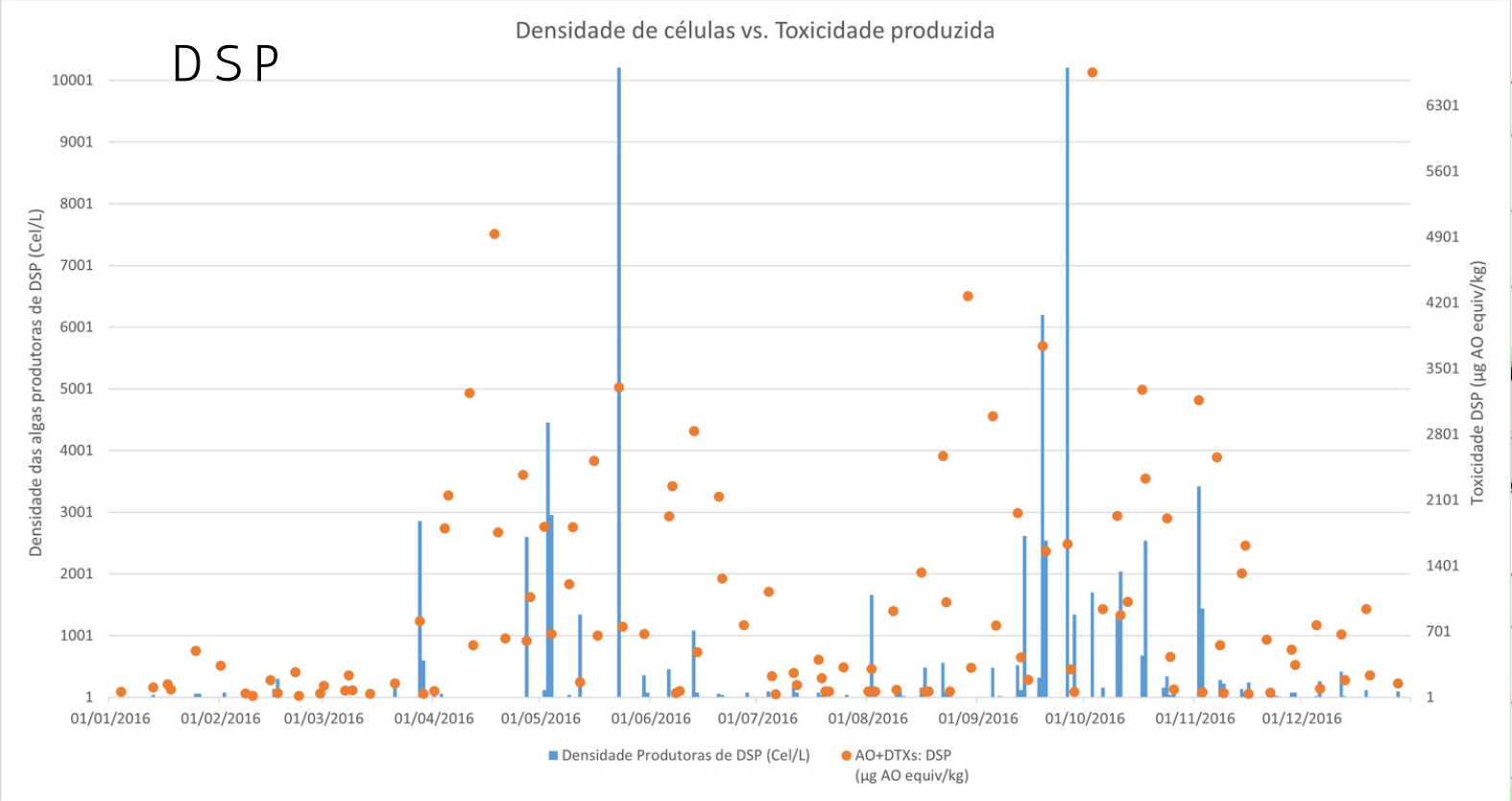
Chlorophyll-a concentration (2017)



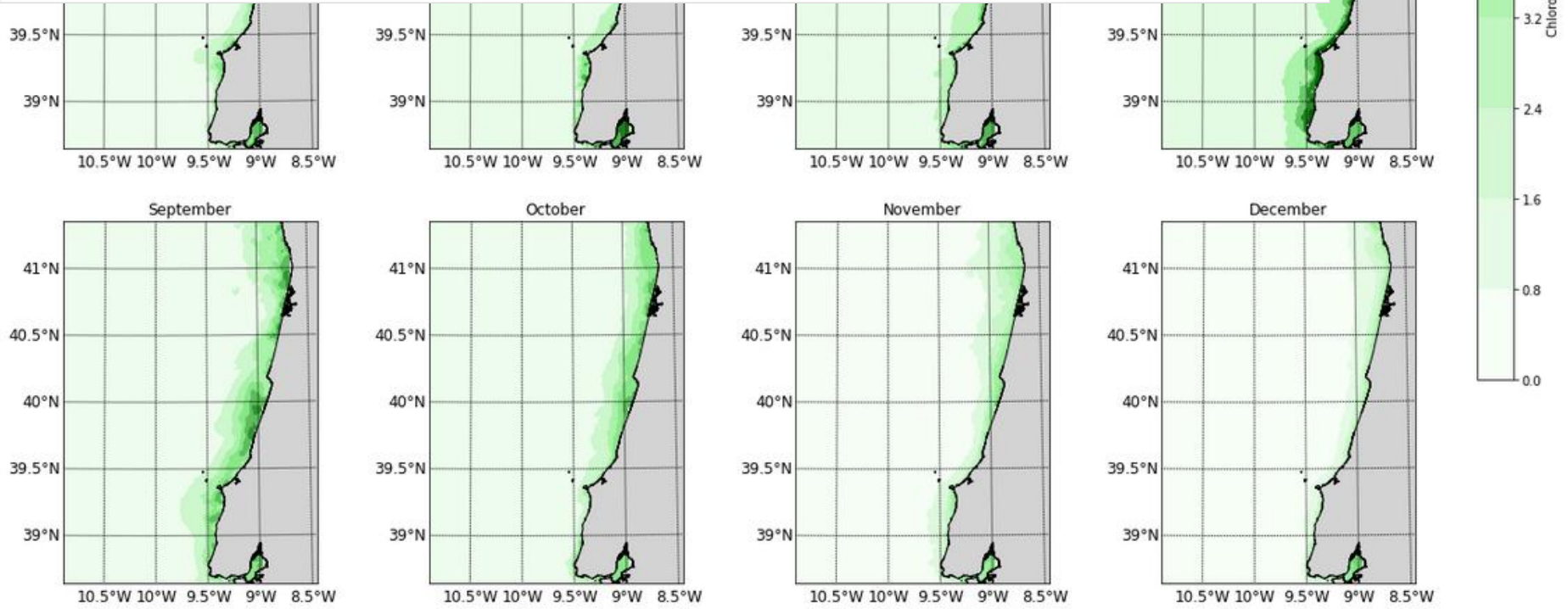
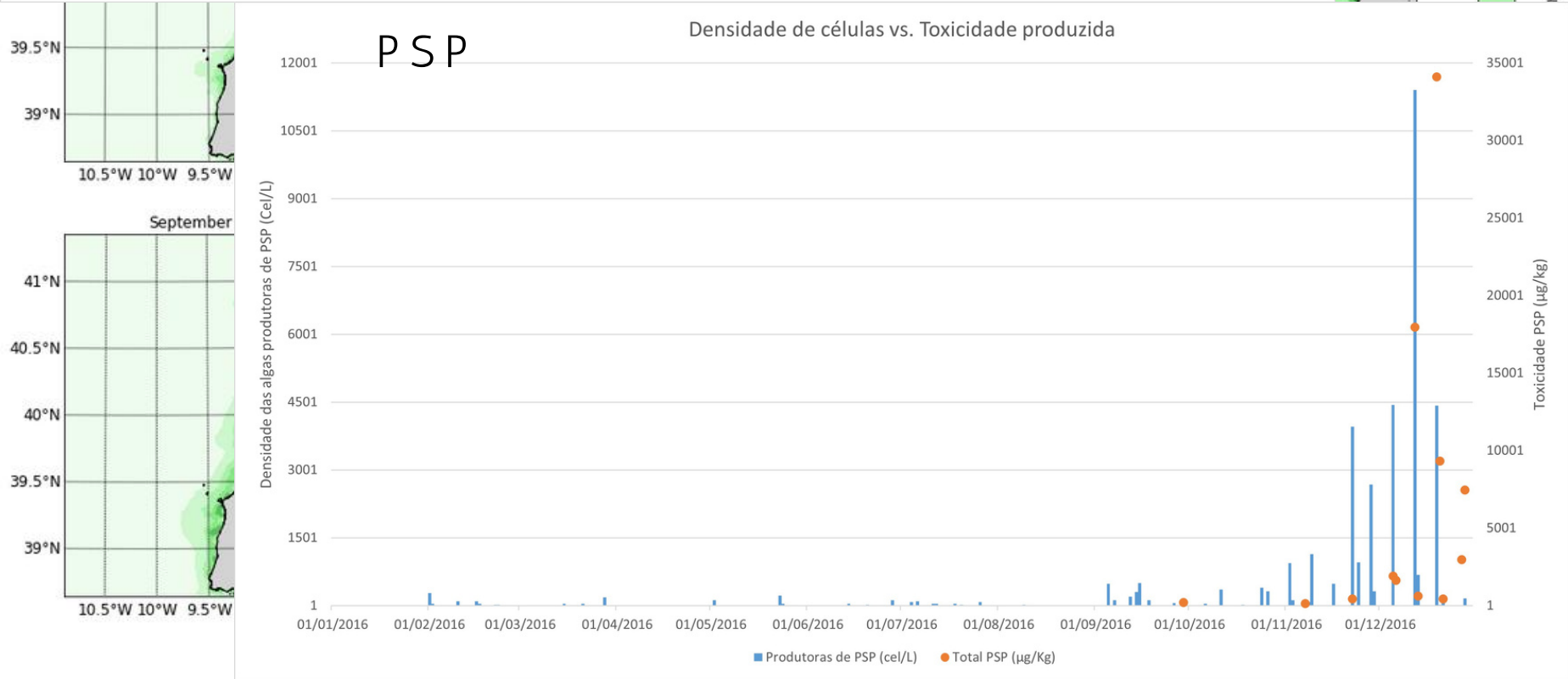
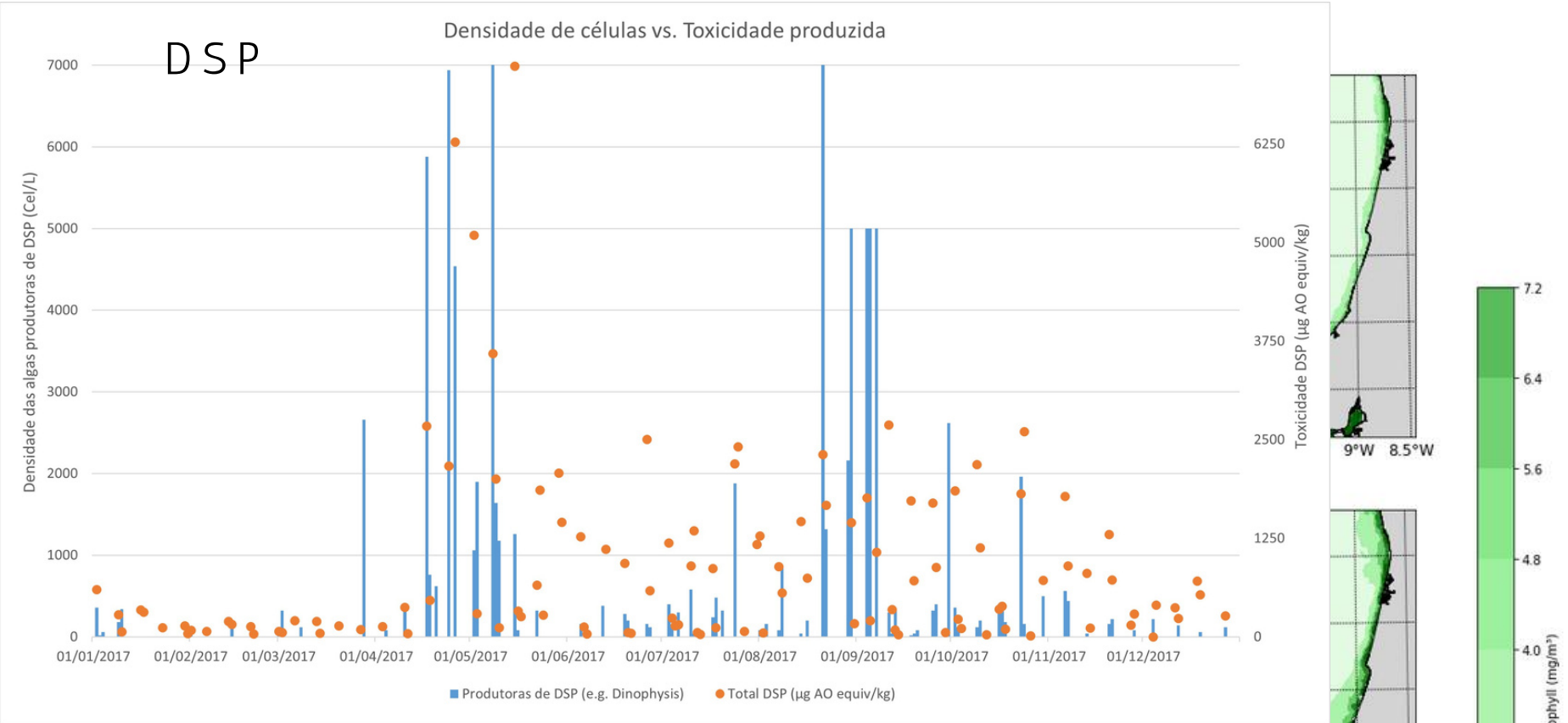
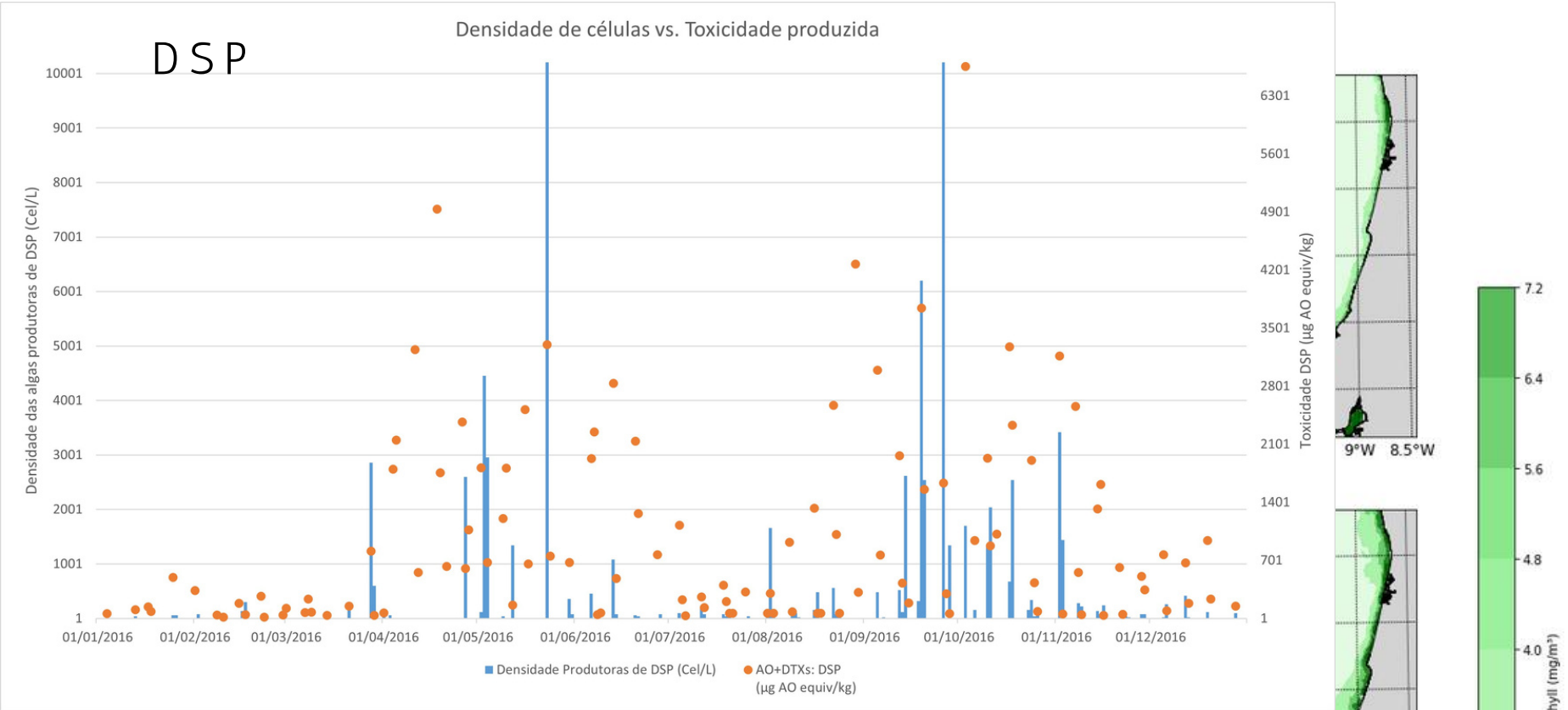
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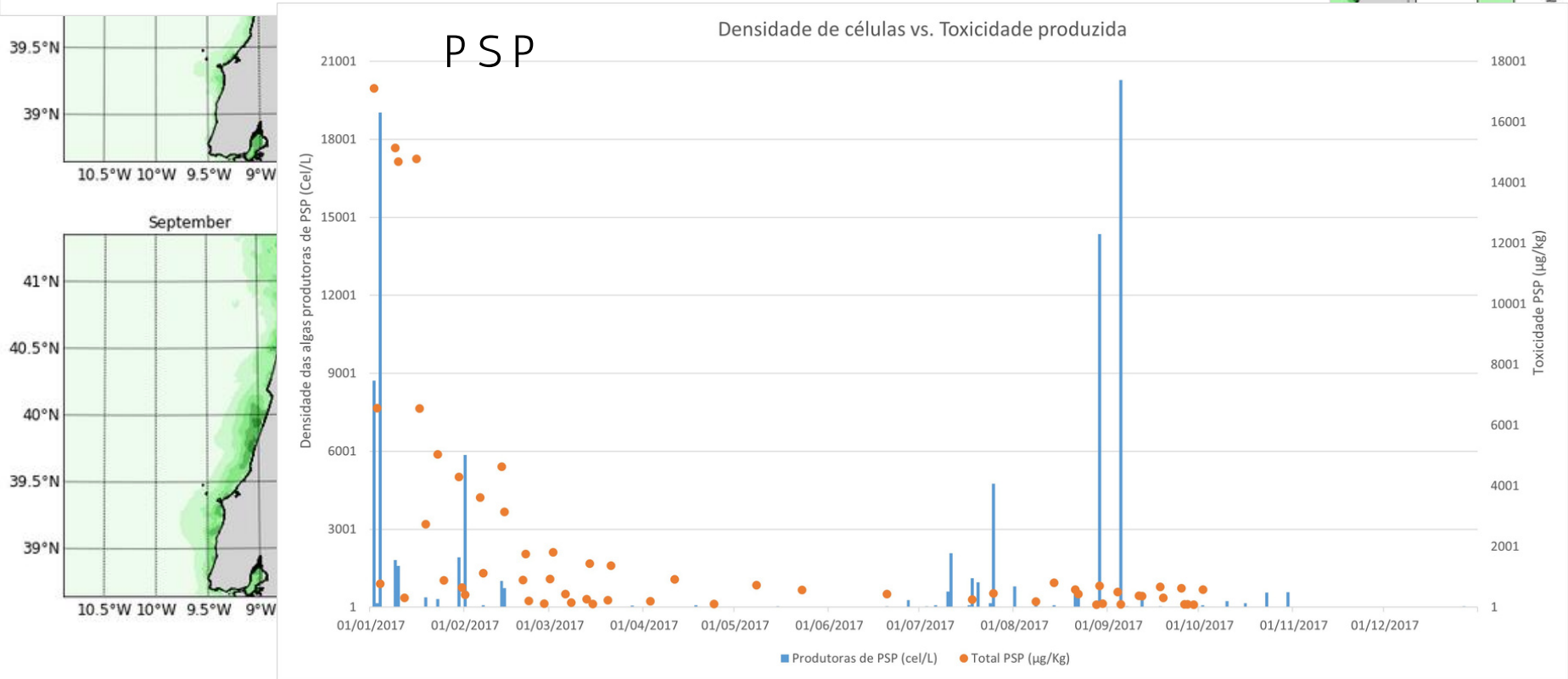
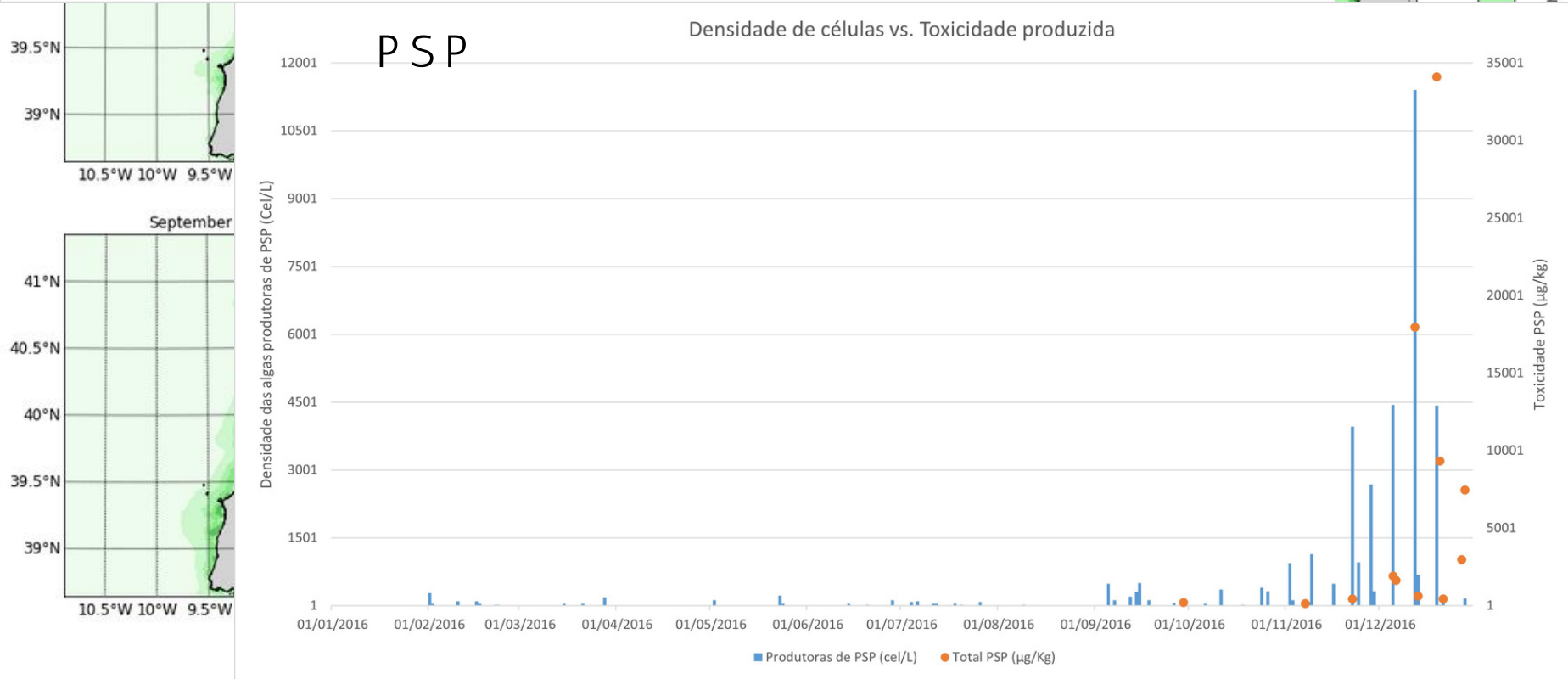
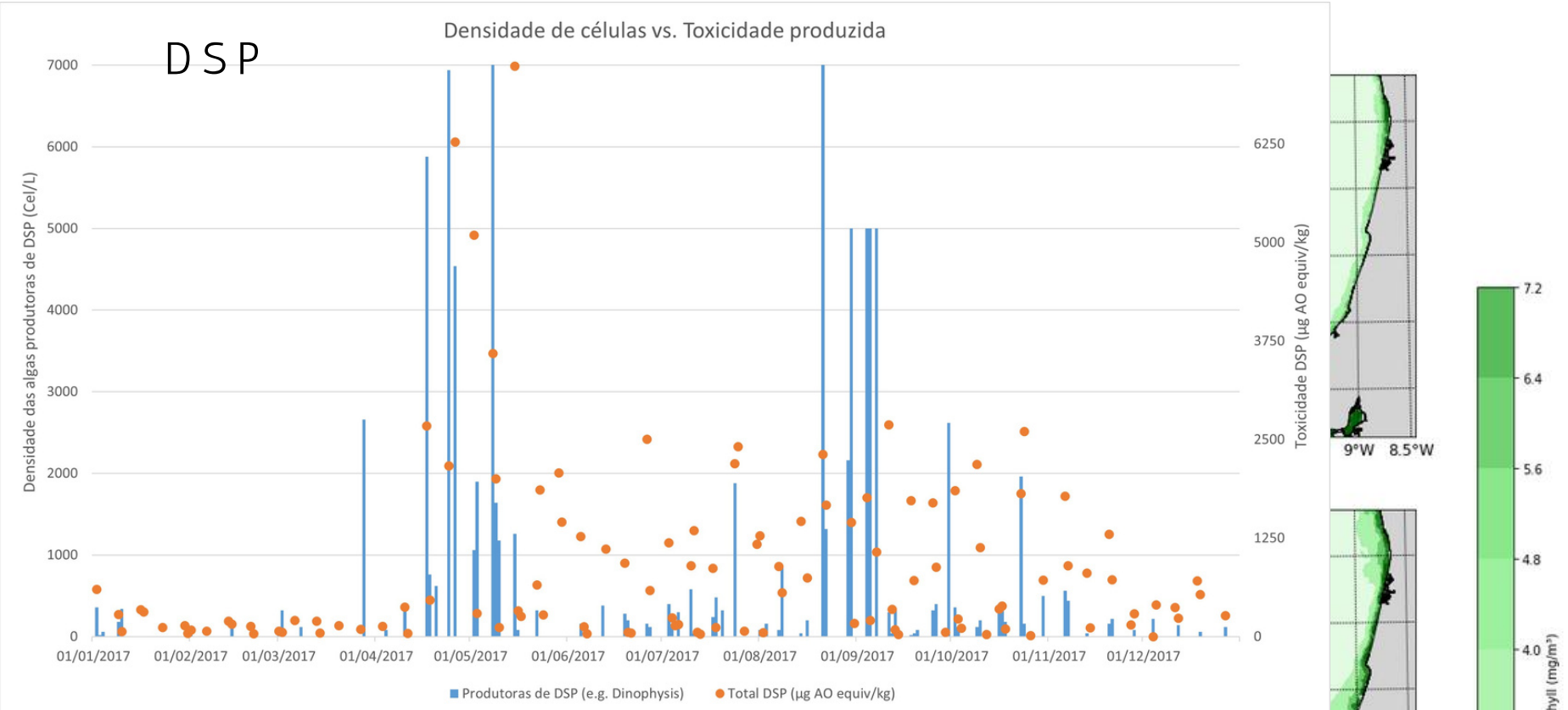
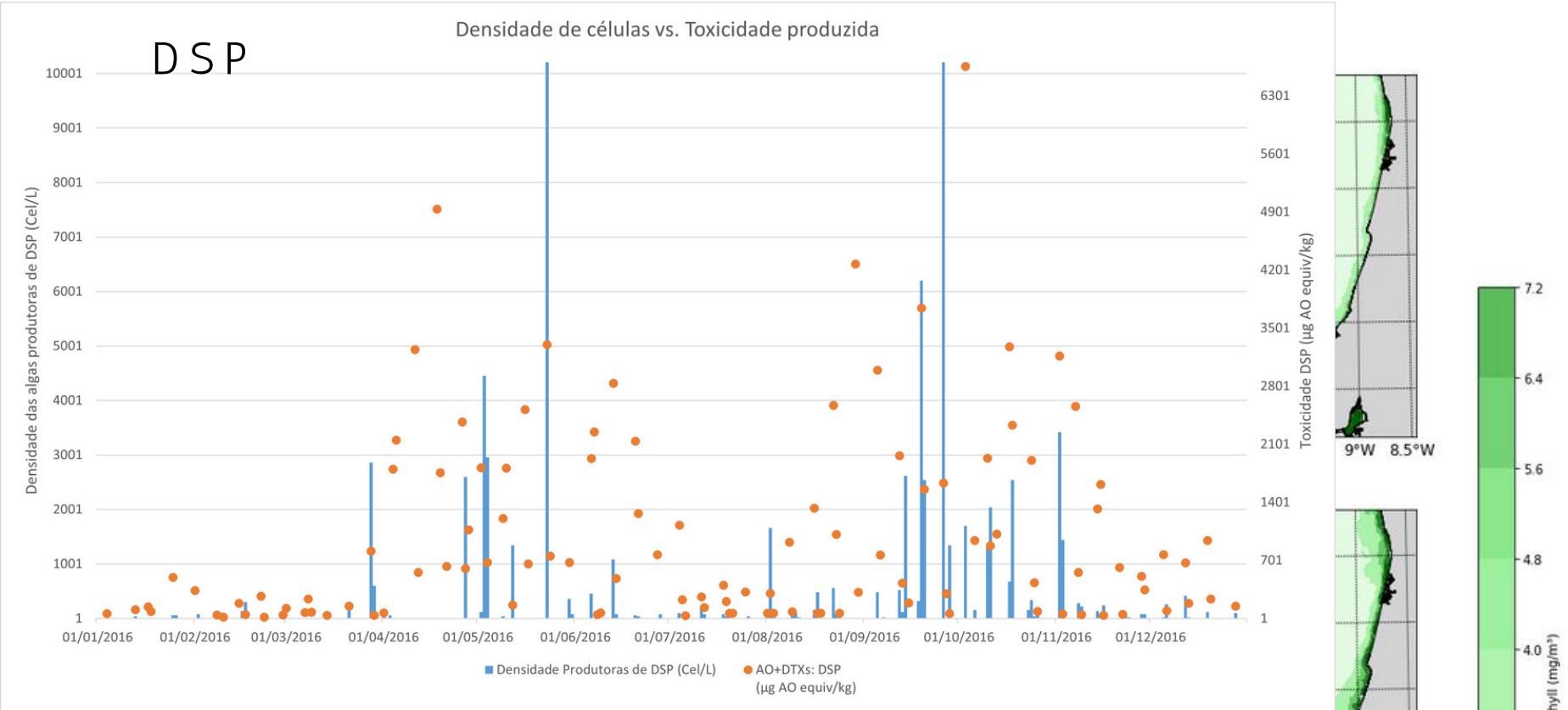
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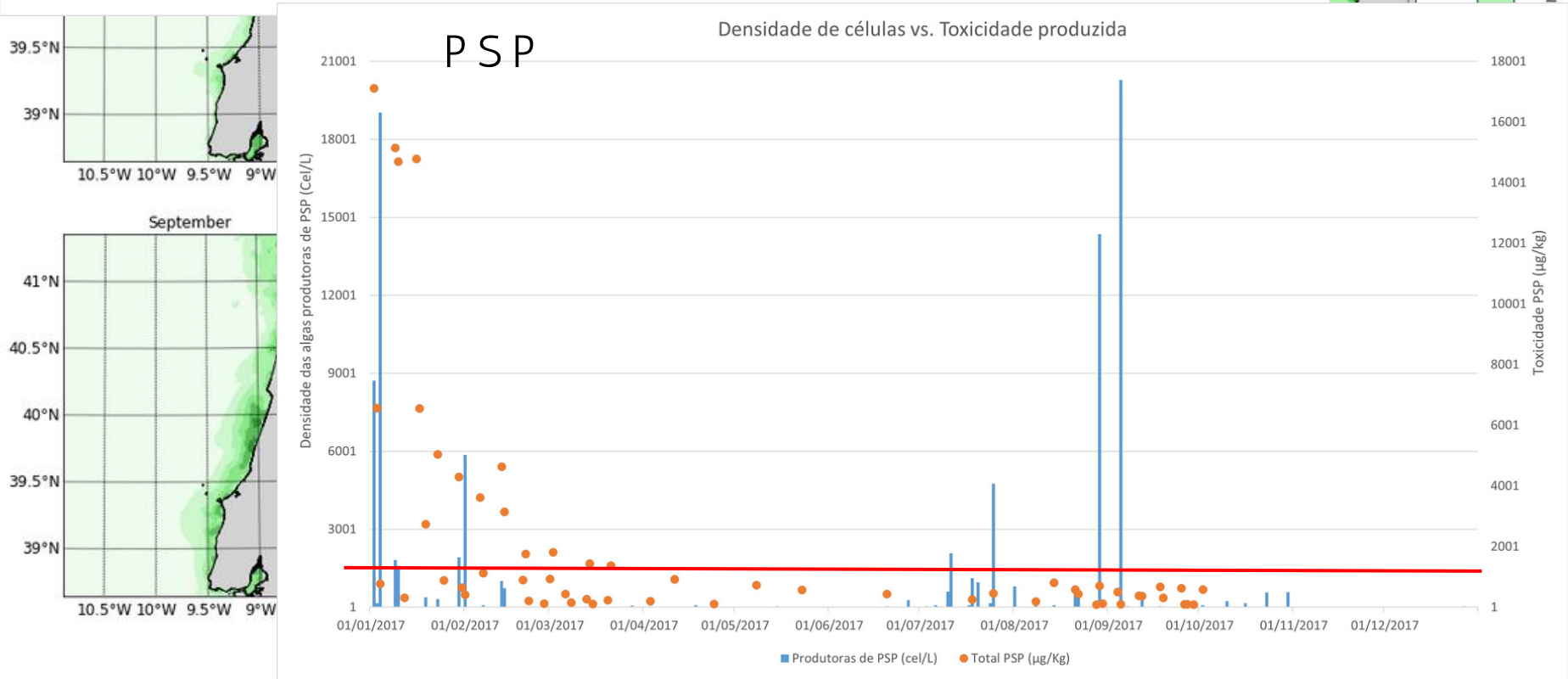
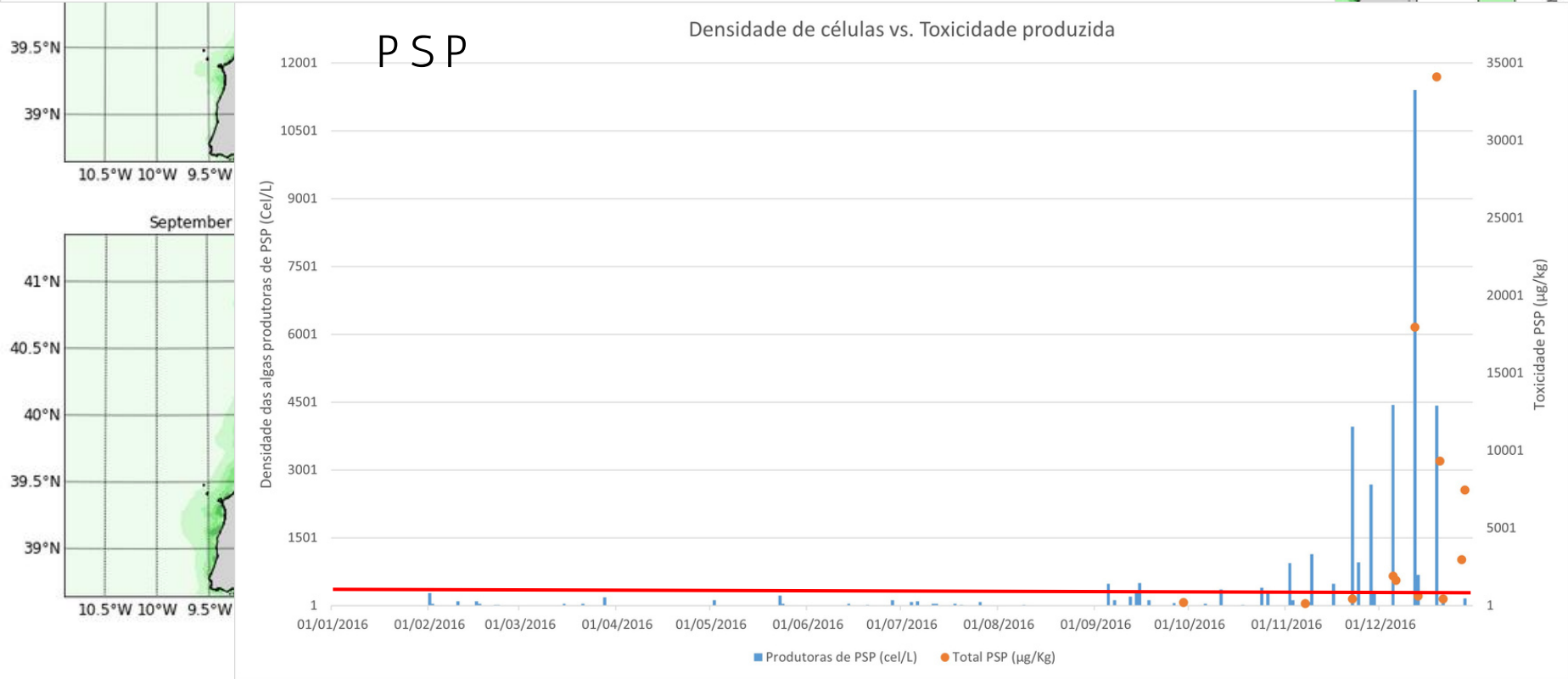
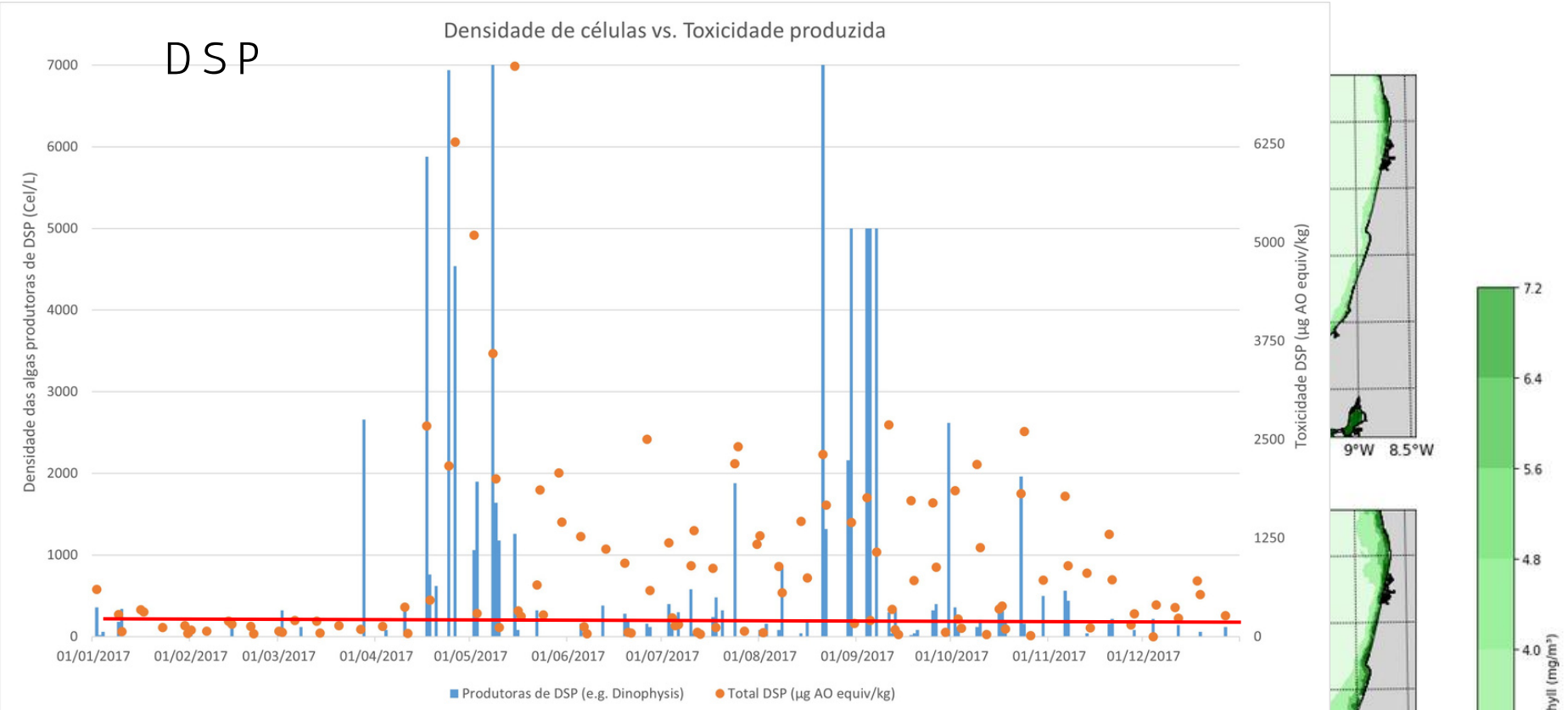
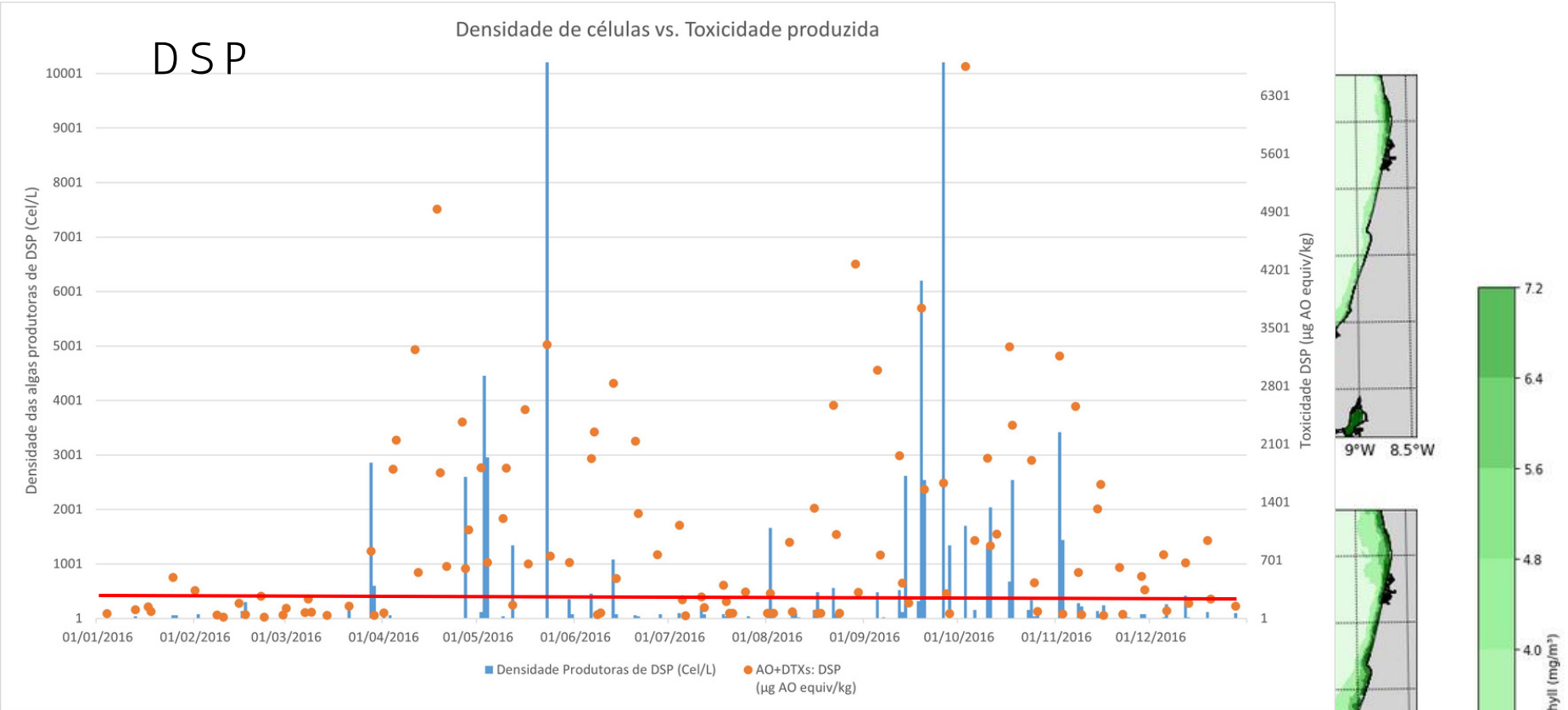
# What has been done:



# What has been done:



# What has been done:



## Next steps:

- 1.To put the regional and local model to run for the years 2016 and 2017;
- 2.To start the tests for the Water Quality Module and run the model;
- 3.To asses the dinoflagellate information from remote sensing and compare with the monitoring data.

# THANK YOU!

Contact

barbara.viana.d.s@tecnico.ulisboa.pt