

# Application à la Méditerranée épipélagique

Pour faire une carte de MESI il faut

les contributions de chaque espèce à chaque service ( $x_{ij}$ )

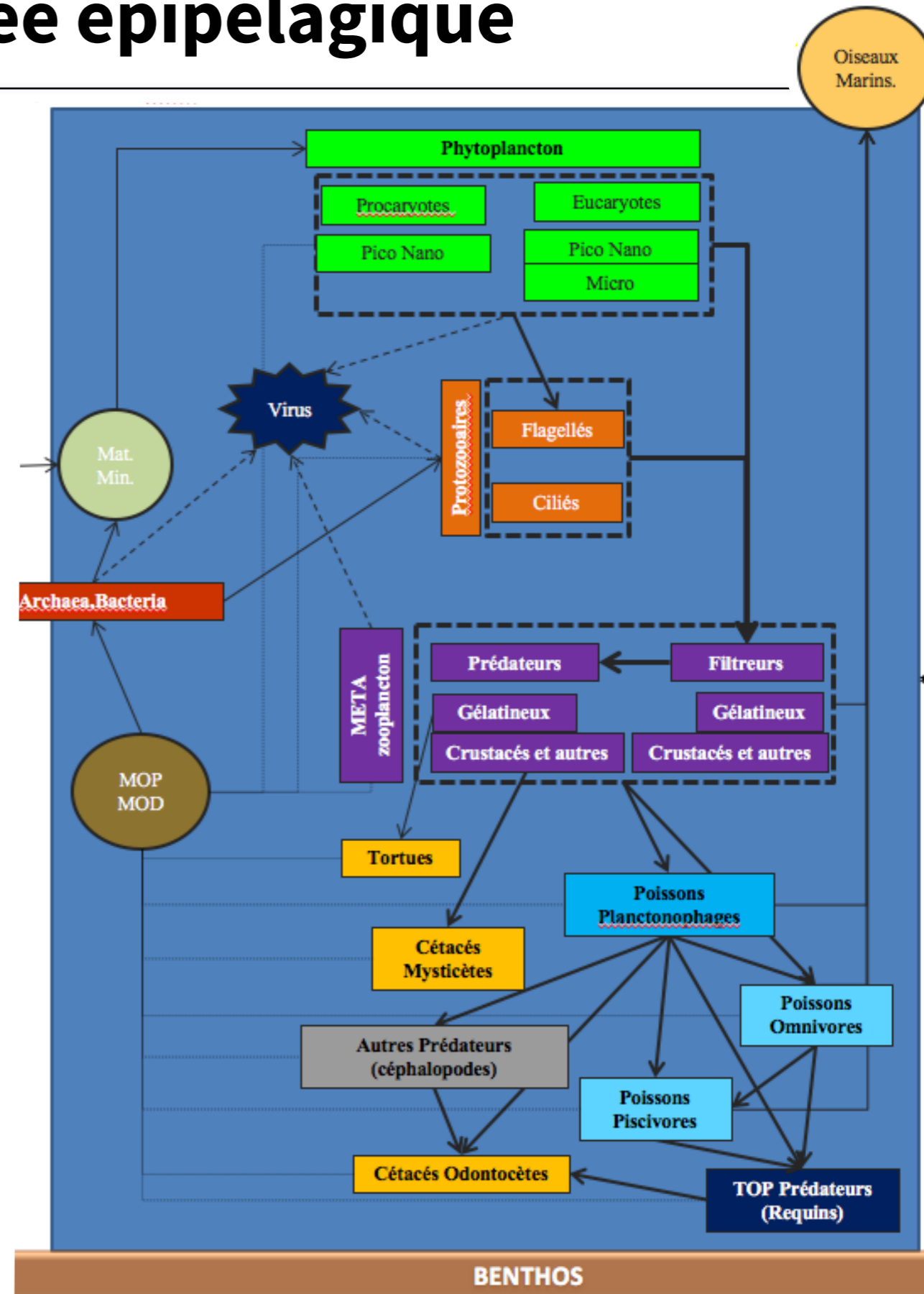
les abondances des espèces ( $n_i$ ) sur tous les pixels de la carte

Solutions

résumé en groupes fonctionnels

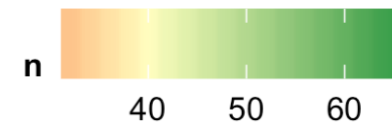
avis d'experts sur les contributions

modélisation de la probabilité de présence des espèces





# Contributions aux services



Récolte d'avis d'experts

par entretien

en ligne

Nombre d'avis par cellule

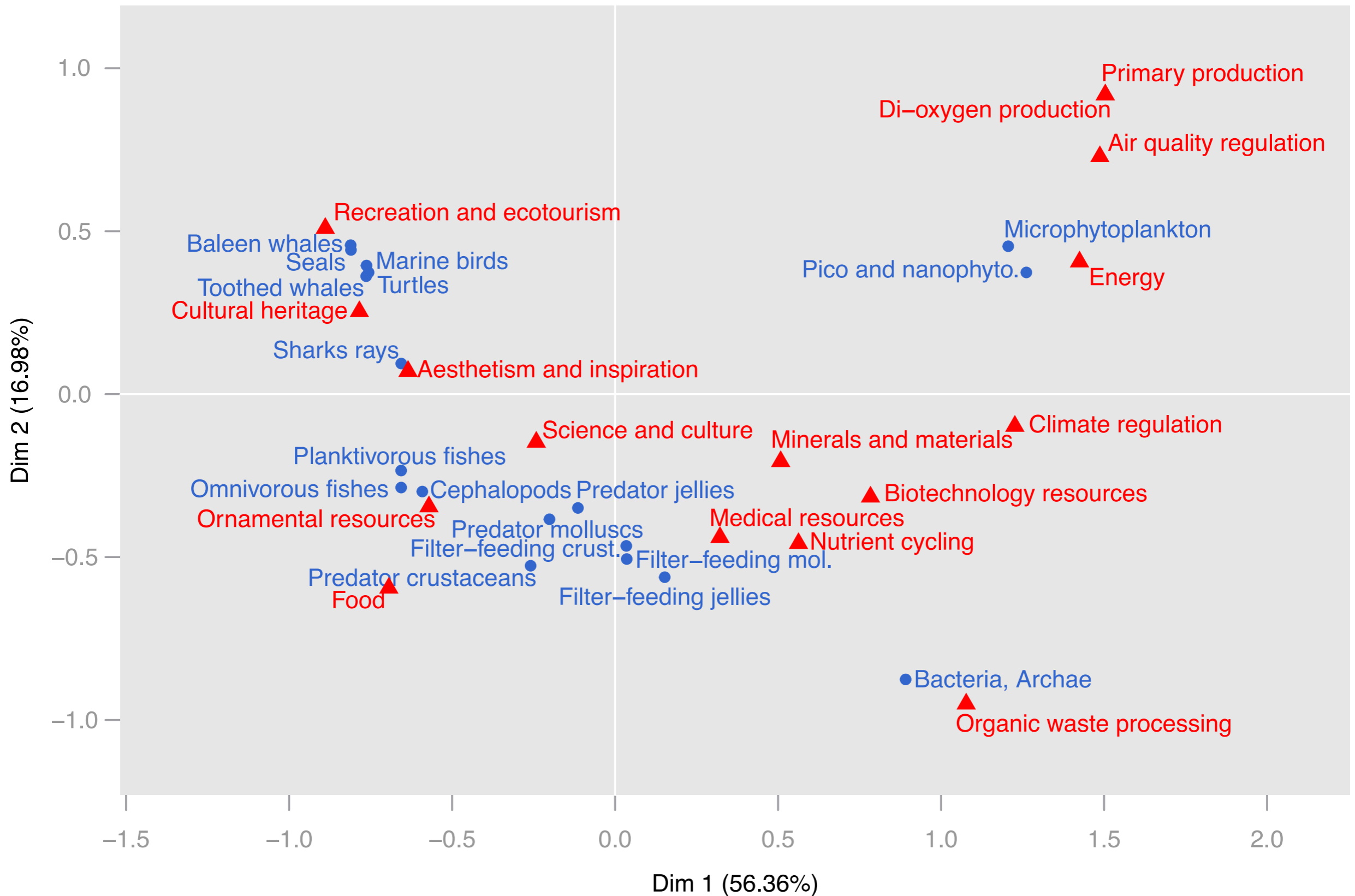
taille de la communauté?

Turtles	47	43	41	44	46	42	43	45	45	48	47	48	47	43	38	42
Sharks, Rays	51	43	39	44	42	40	43	43	43	49	46	47	46	43	39	43
Cephalopods	50	41	38	40	40	38	42	43	41	46	46	42	45	43	38	42
Marine birds	43	36	32	38	35	33	37	39	37	46	45	42	43	37	32	39
Seals	46	40	34	39	38	37	40	41	41	48	45	47	46	41	37	41
Baleen whales	44	37	31	36	37	35	37	38	39	45	43	44	45	38	34	37
Toothed whales	44	37	31	36	37	35	37	38	39	45	43	44	44	37	33	37
Omnivorous fishes	54	41	37	43	45	40	45	48	44	49	49	49	49	44	40	46
Planktivorous fishes	55	43	40	45	48	42	48	50	47	51	52	50	51	46	41	48
Predator jellies	48	45	40	40	40	38	42	44	43	50	49	44	48	43	38	44
Predator crustaceans	49	40	37	41	40	37	43	44	45	50	46	44	45	43	38	44
Predator molluscs	48	38	35	40	38	36	39	41	41	44	45	42	44	42	37	42
Filter-feeding jellies	45	41	36	40	39	37	39	42	43	44	44	42	43	43	38	46
Filter-feeding crust.	49	38	35	40	40	36	41	42	41	46	44	41	43	41	37	46
Filter-feeding mol.	50	40	35	41	42	38	40	43	43	45	46	44	47	43	37	46
Microphytoplankton	59	58	52	59	46	53	59	65	58	63	59	53	54	67	54	65
Pico and nanophyto.	58	54	51	56	44	50	54	61	56	59	56	53	53	63	52	61
Bacteria, Archae	51	52	49	48	43	42	45	54	54	53	49	48	46	51	44	58
	Food	Medical resources	Biotechnology resources	Energy	Ornamental resources	Minerals and materials	Air quality regulation	Climate regulation	Organic waste processing	Science and culture	Aesthetics and inspiration	Cultural heritage	Recreation and ecotourism	Primary production	Di-oxygen production	Nutrient cycling





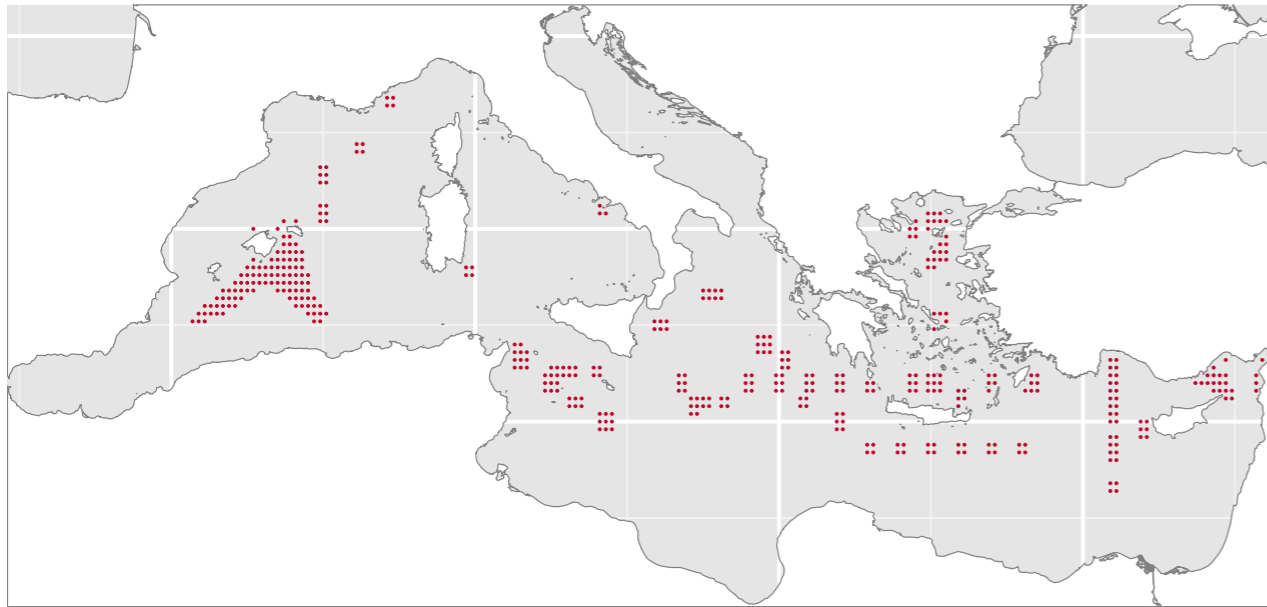
# Projection factorielle des contributions



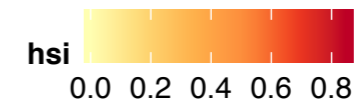
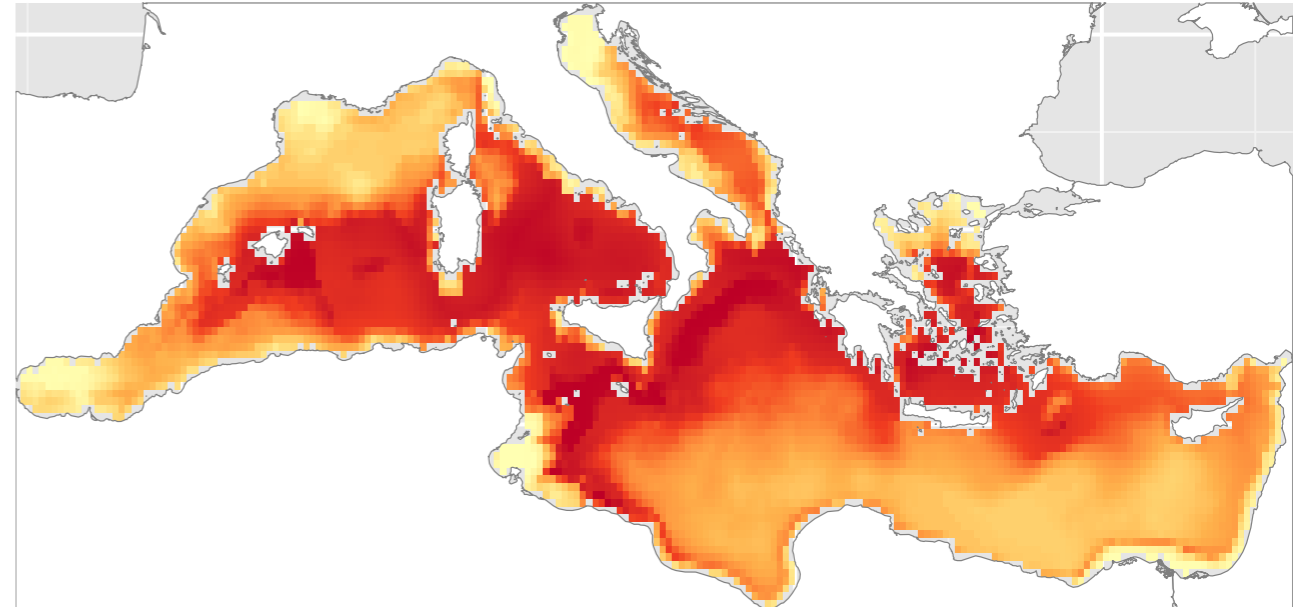
# Distribution des espèces

---

*NoUS avONS*



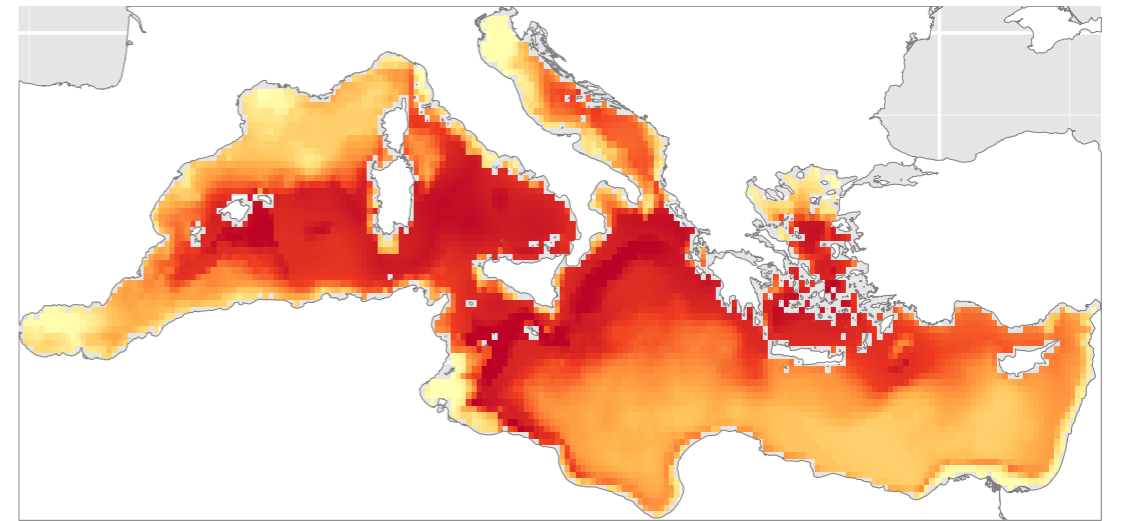
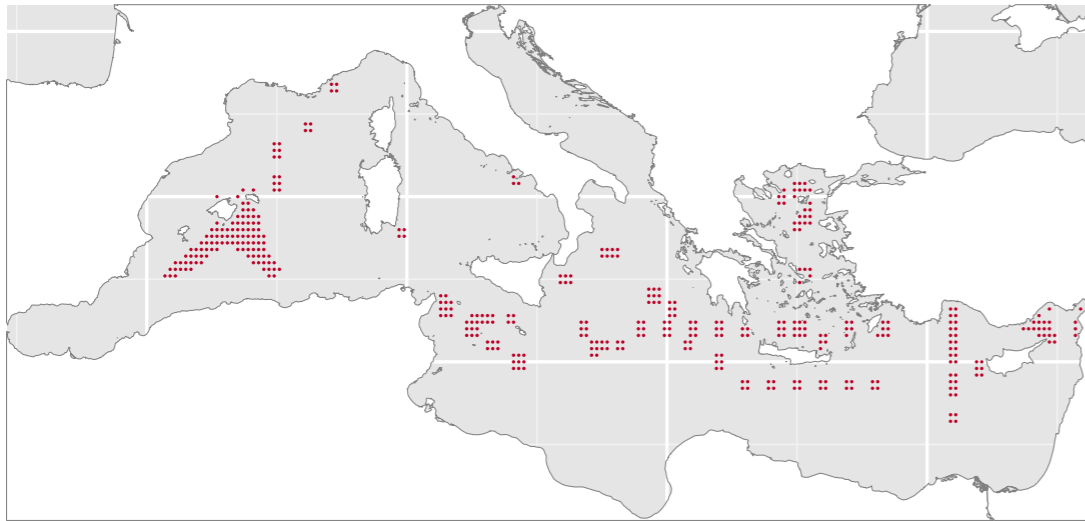
*NoUS vOULONS*



*Species Distribution Models  
(ou modèles de niche)*

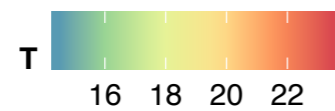
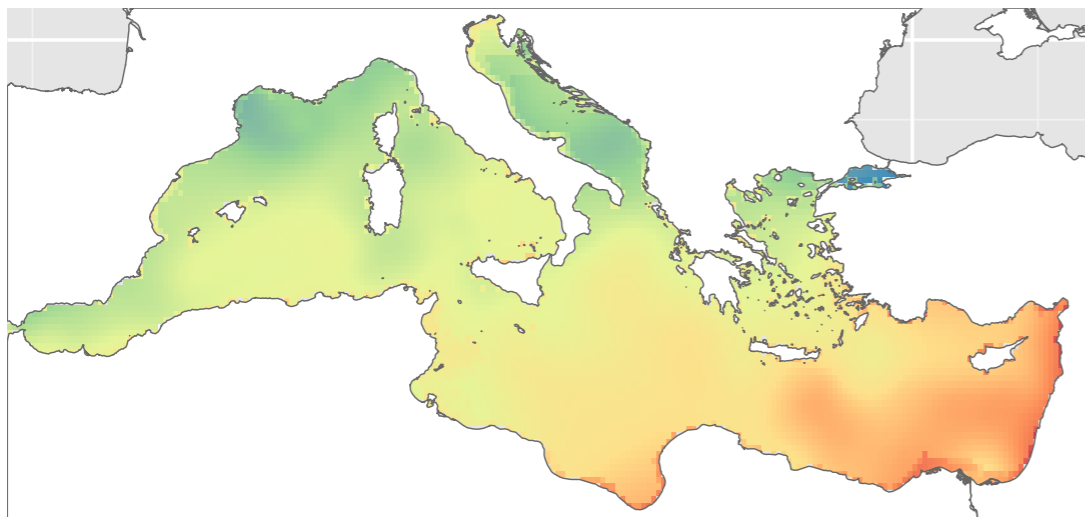
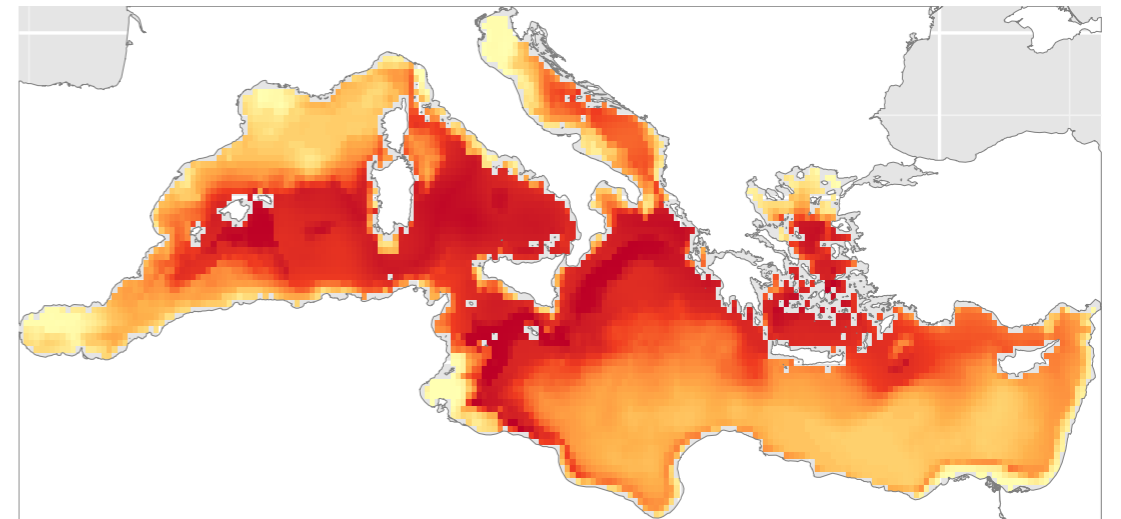
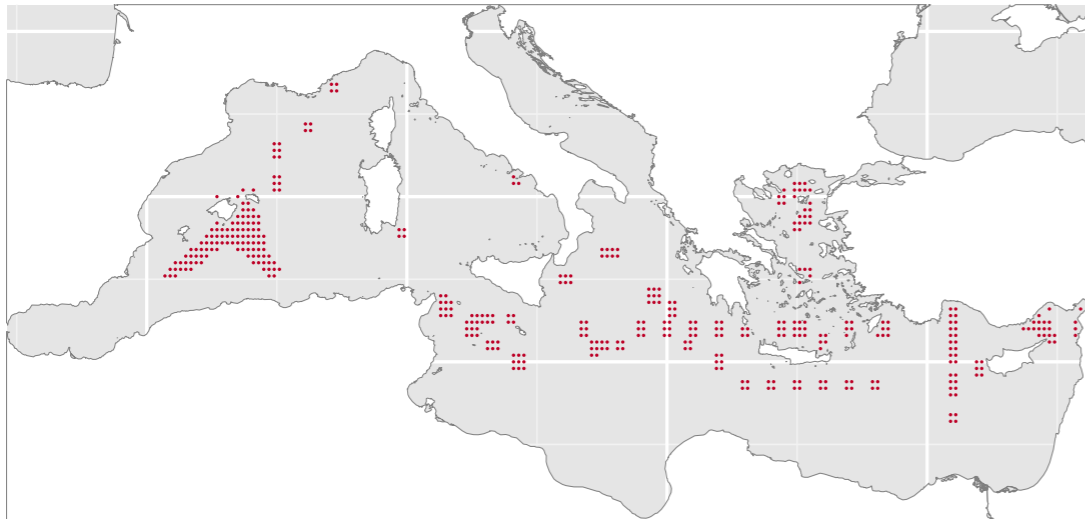
# Species Distribution Models

---



# Species Distribution Models

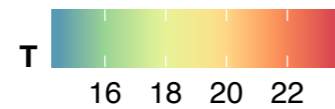
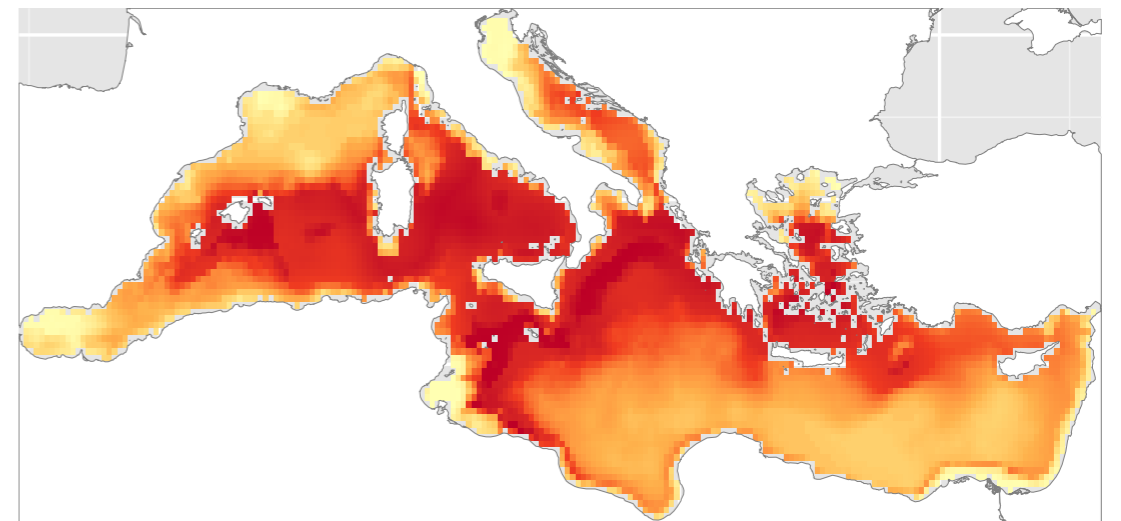
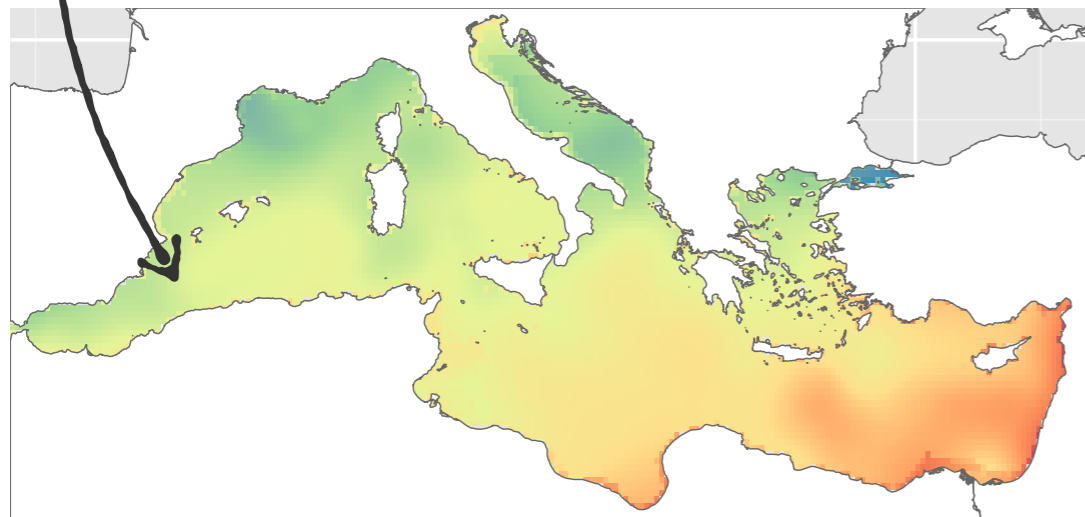
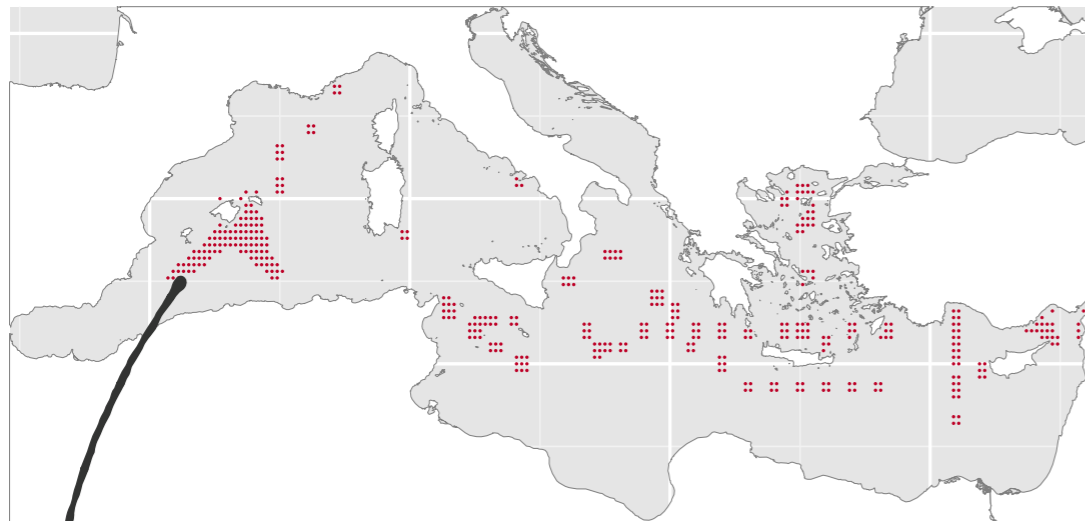
---



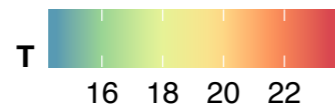
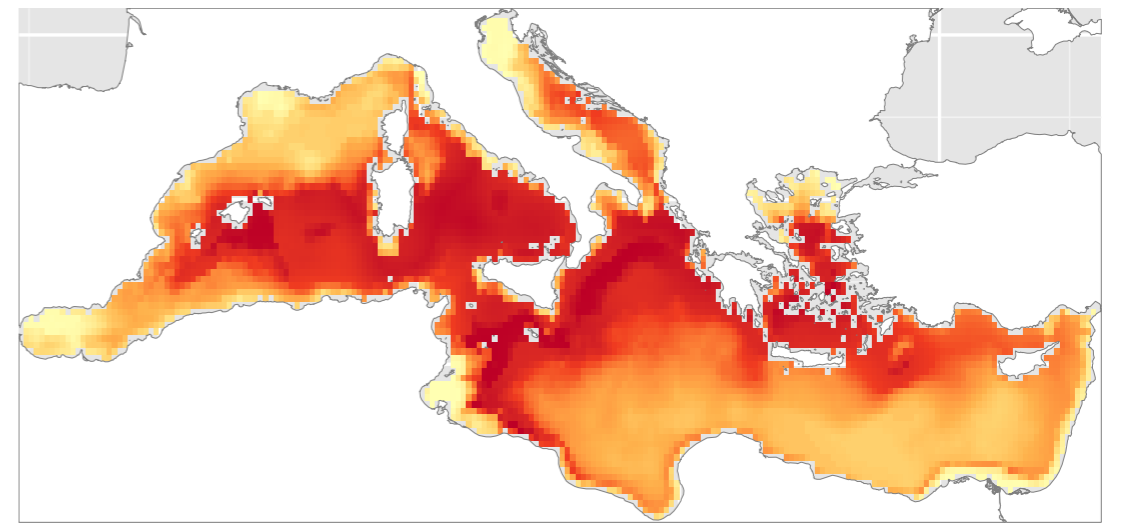
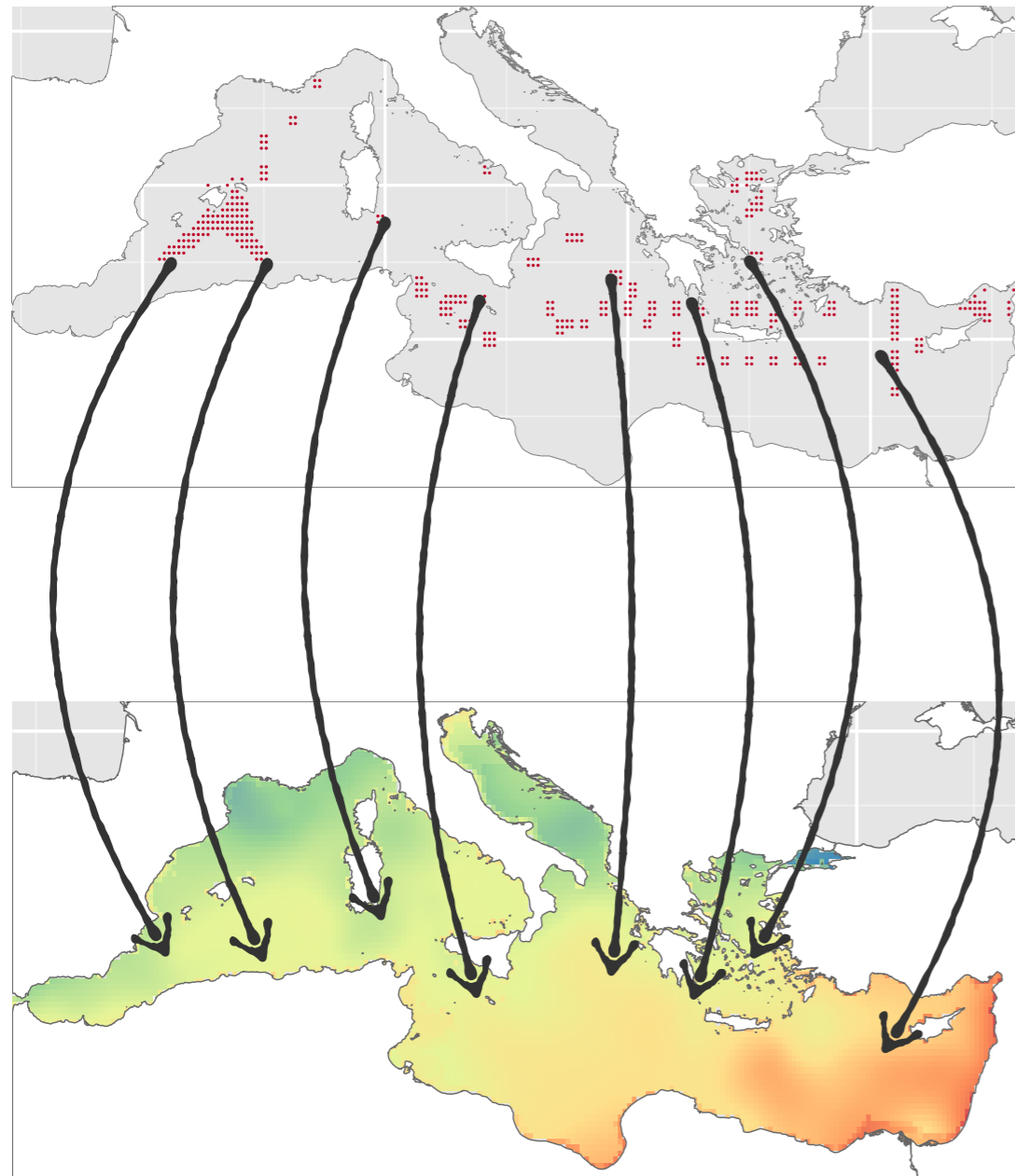


# Species Distribution Models

---

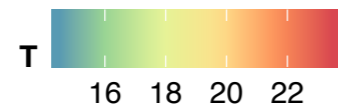
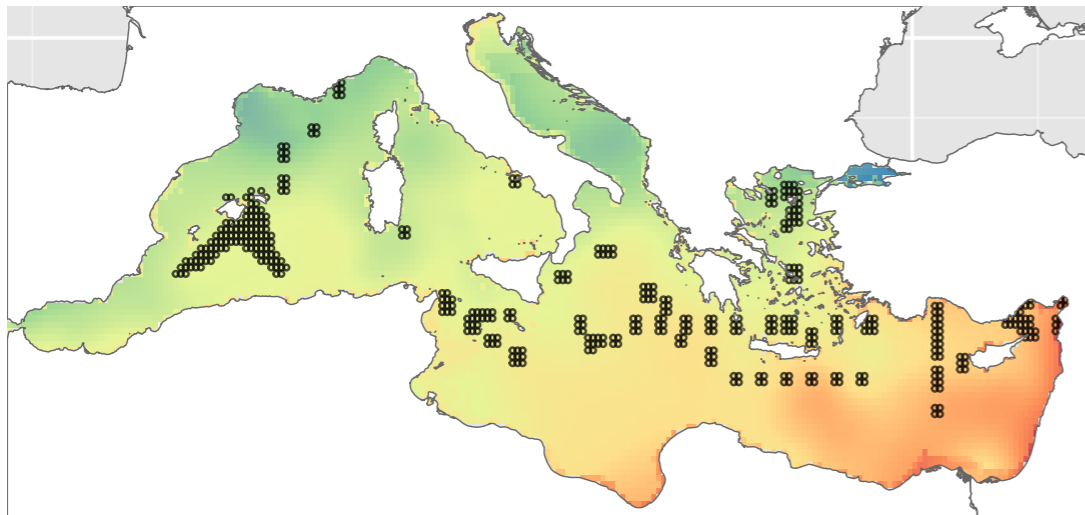
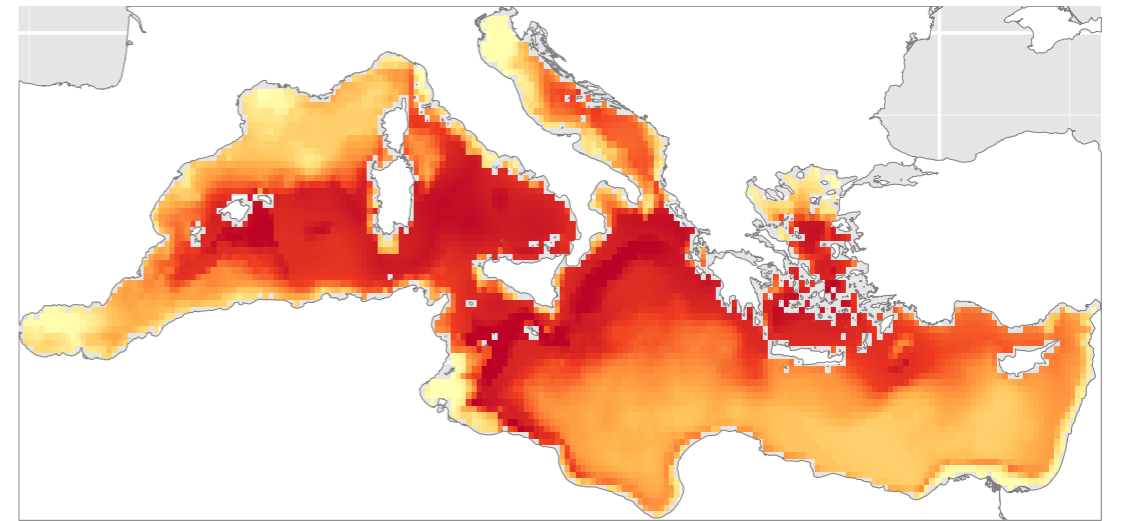
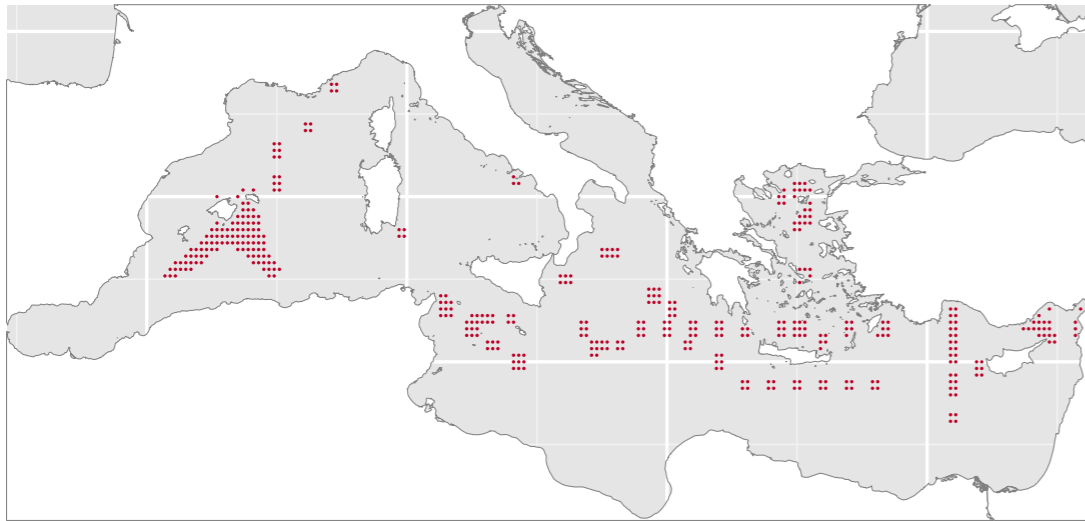


# Species Distribution Models

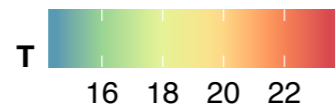
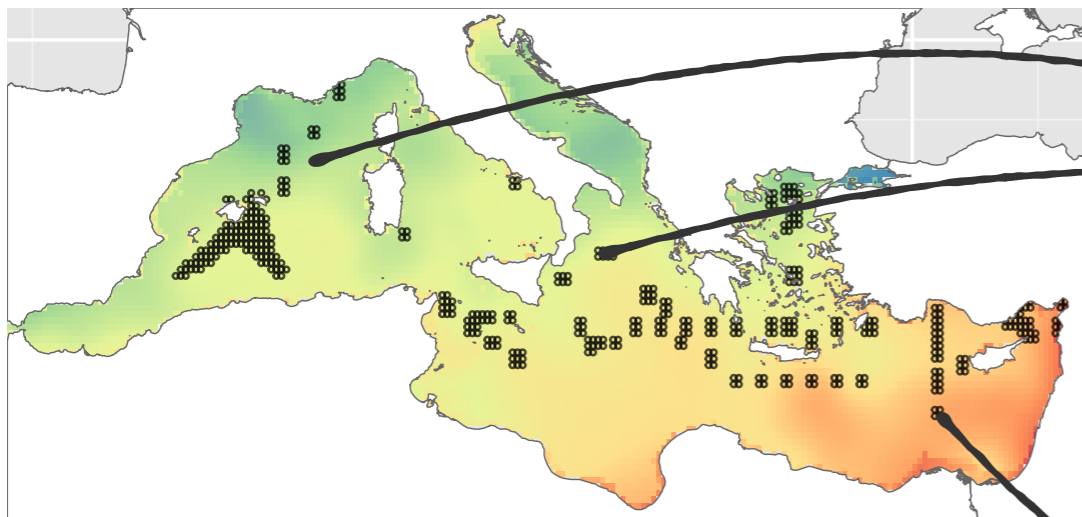
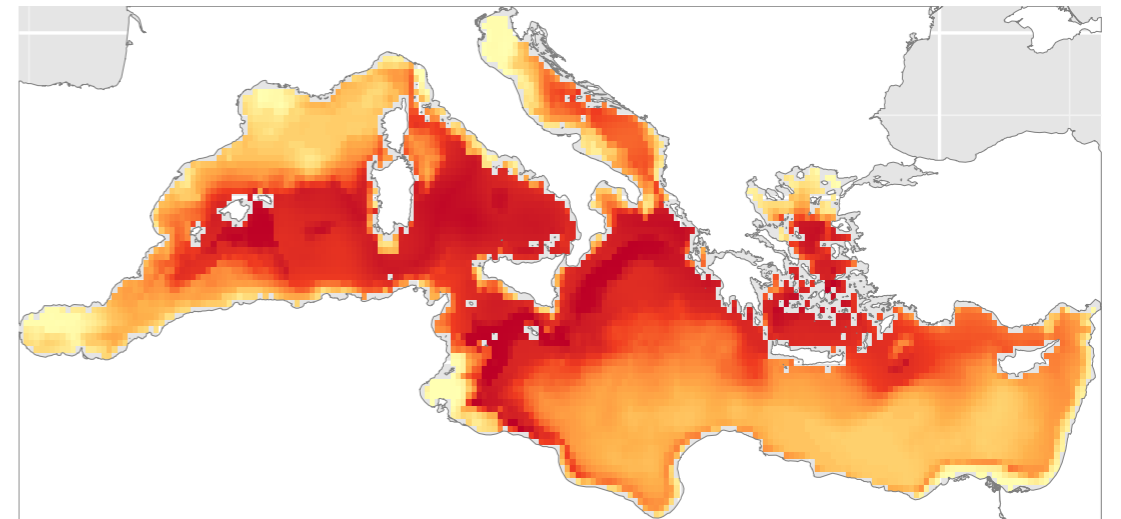
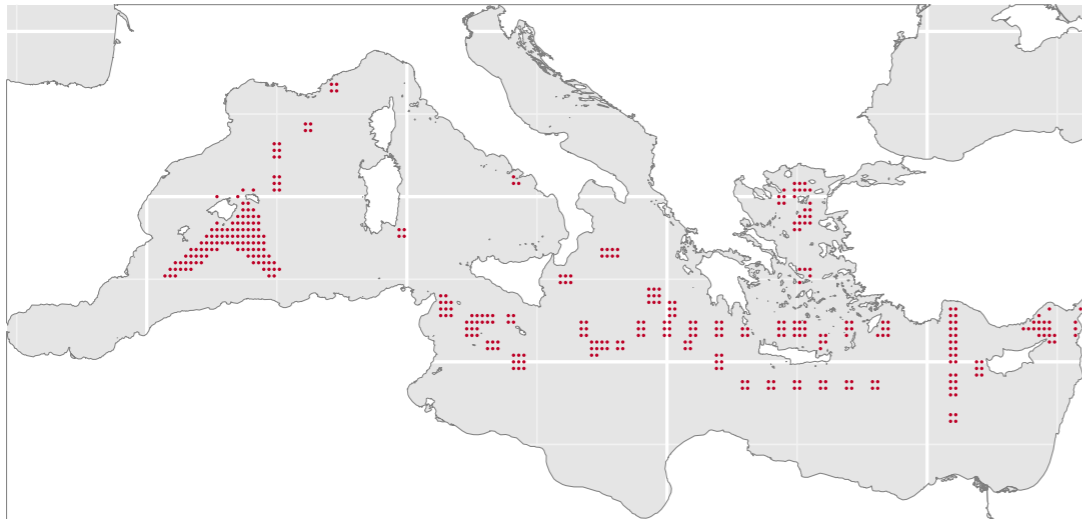


# Species Distribution Models

---

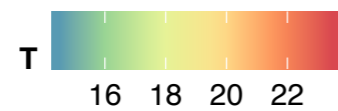
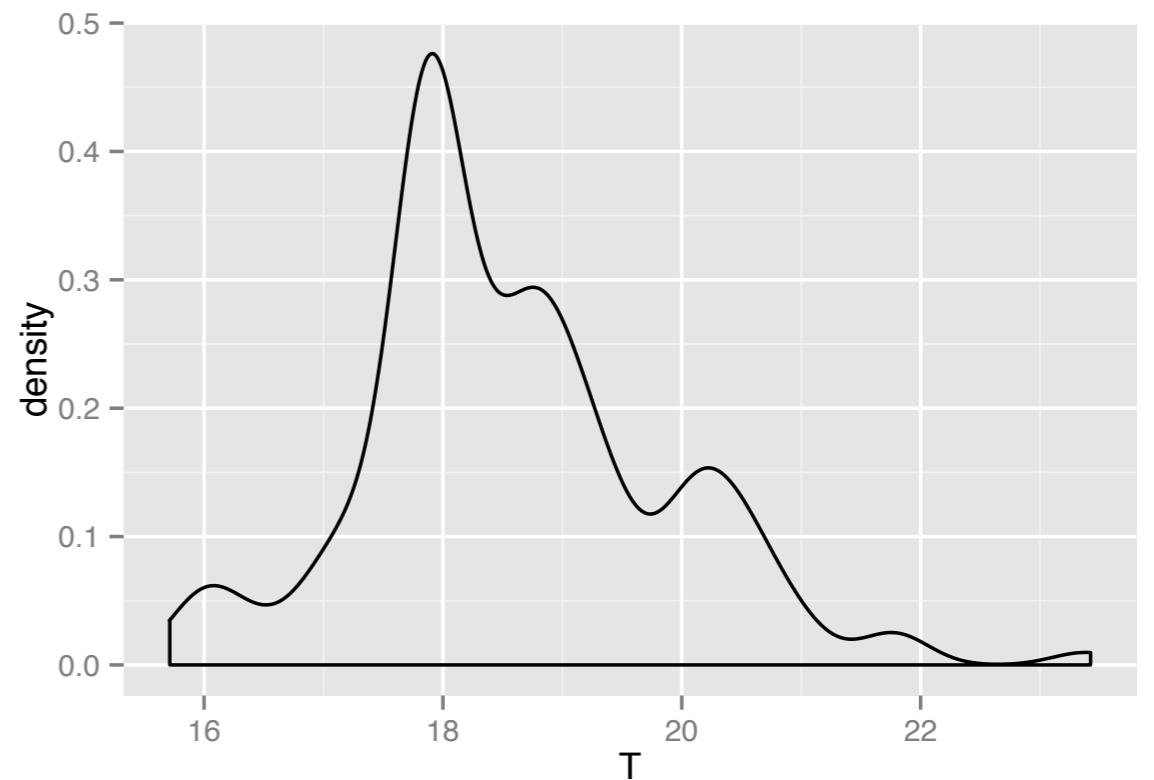
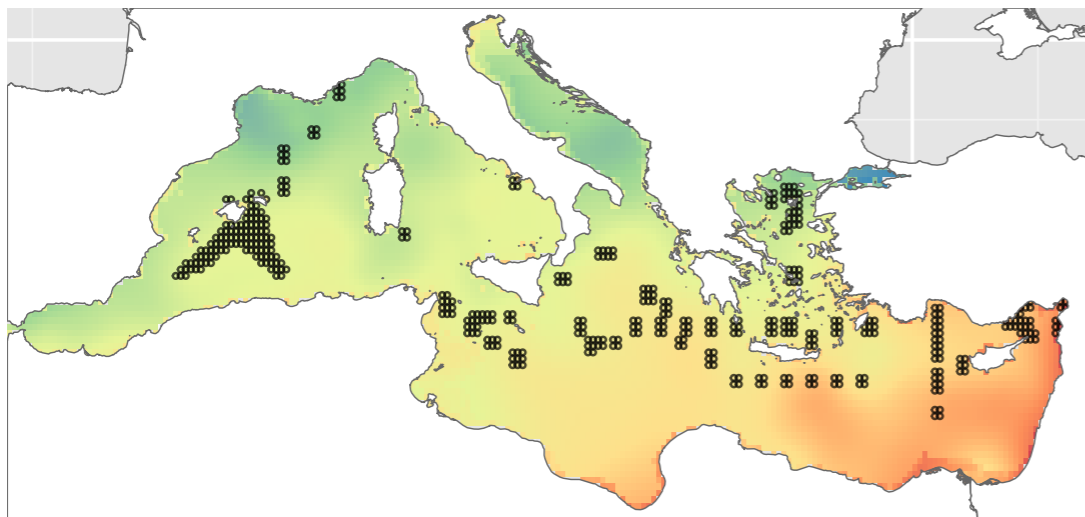
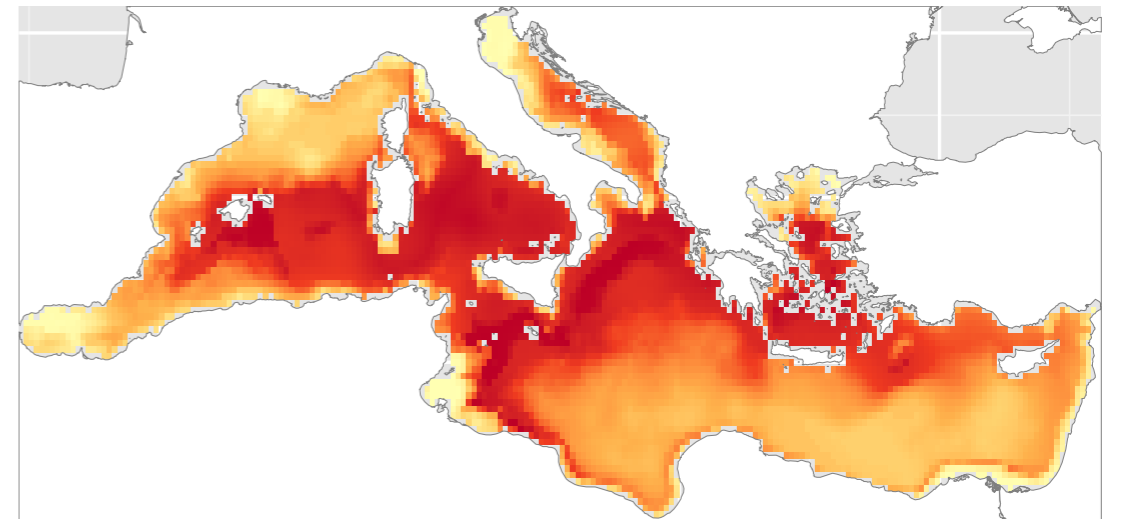
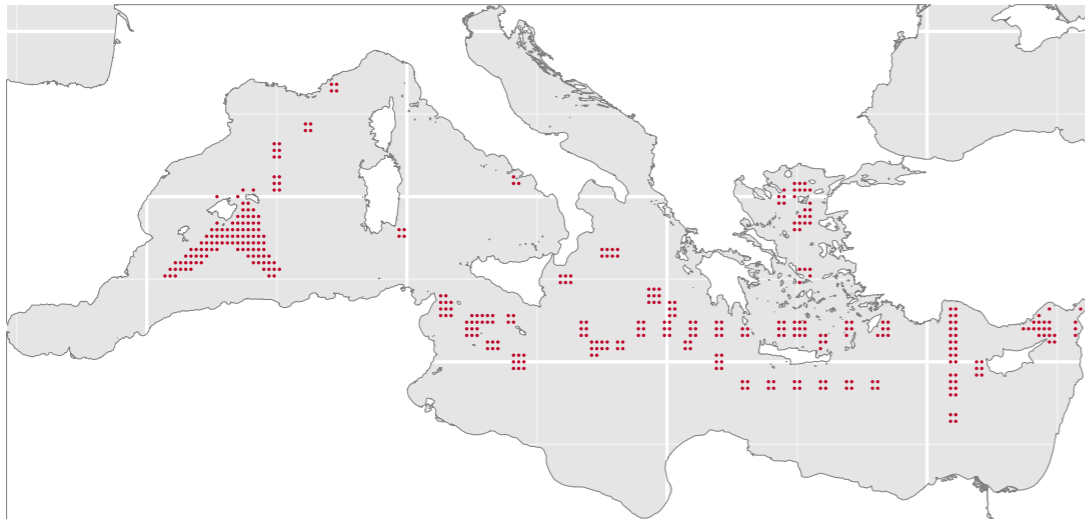


# Species Distribution Models

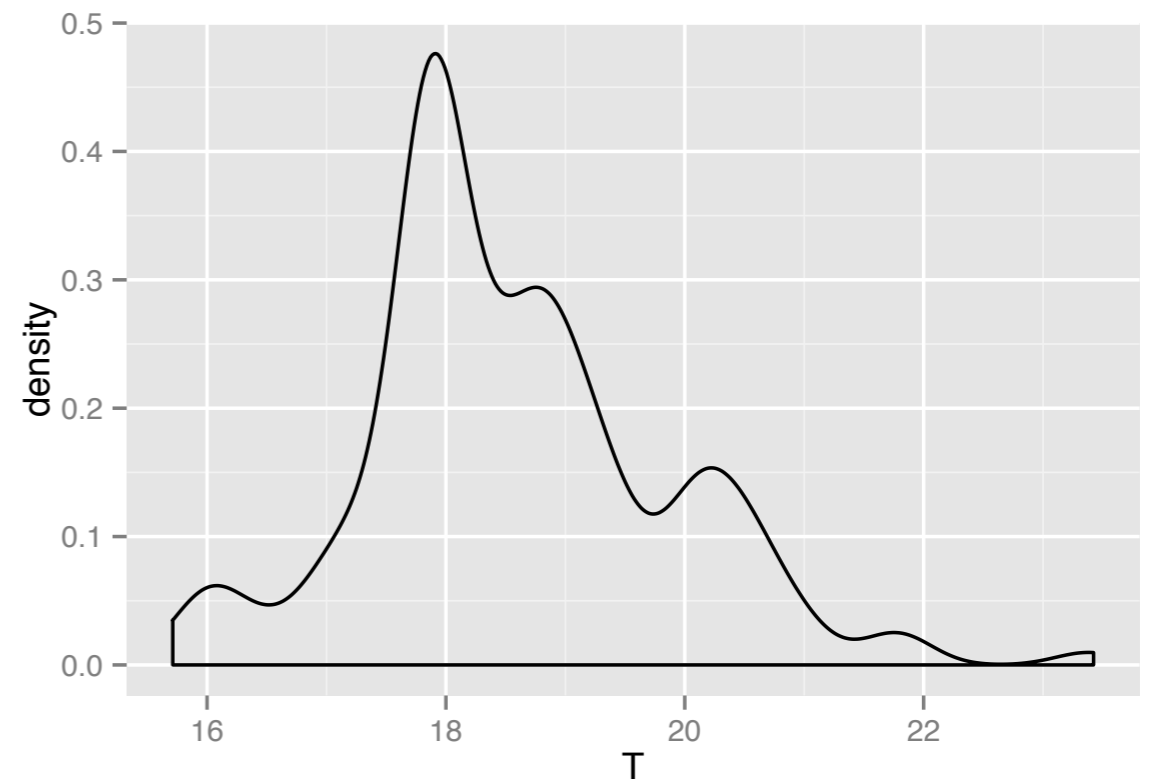
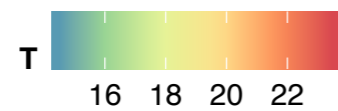
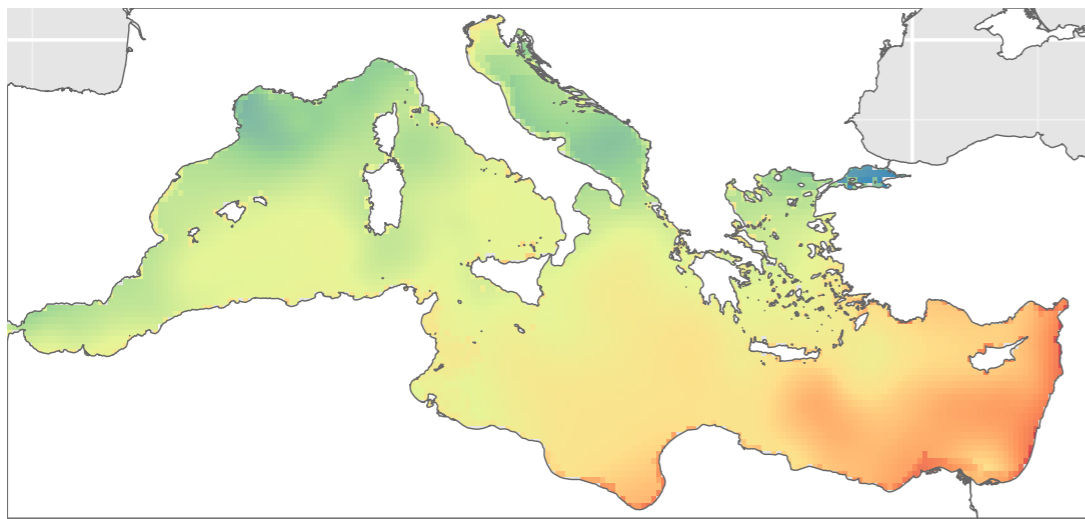
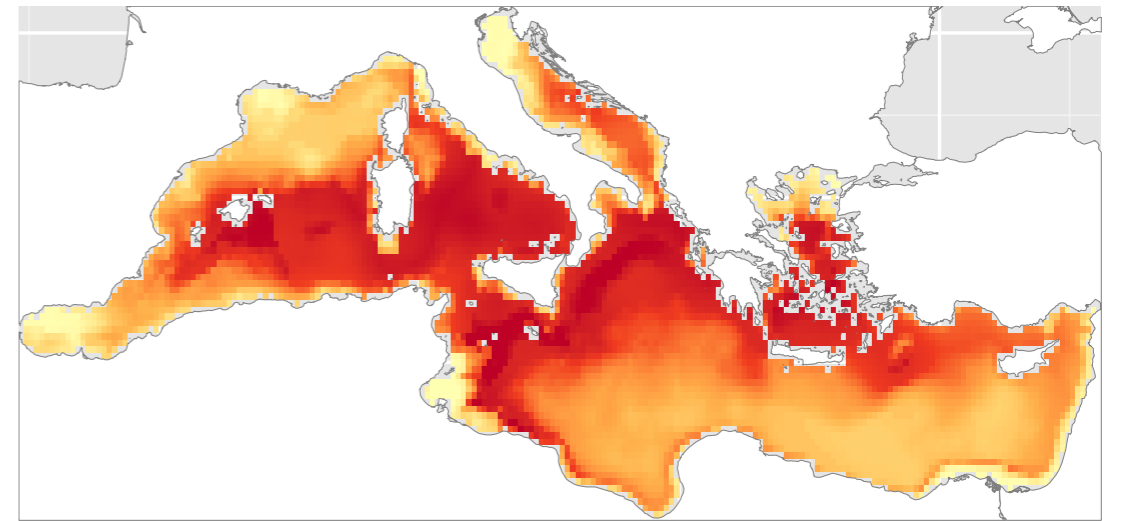
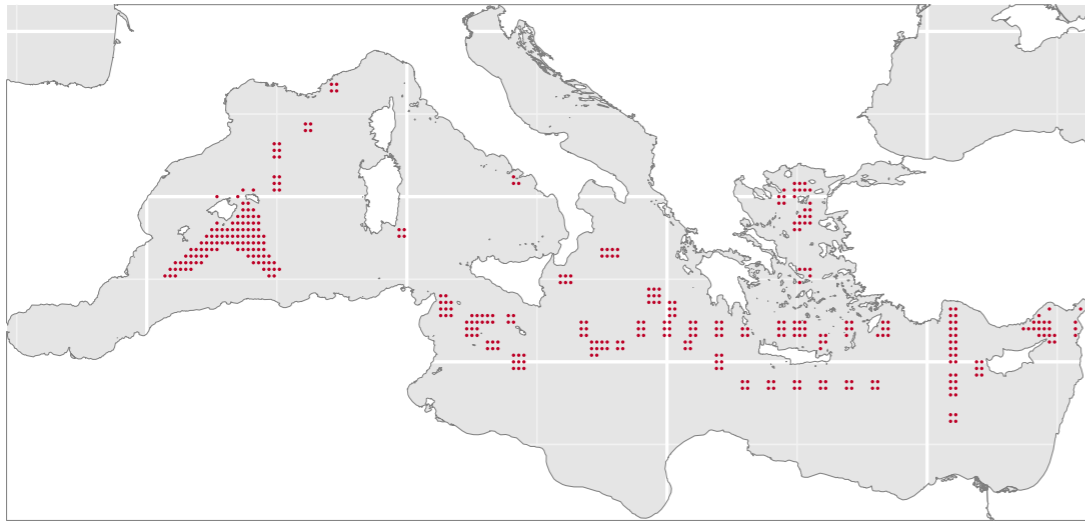




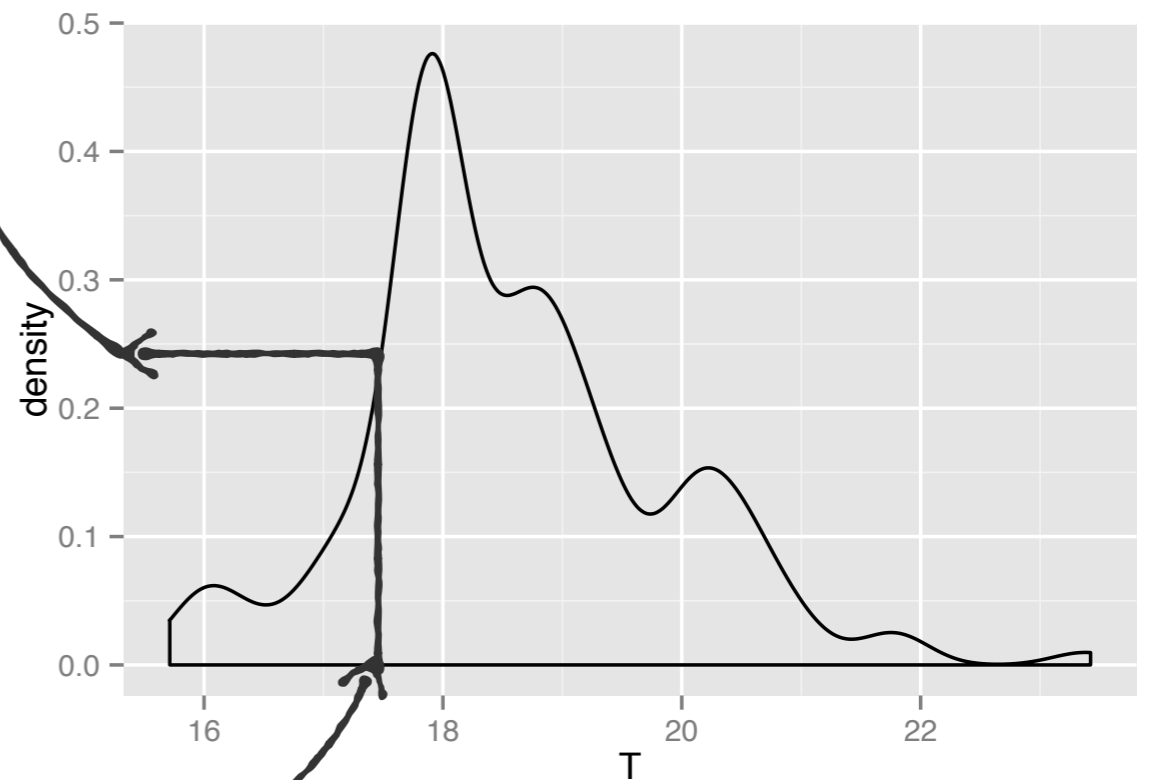
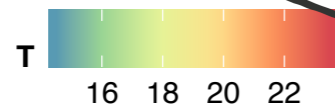
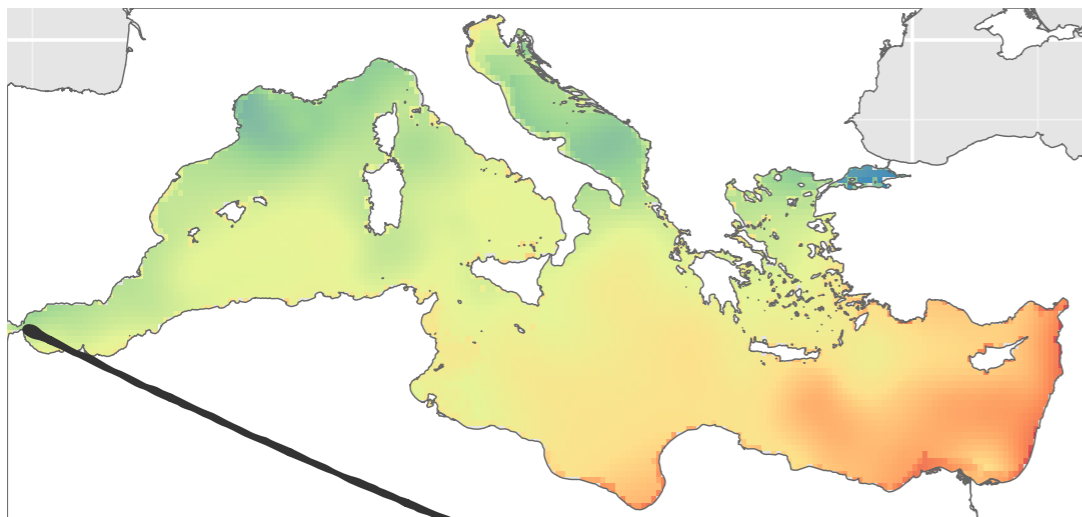
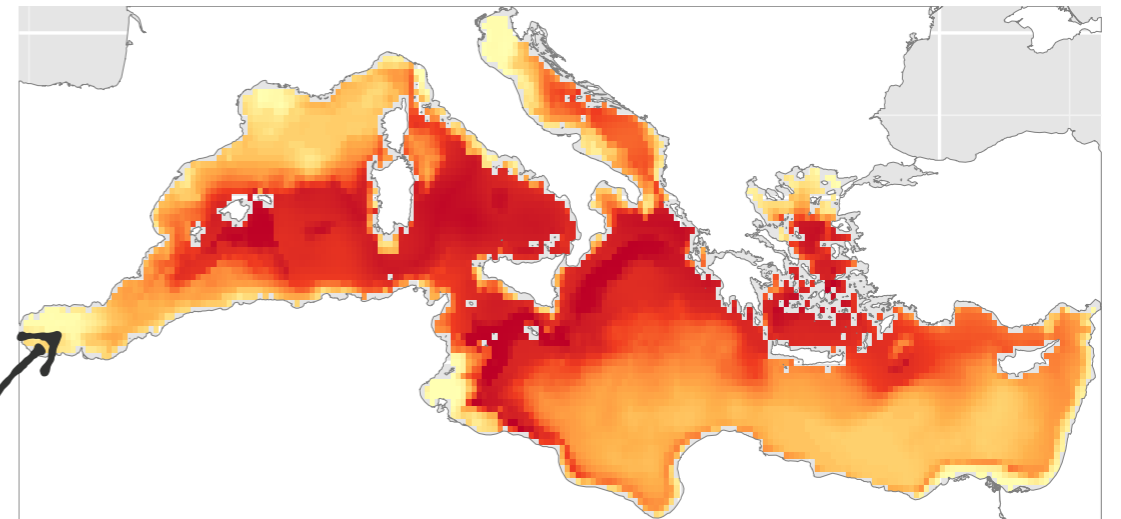
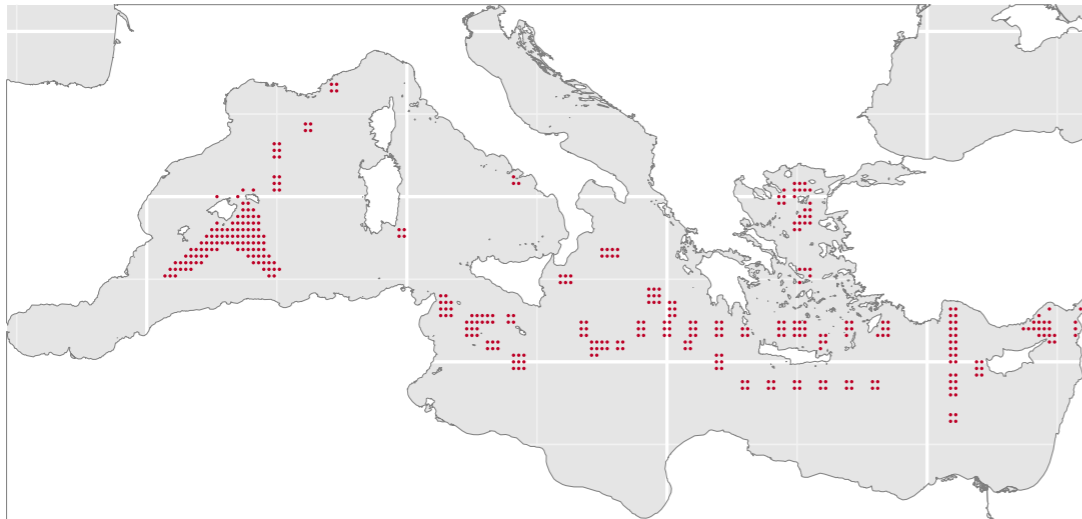
# Species Distribution Models



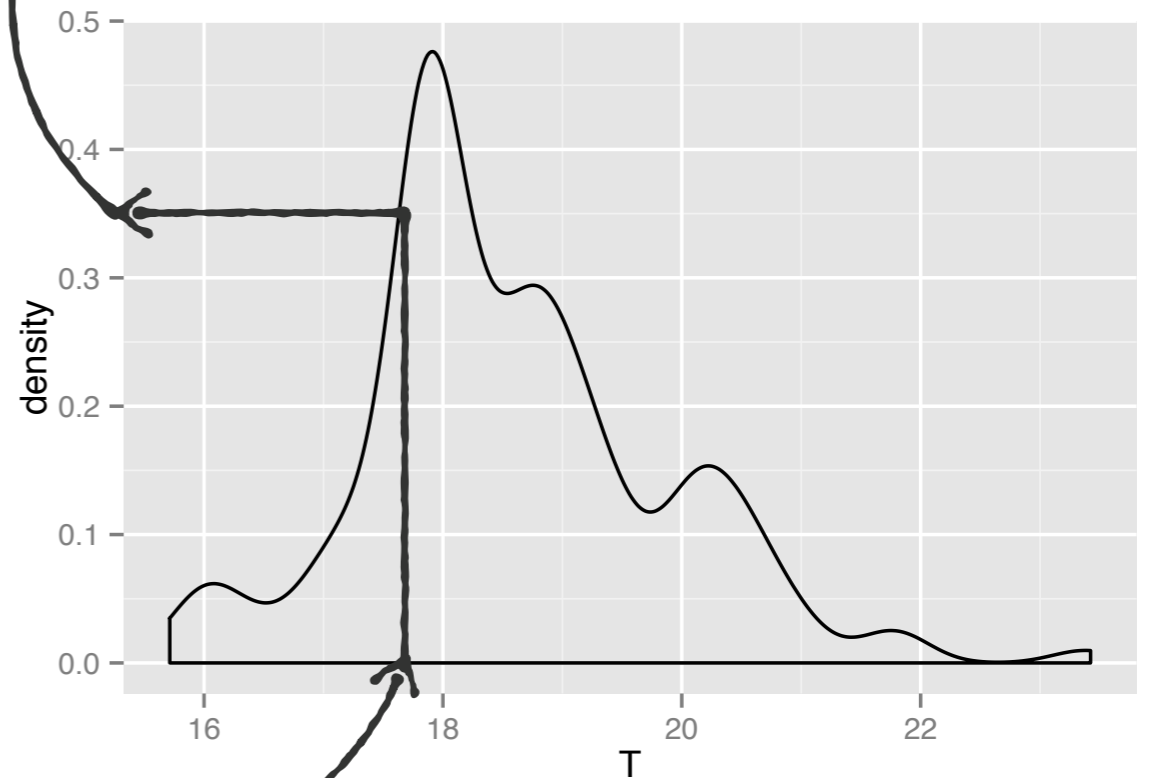
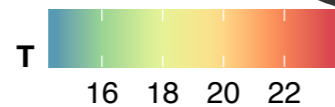
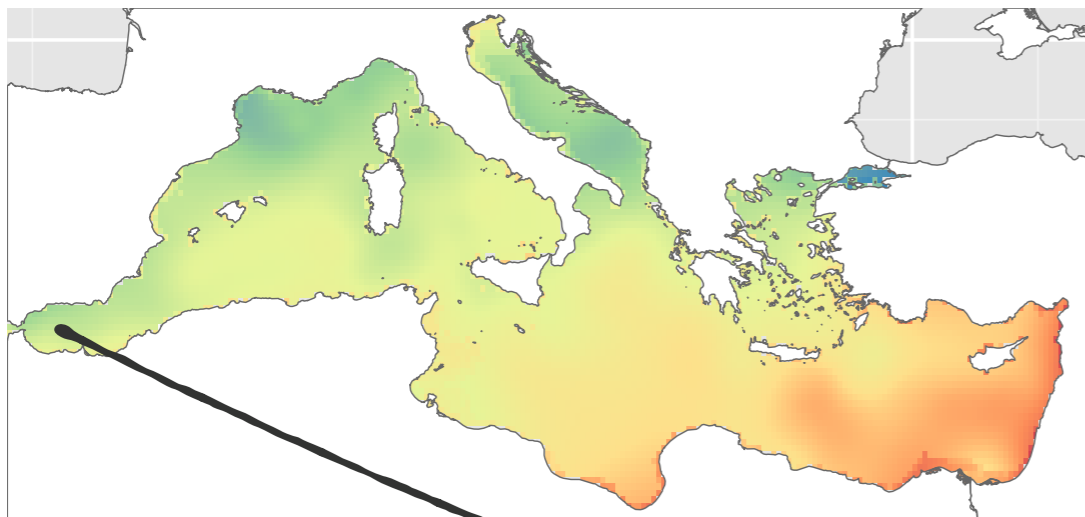
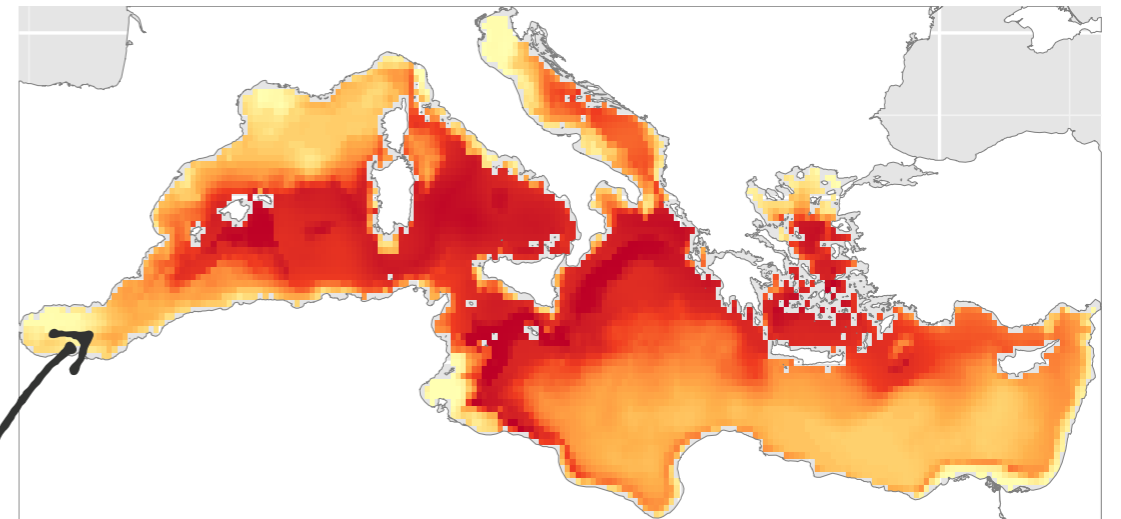
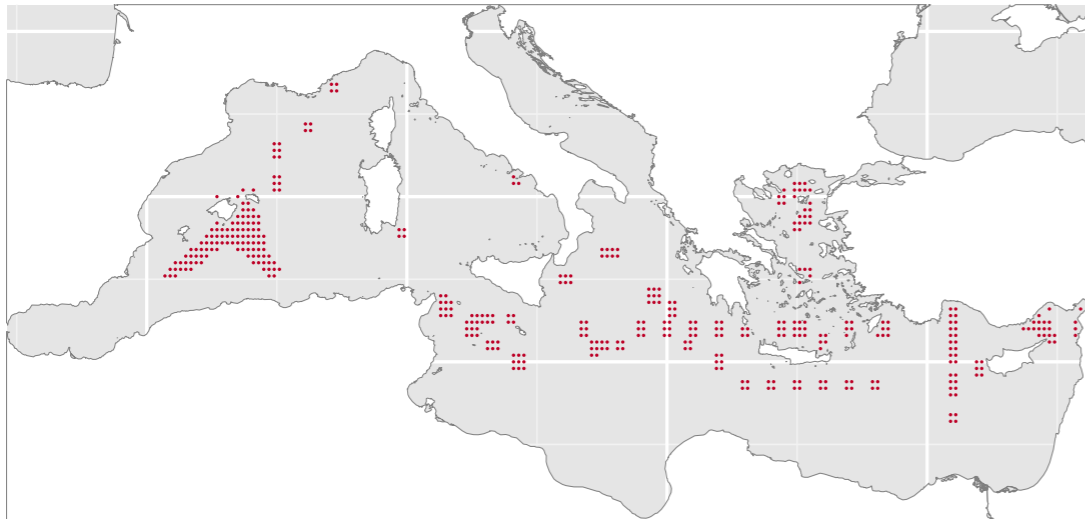
# Species Distribution Models



# Species Distribution Models

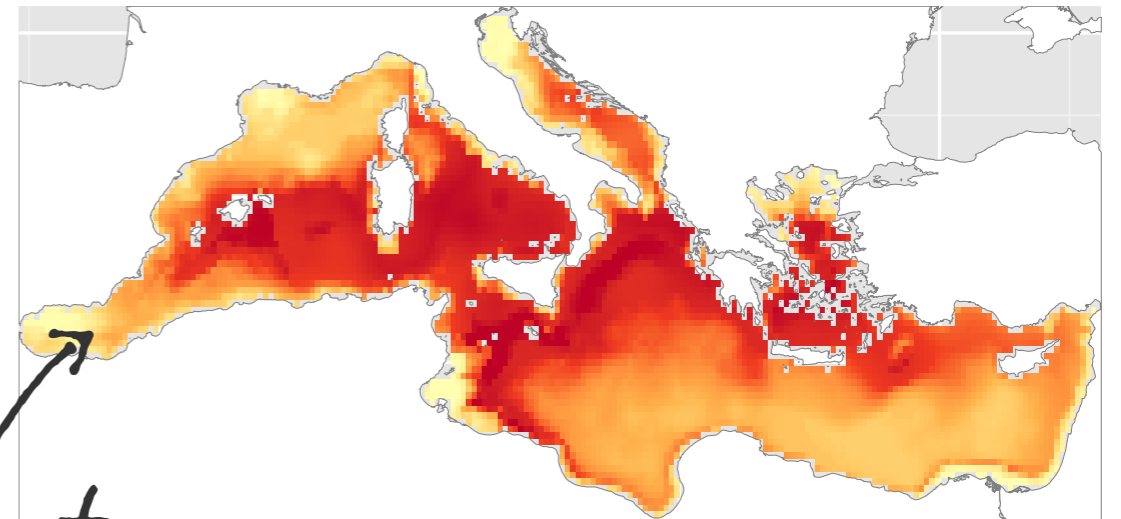
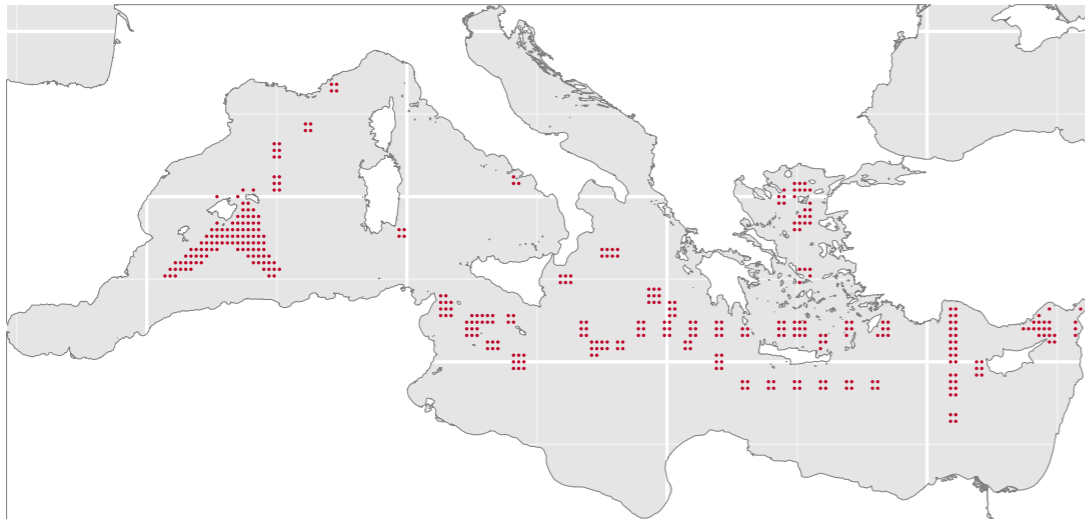


# Species Distribution Models

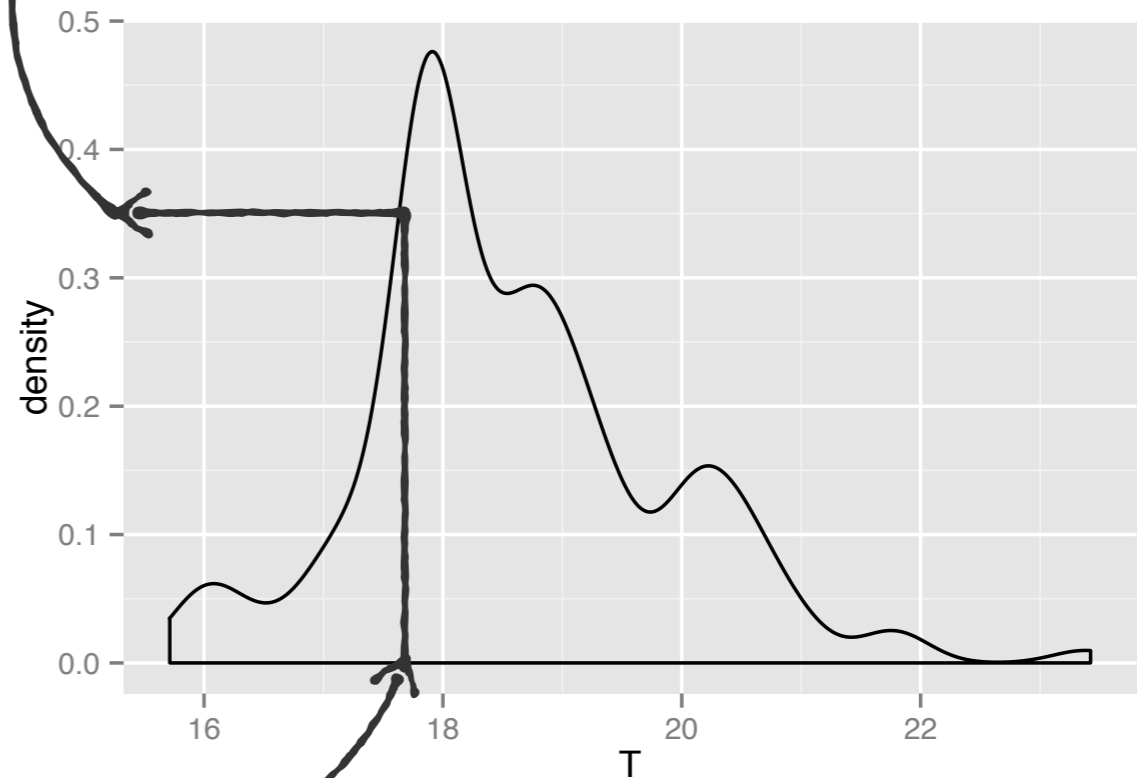
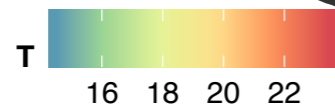
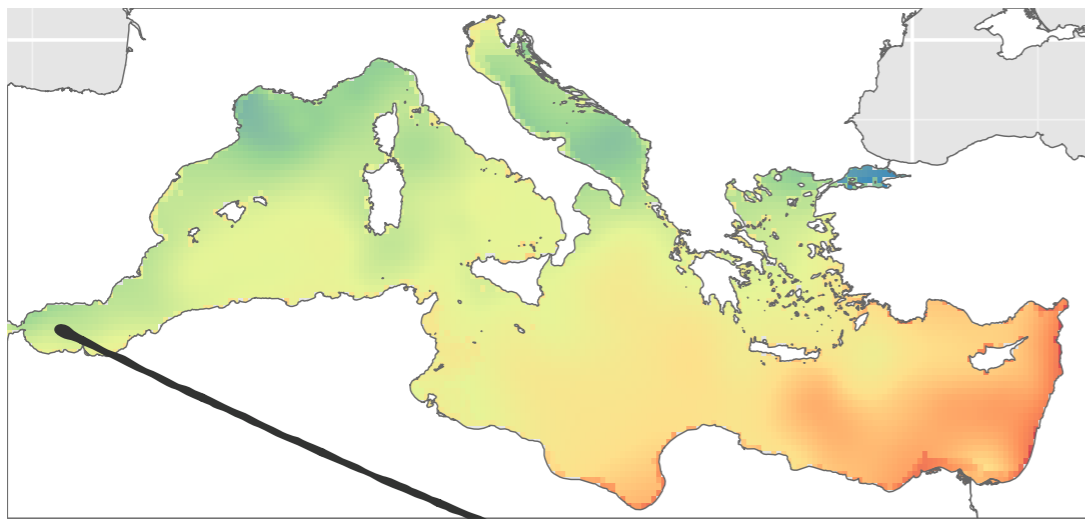




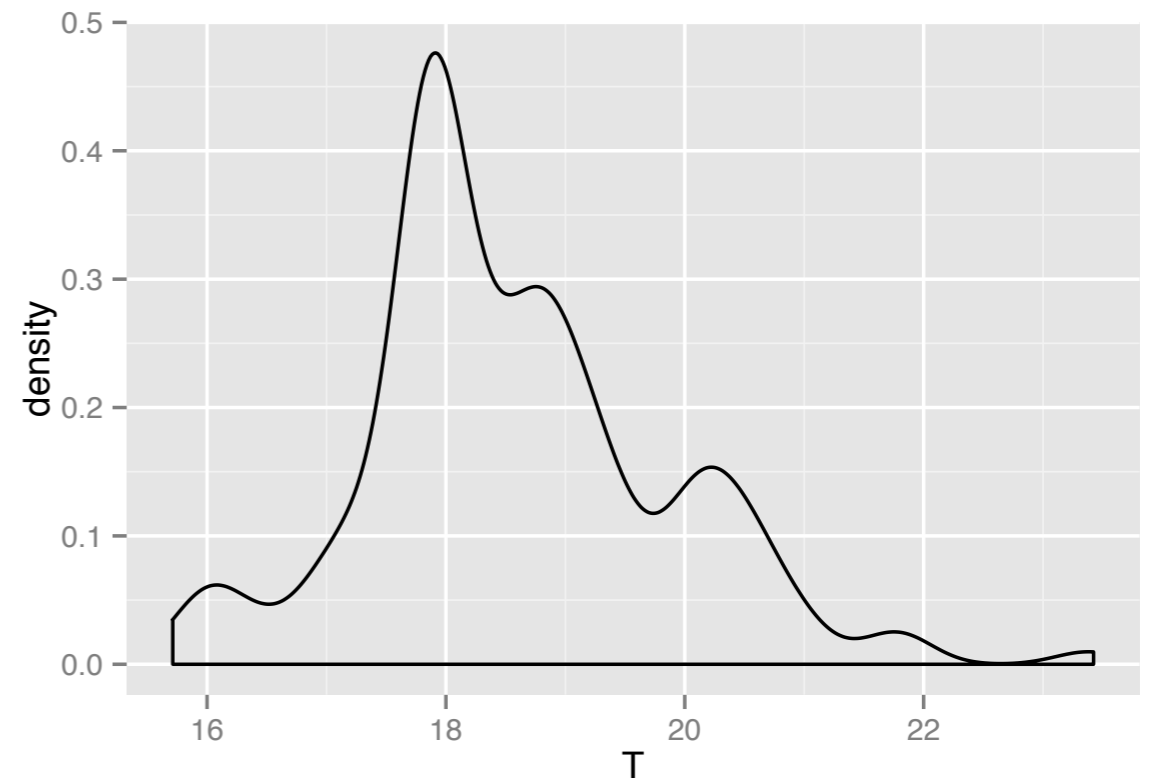
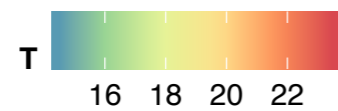
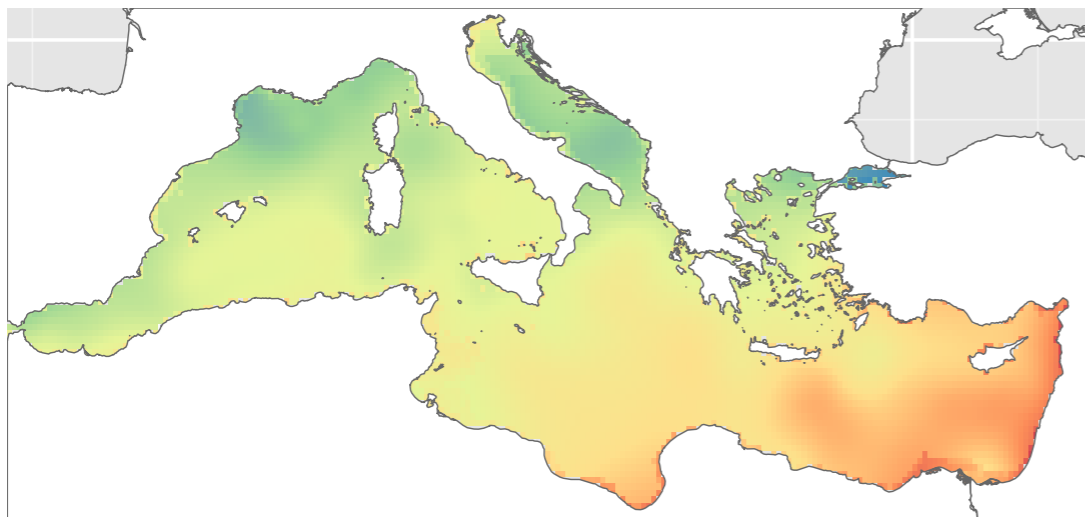
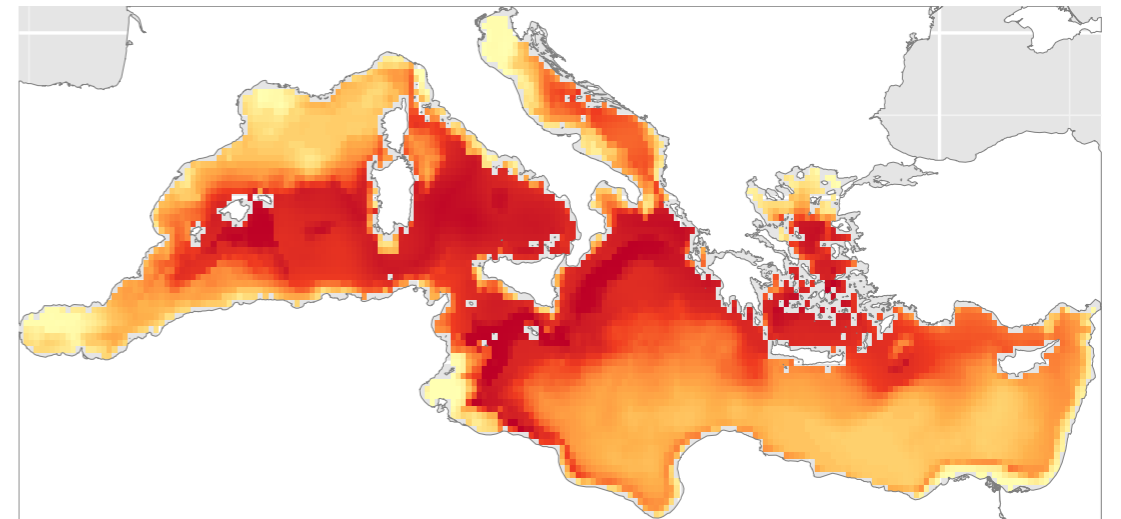
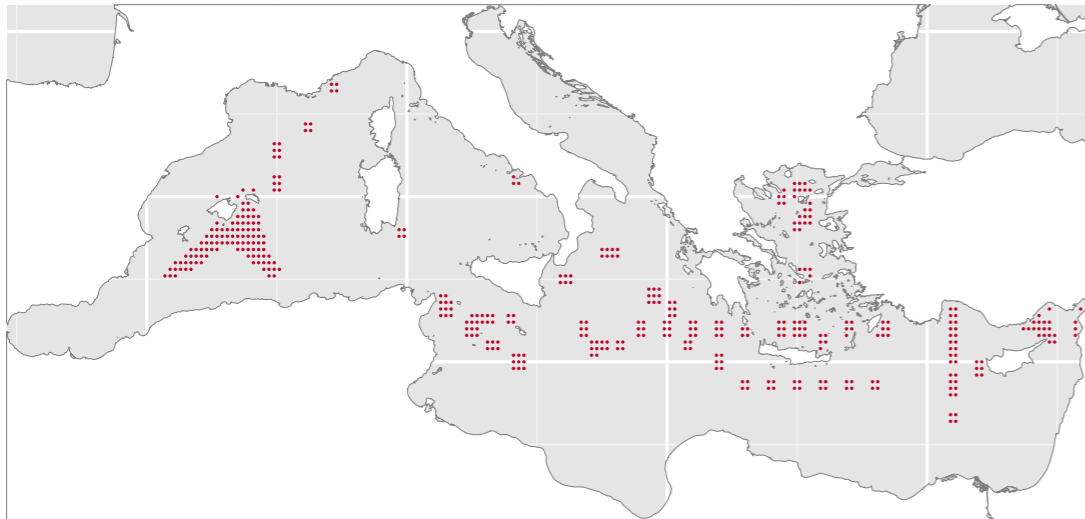
# Species Distribution Models



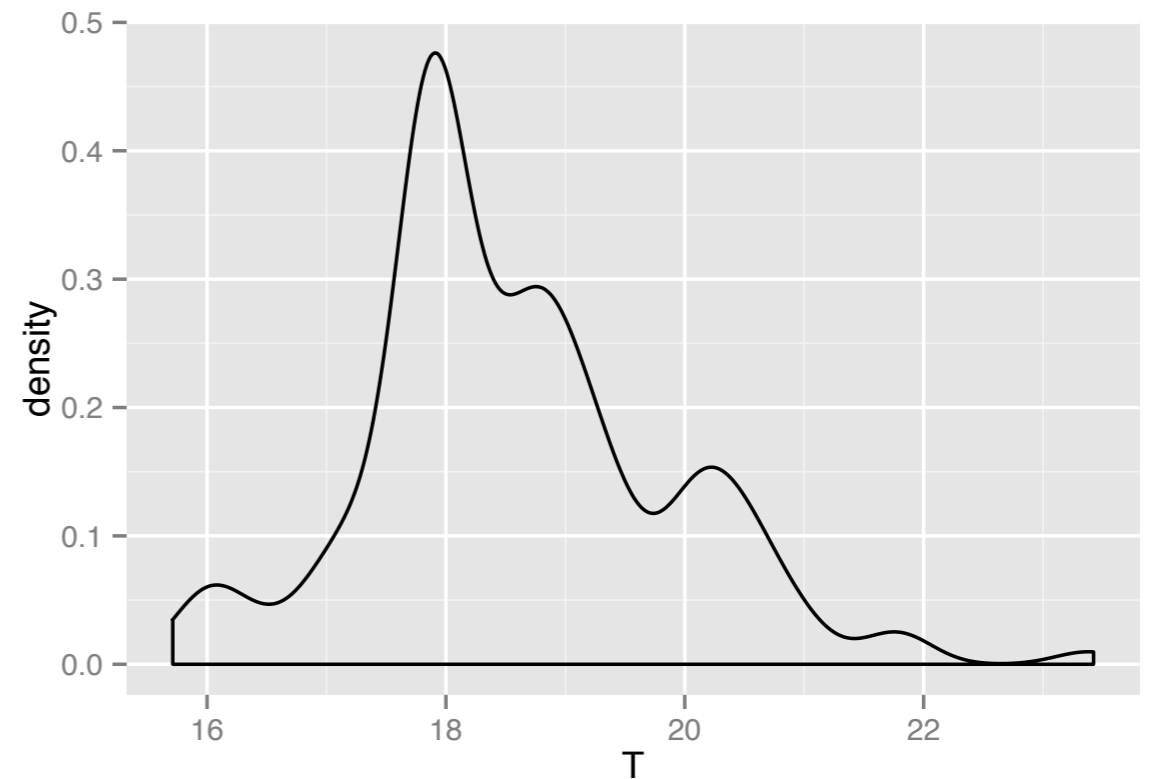
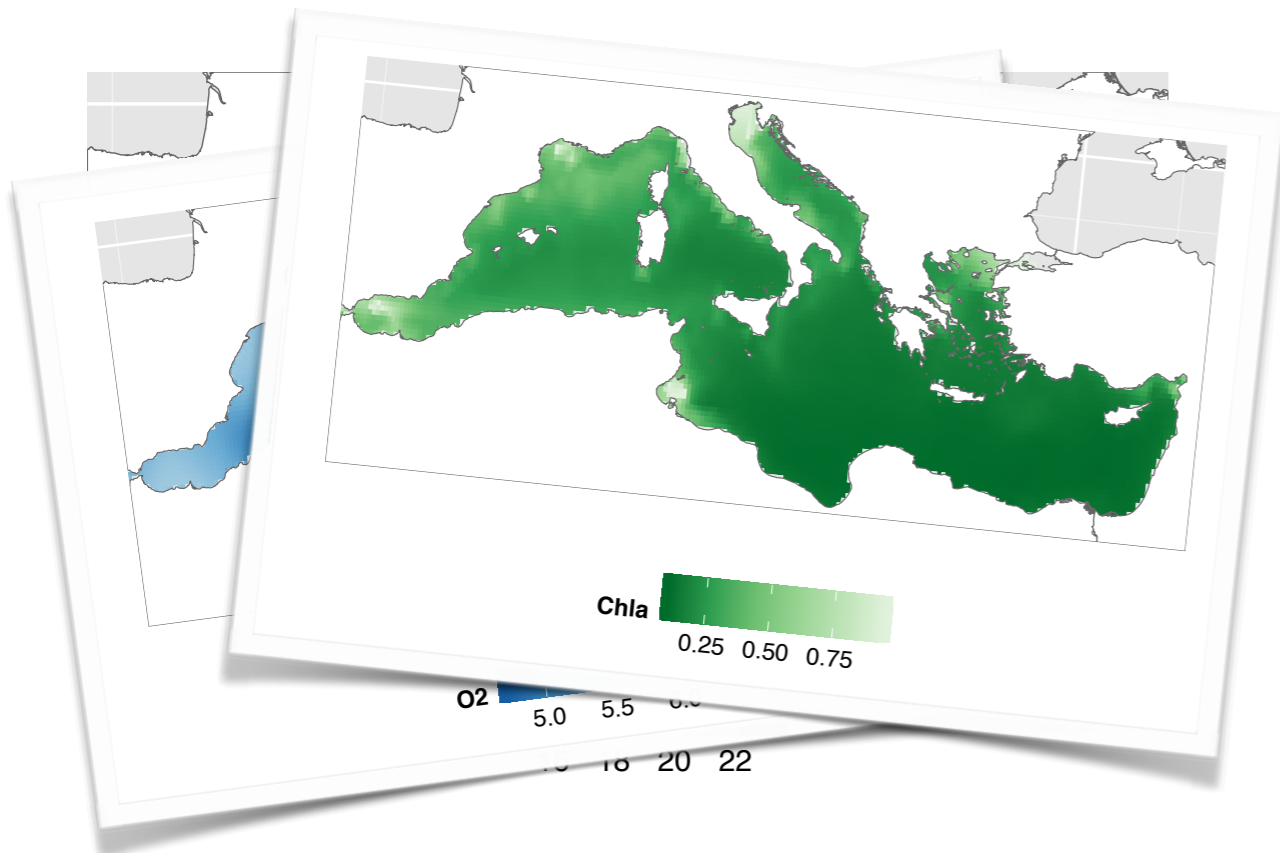
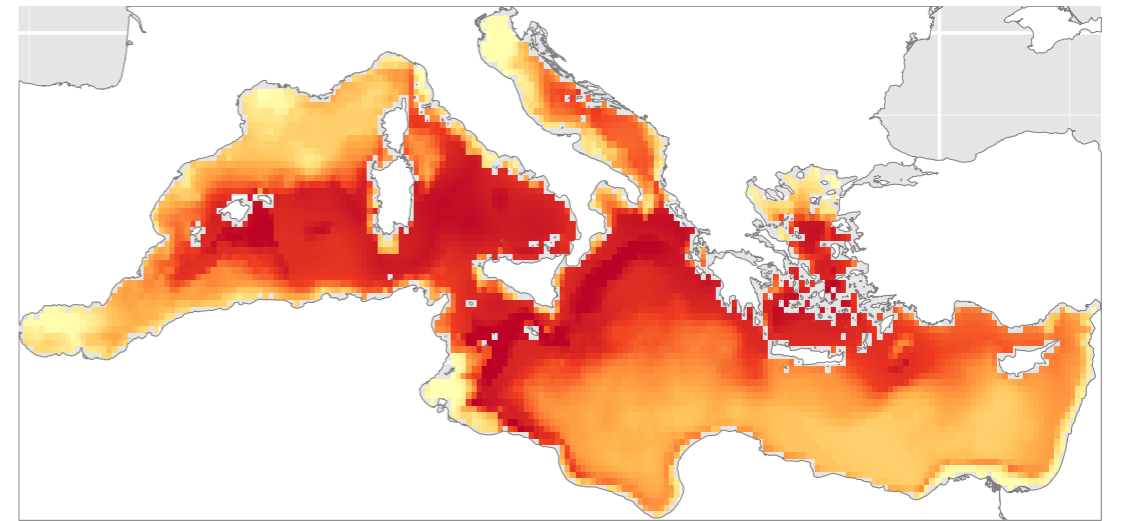
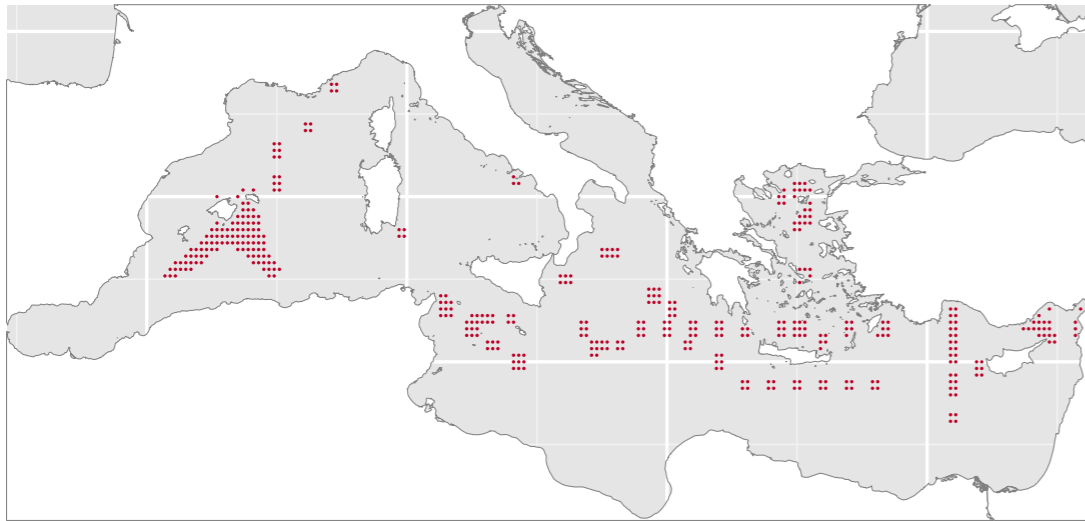
*etc.*



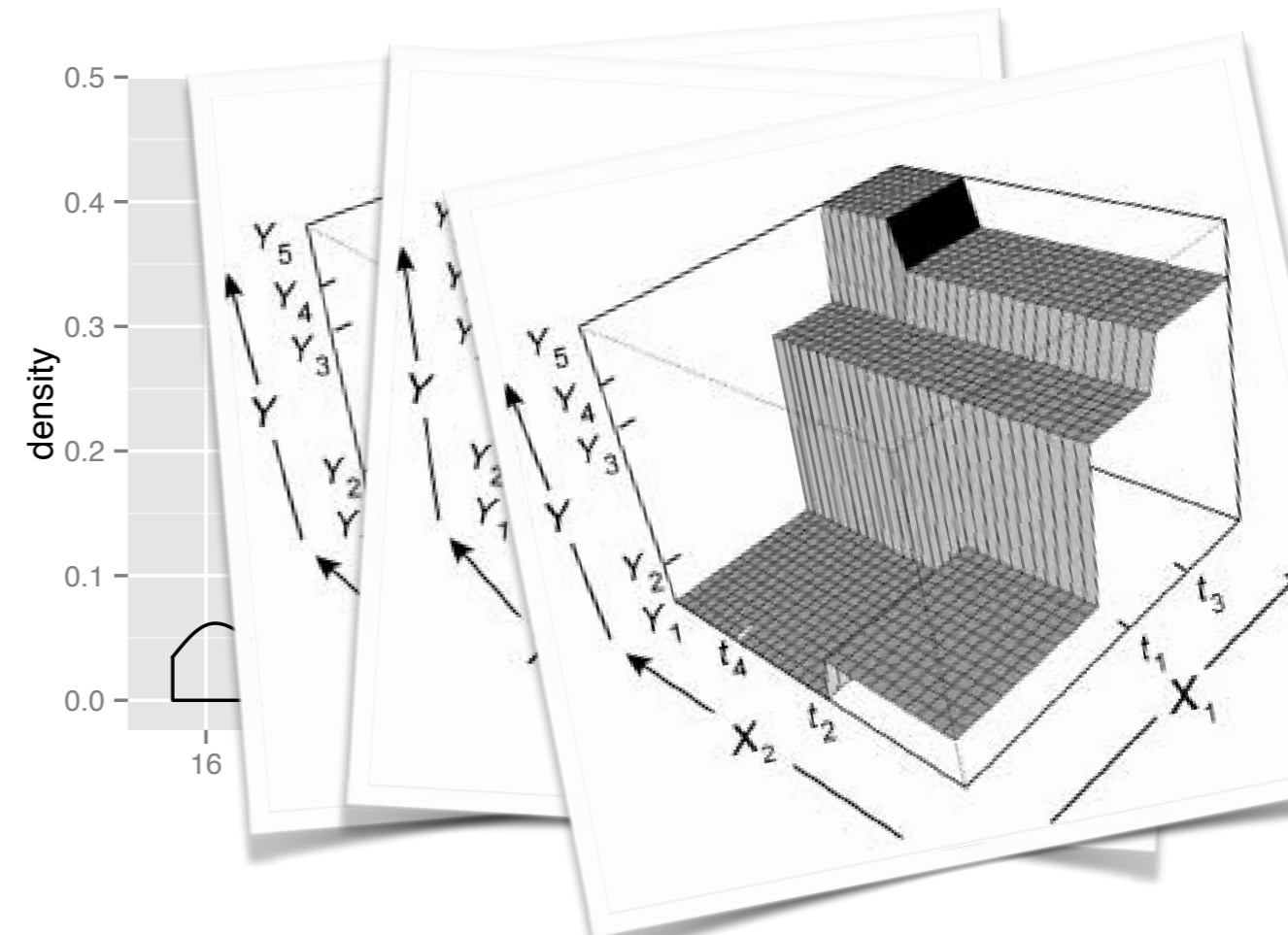
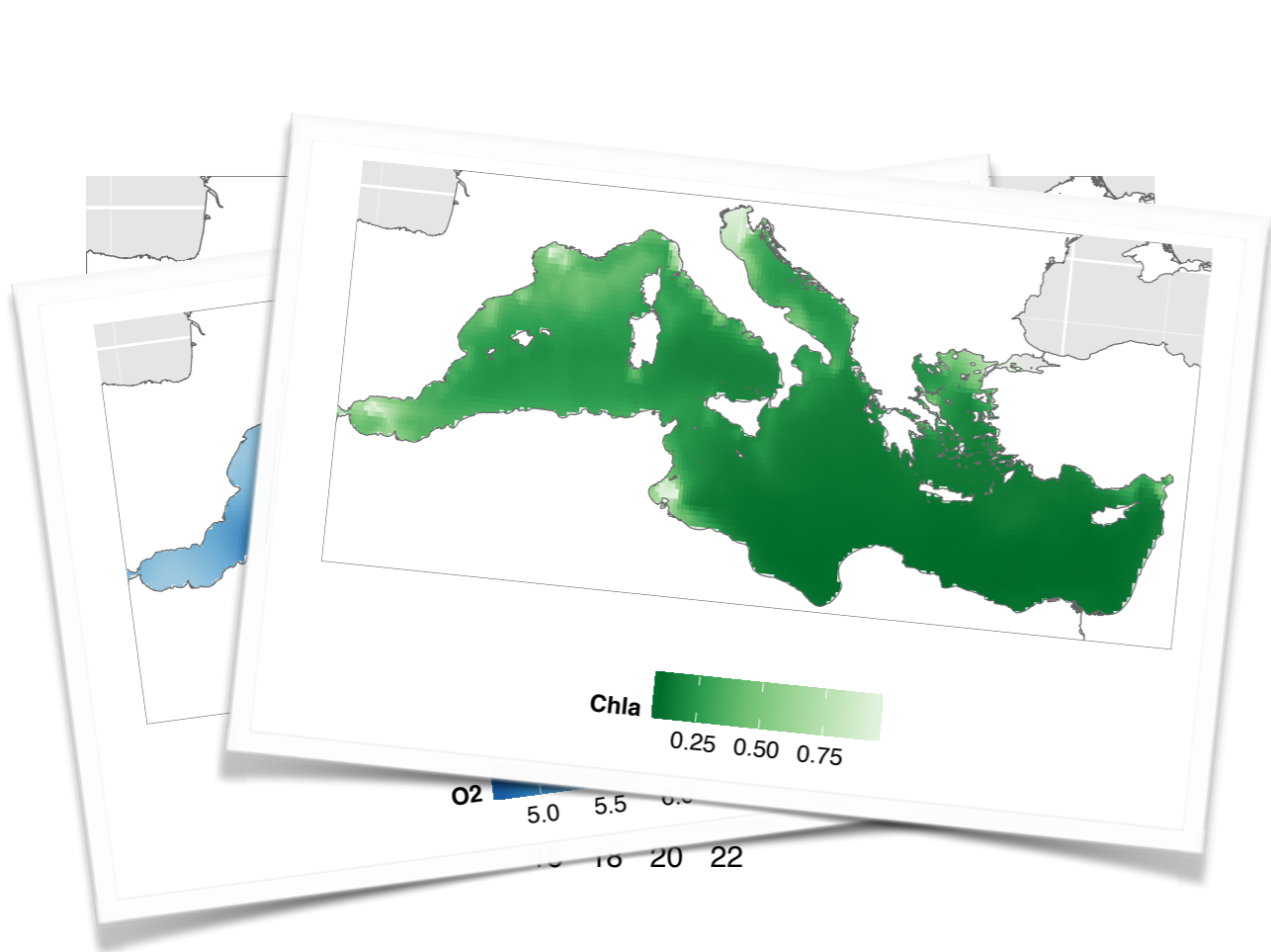
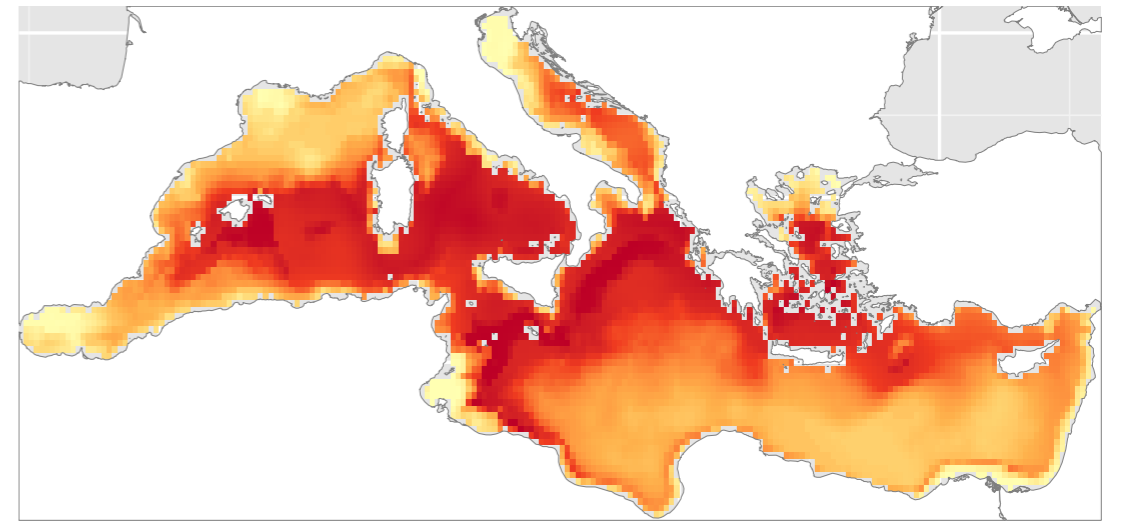
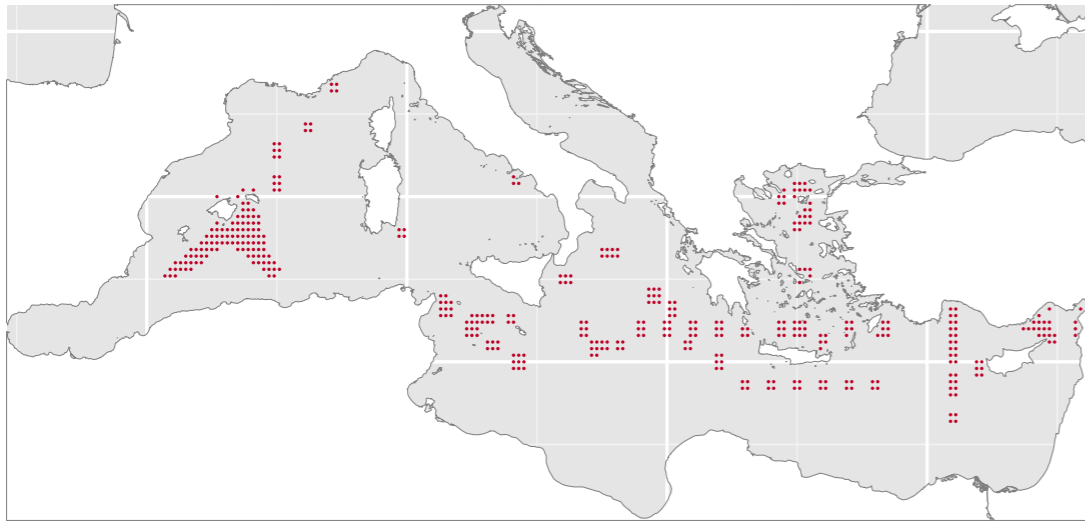
# Species Distribution Models



# Species Distribution Models

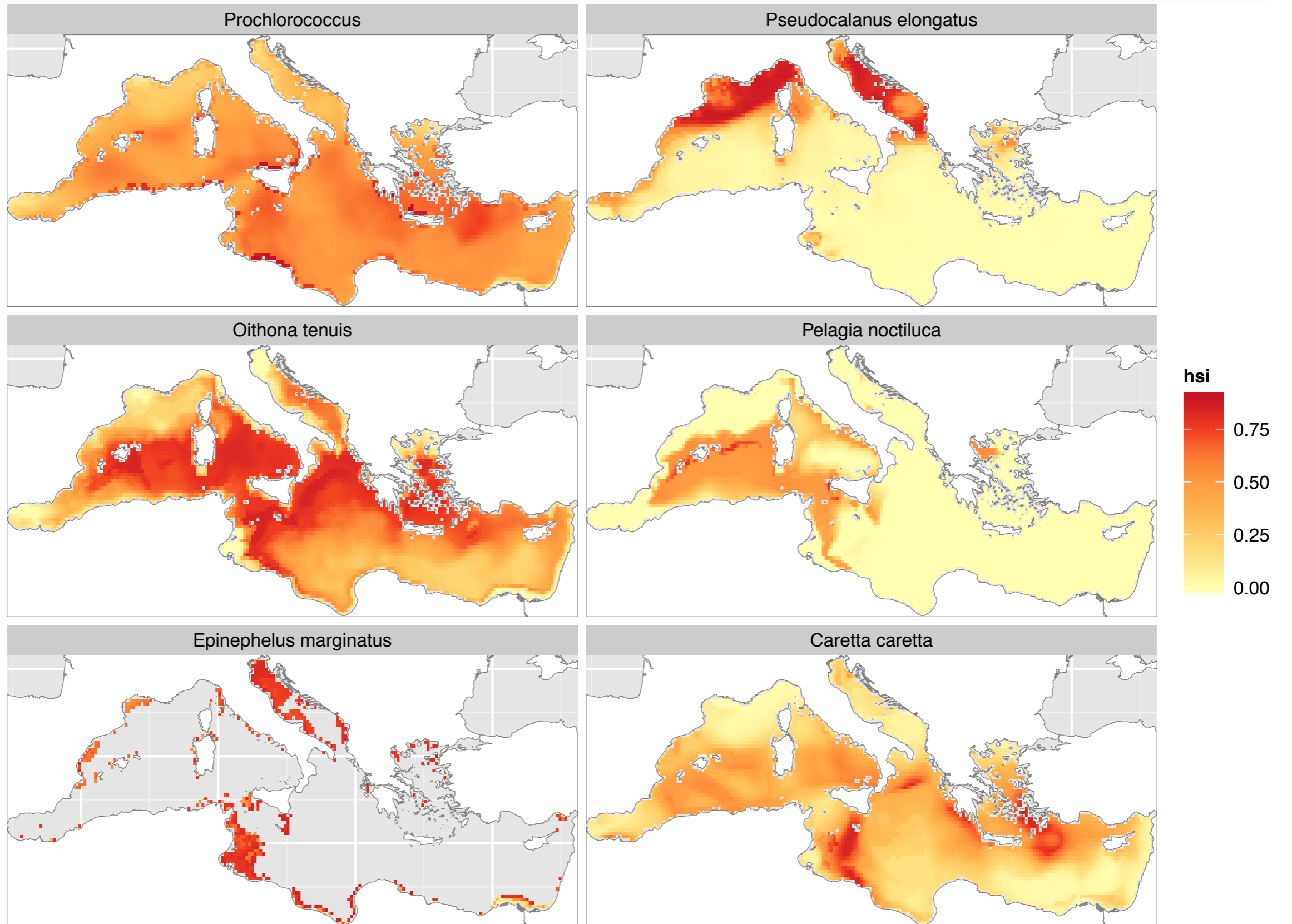


# Species Distribution Models



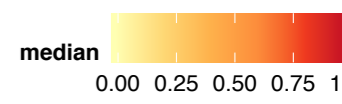
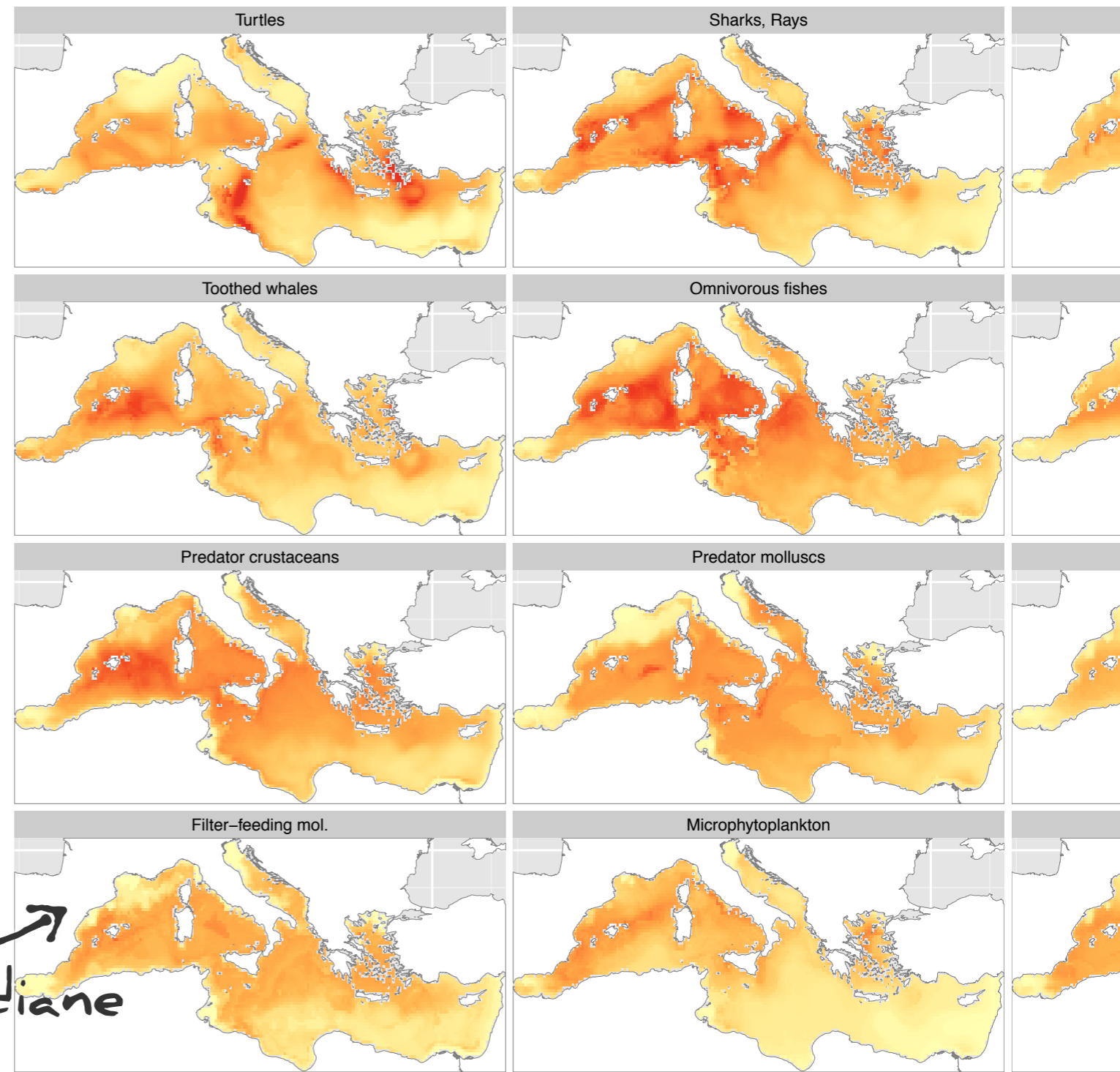


# Distribution modélisée pour quelques espèces

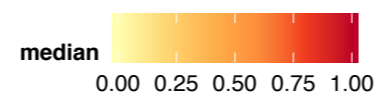
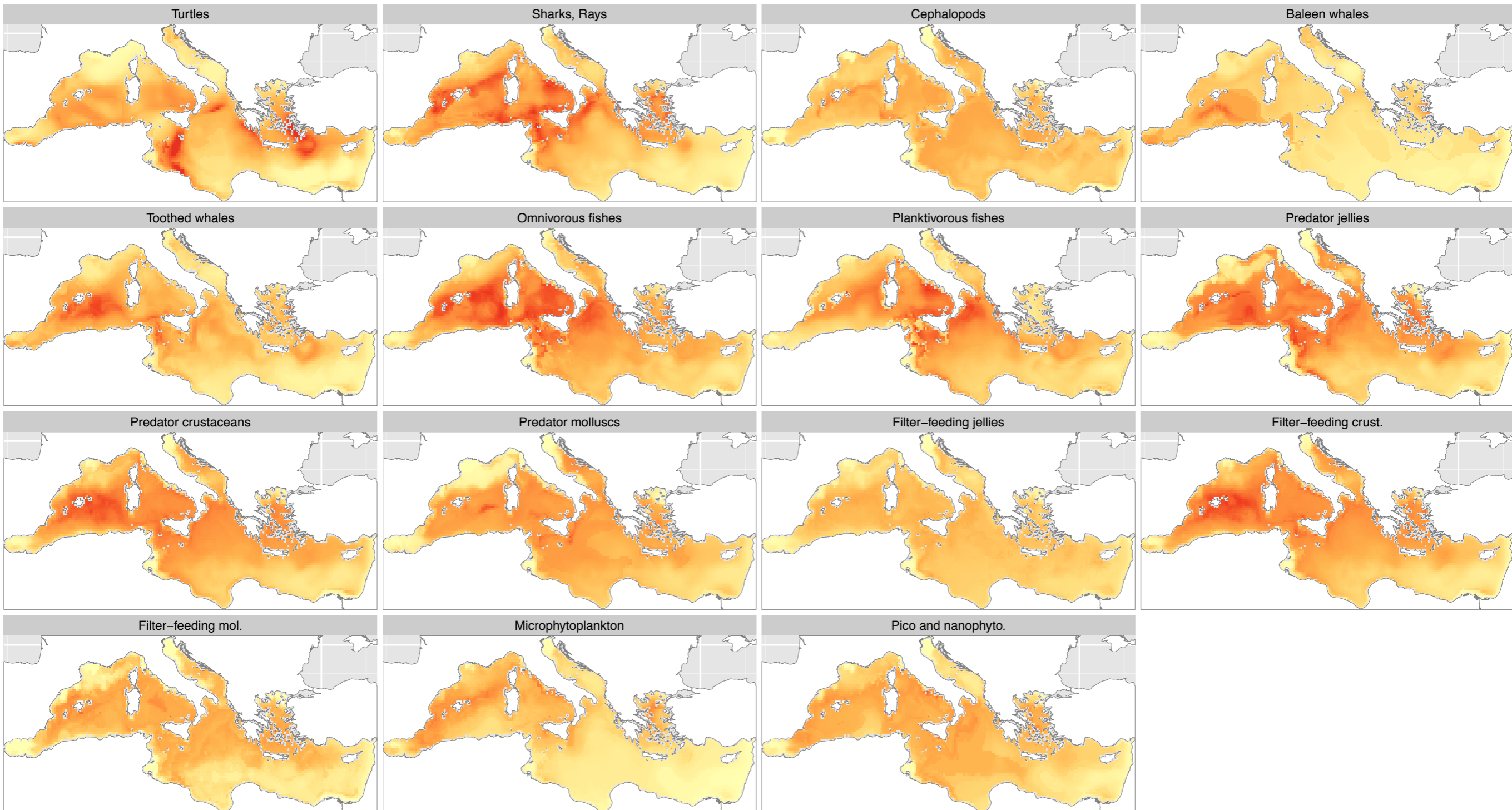


# Résumé à 15 groupes fonctionnels

Groupe	Nb espèces
Turtles	1
Sharks, Rays	17
Cephalopods	2
Baleen whales	7
Toothed whales	27
Omnivorous fishes	98
Planktivorous fishes	40
Predator jellies	13
Predator crustaceans	93
Predator molluscs	2
Filter-feeding jellies	99
Filter-feeding crust.	96
Filter-feeding mol.	11
Microphytoplankton	66
Pico and nanophyto.	9
<b>TOTAL</b>	<b>581</b>

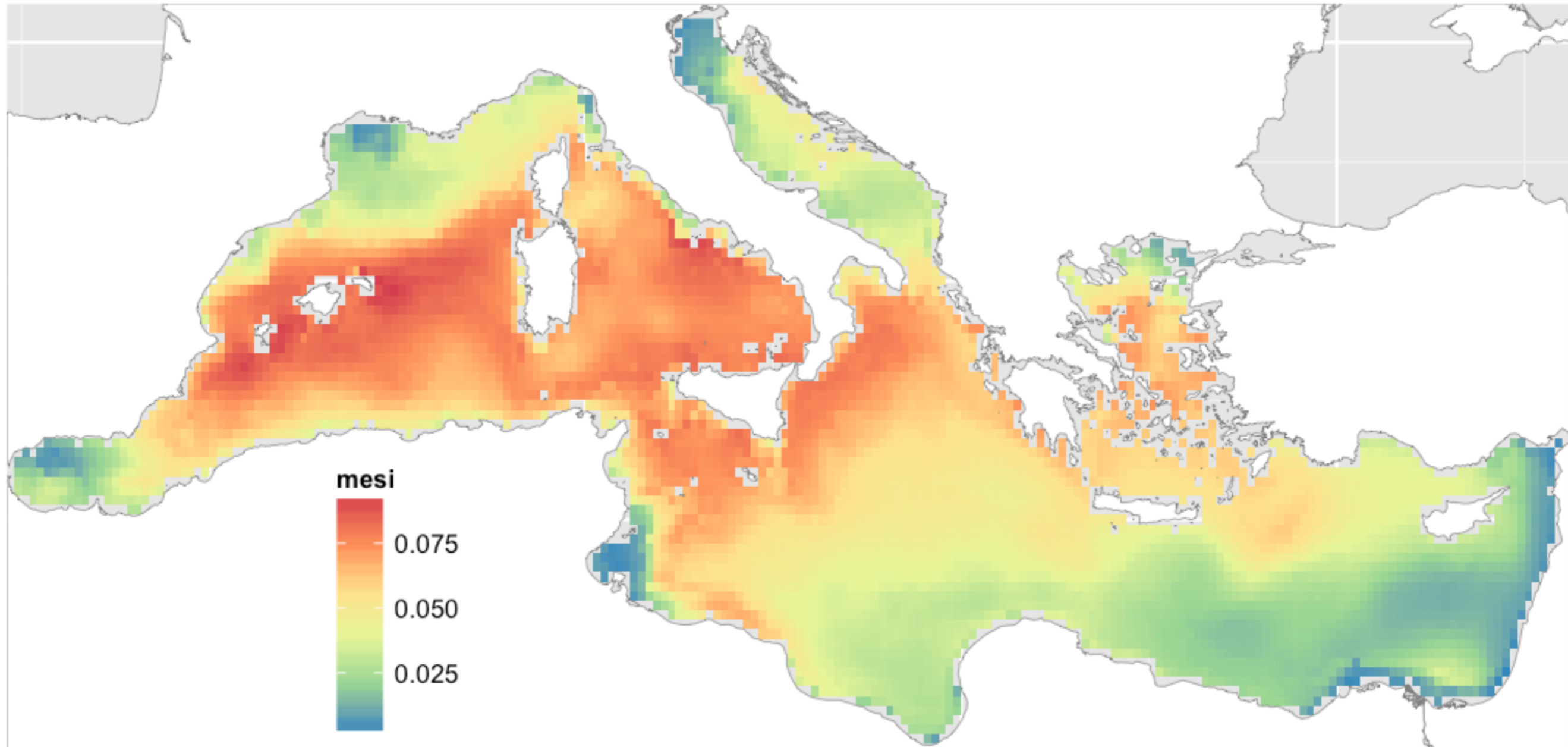


# Résumé à 15 groupes fonctionnels



# Carte de MESI

---



# Hypothèses

---

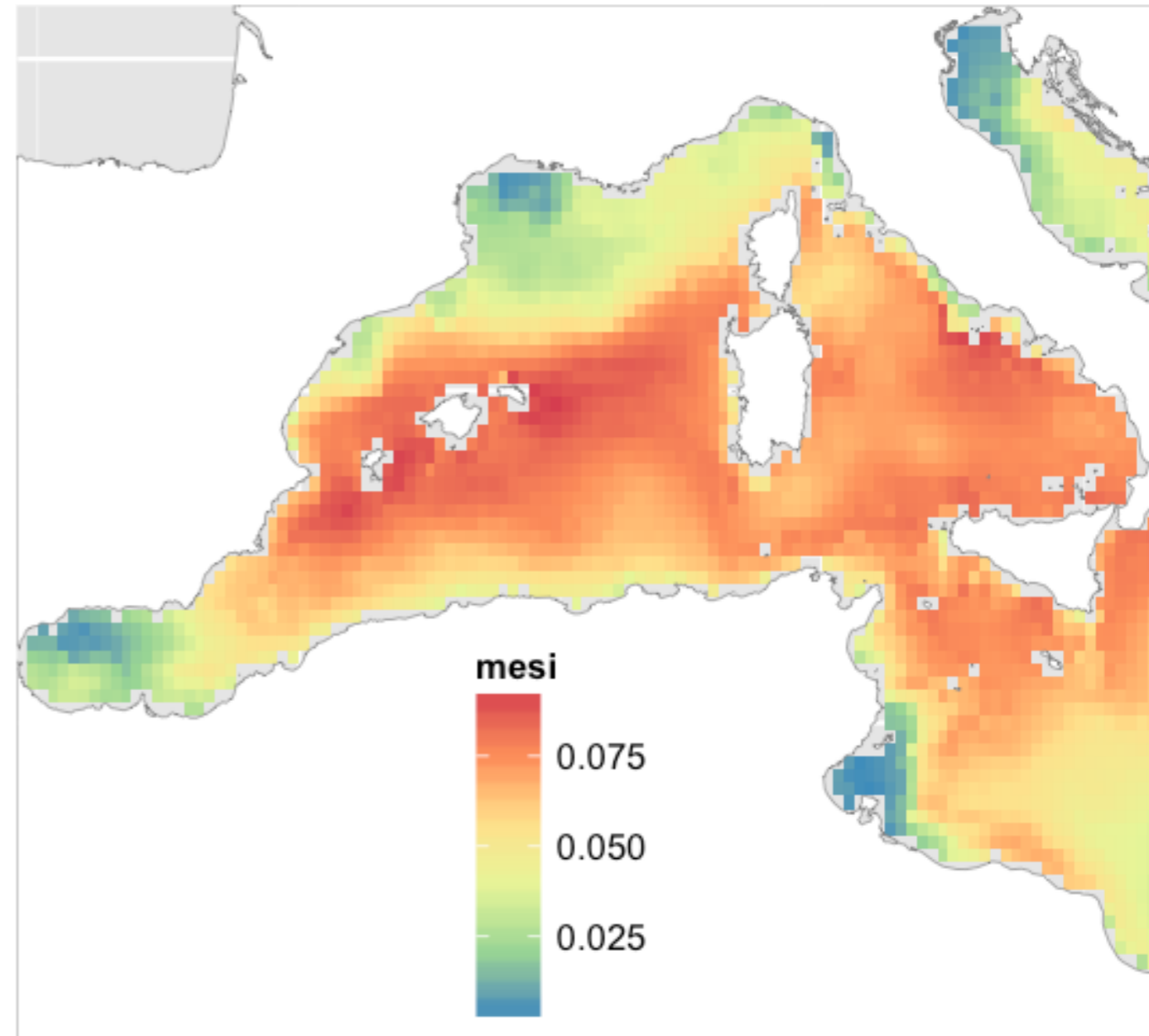
Les contributions estimées par avis d'experts sont réalistes et non-biaisées

L'avis médian est représentatif

Les espèces sont correctement modélisées

La probabilité de présence est un bon estimateur de l'abondance

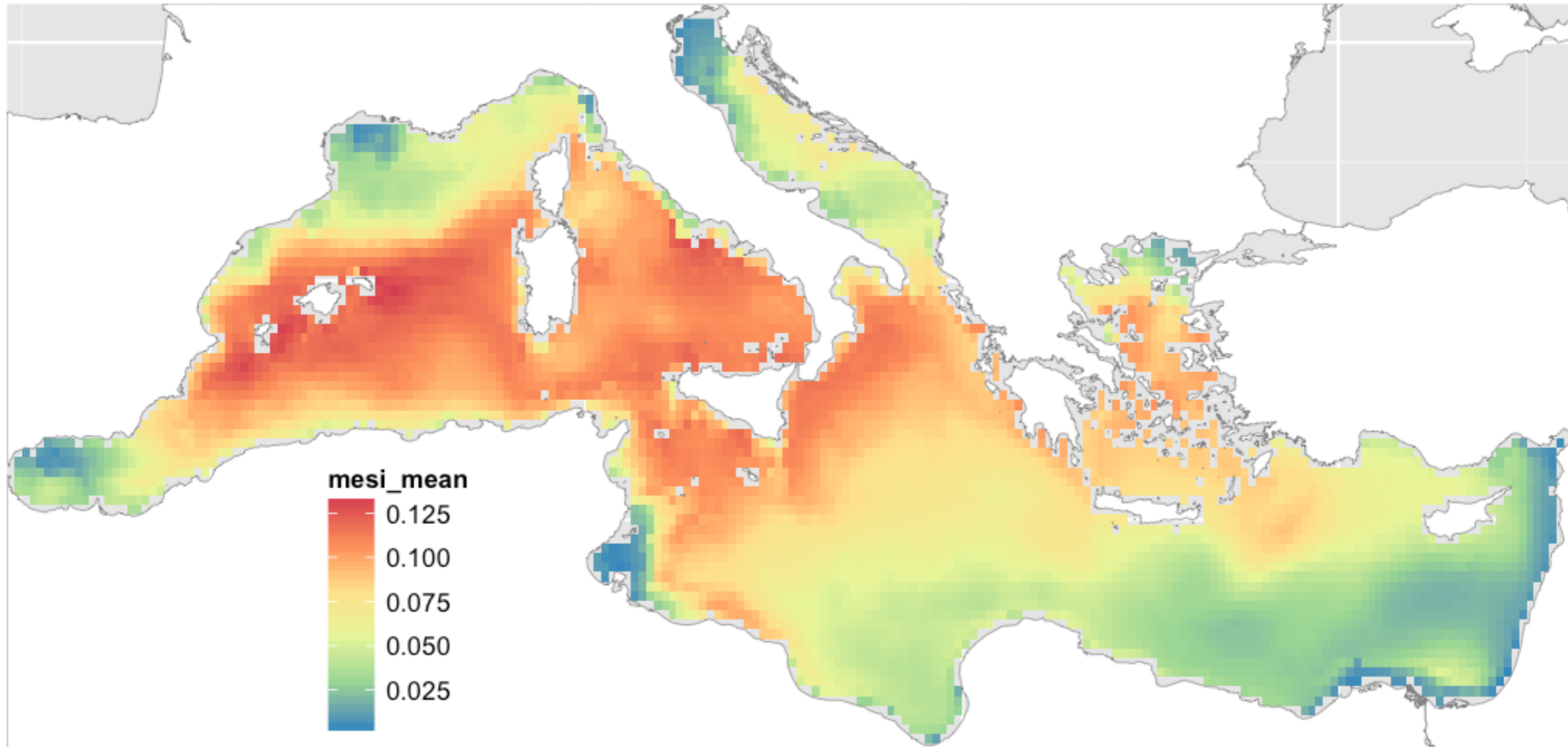
La médiane des probabilités est représentative du groupe





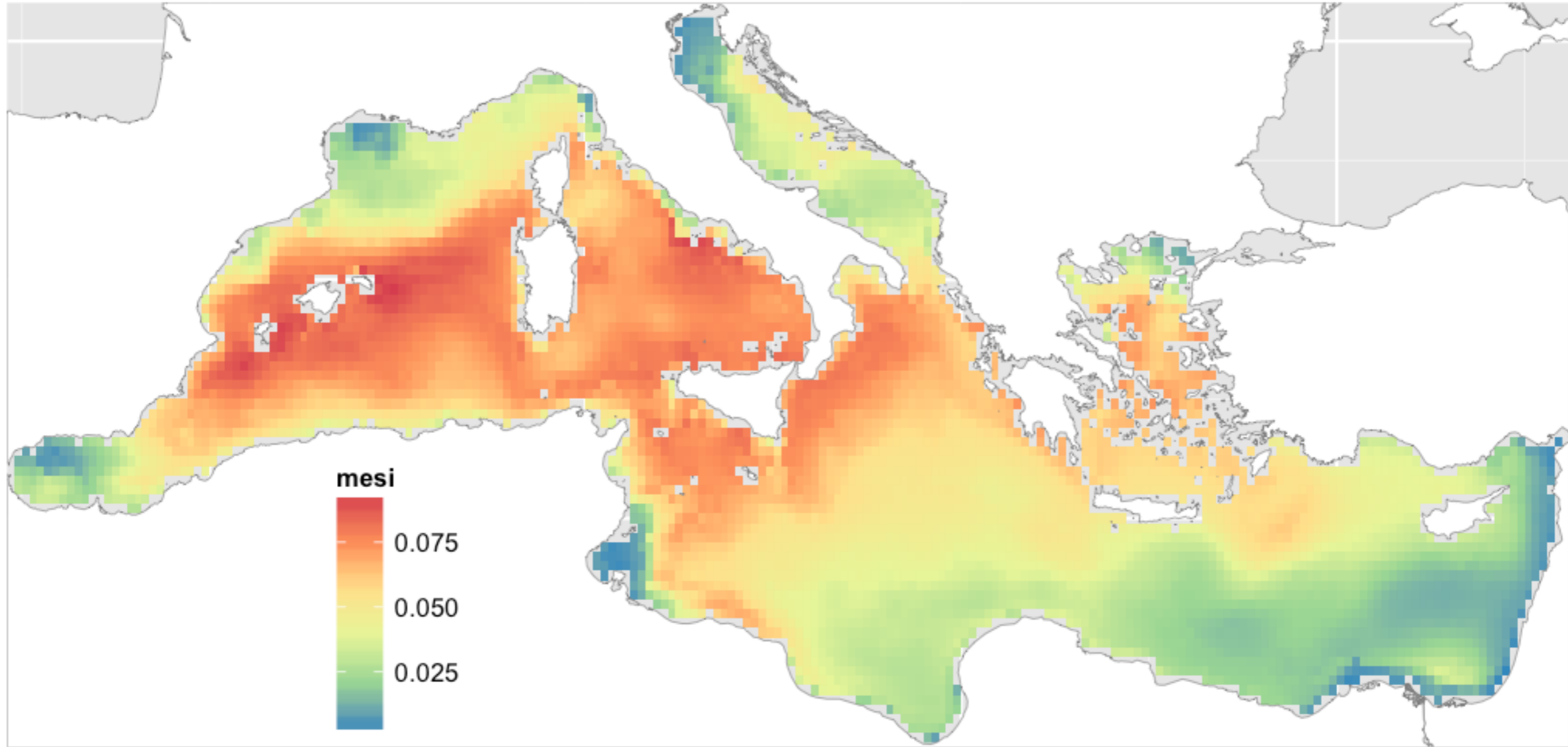
# Bootstrap de la matrice des contributions

---



# Bootstrap de la matrice des contributions

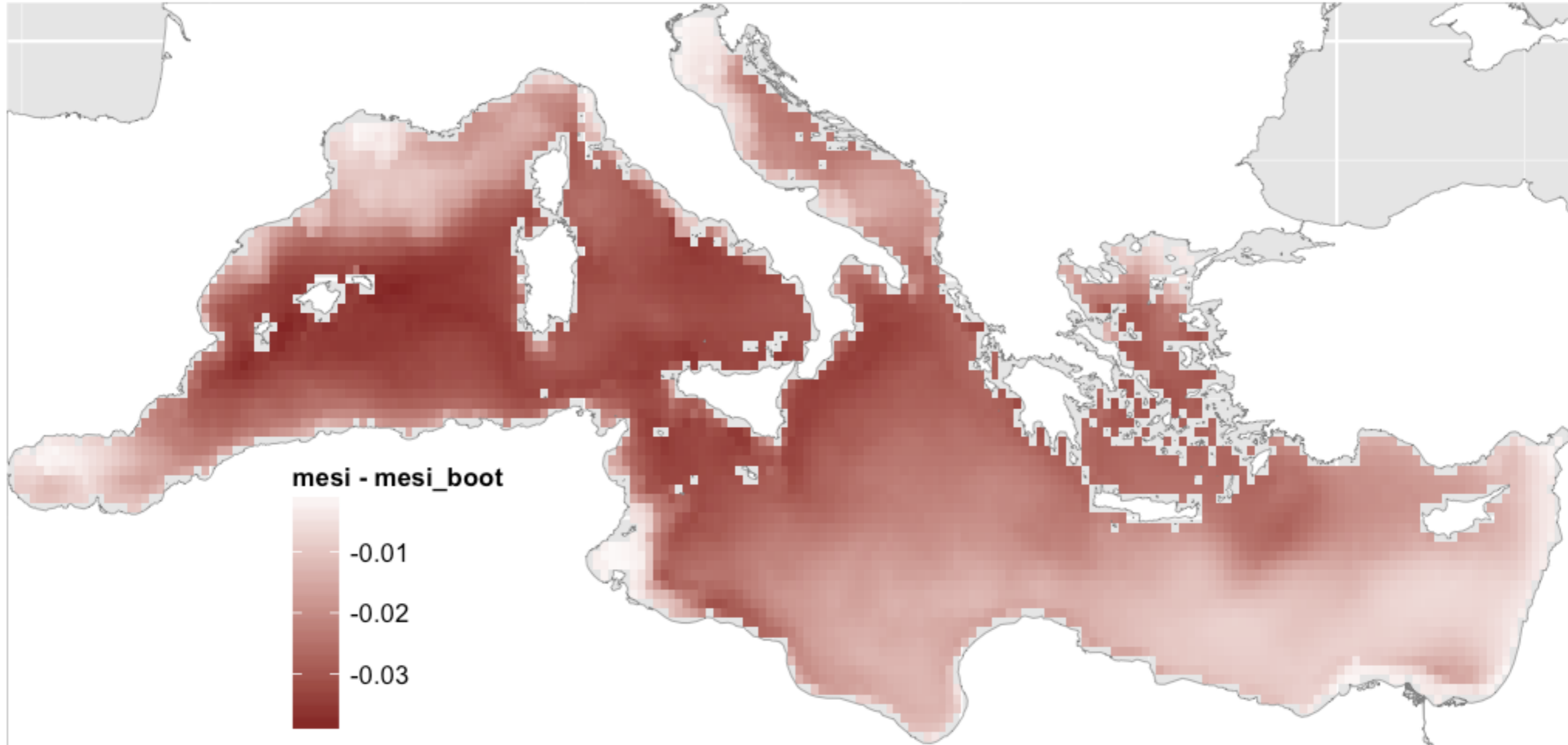
---





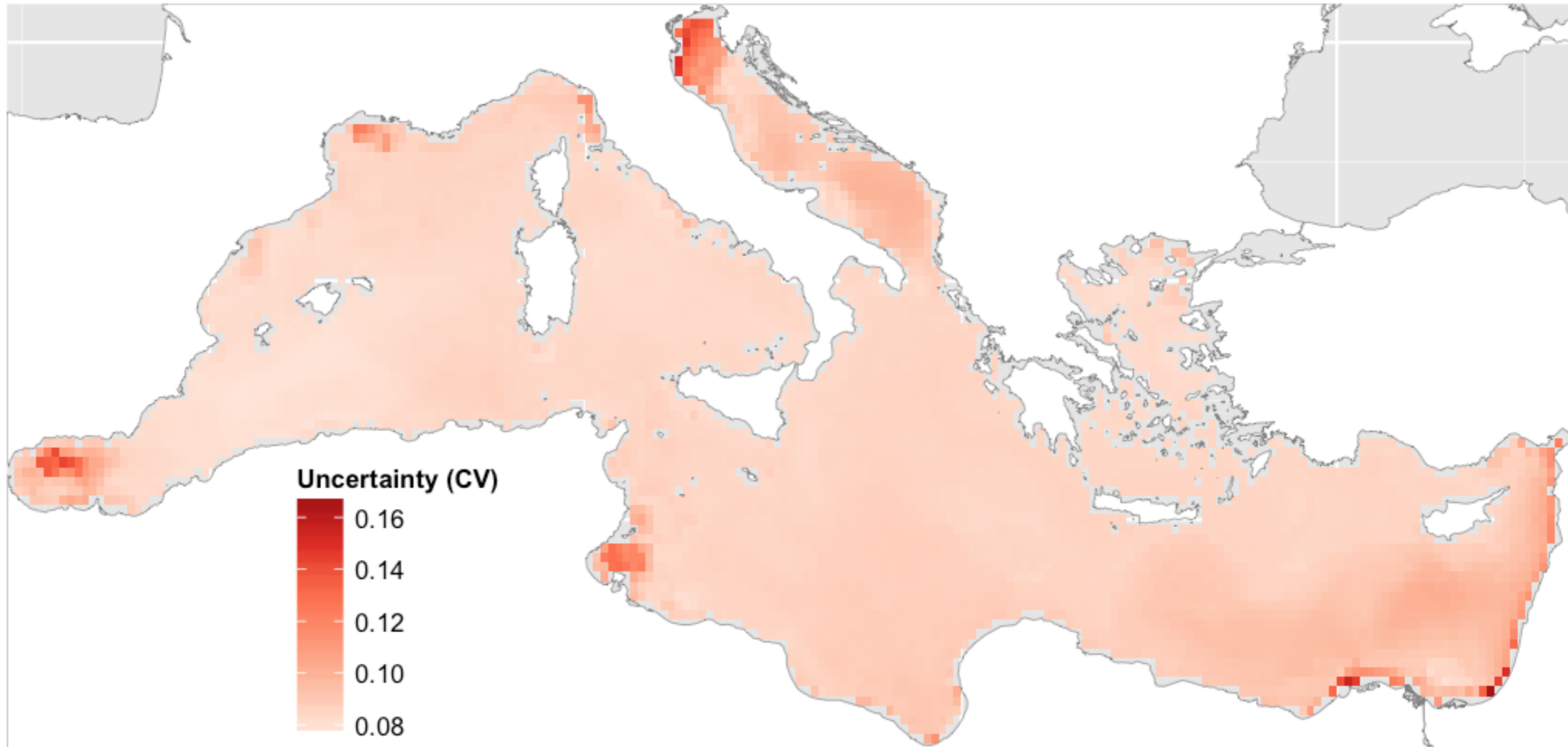
# Bootstrap de la matrice des contributions

---



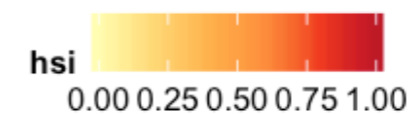
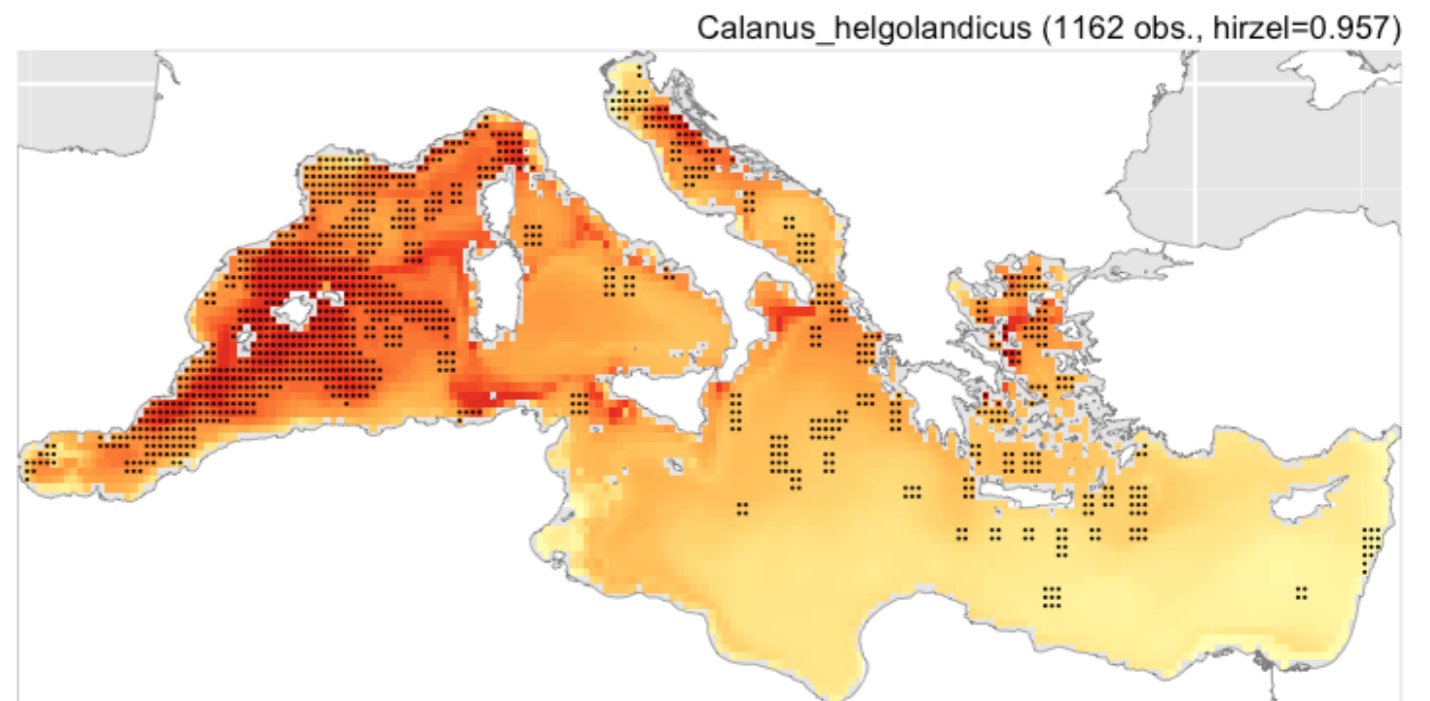
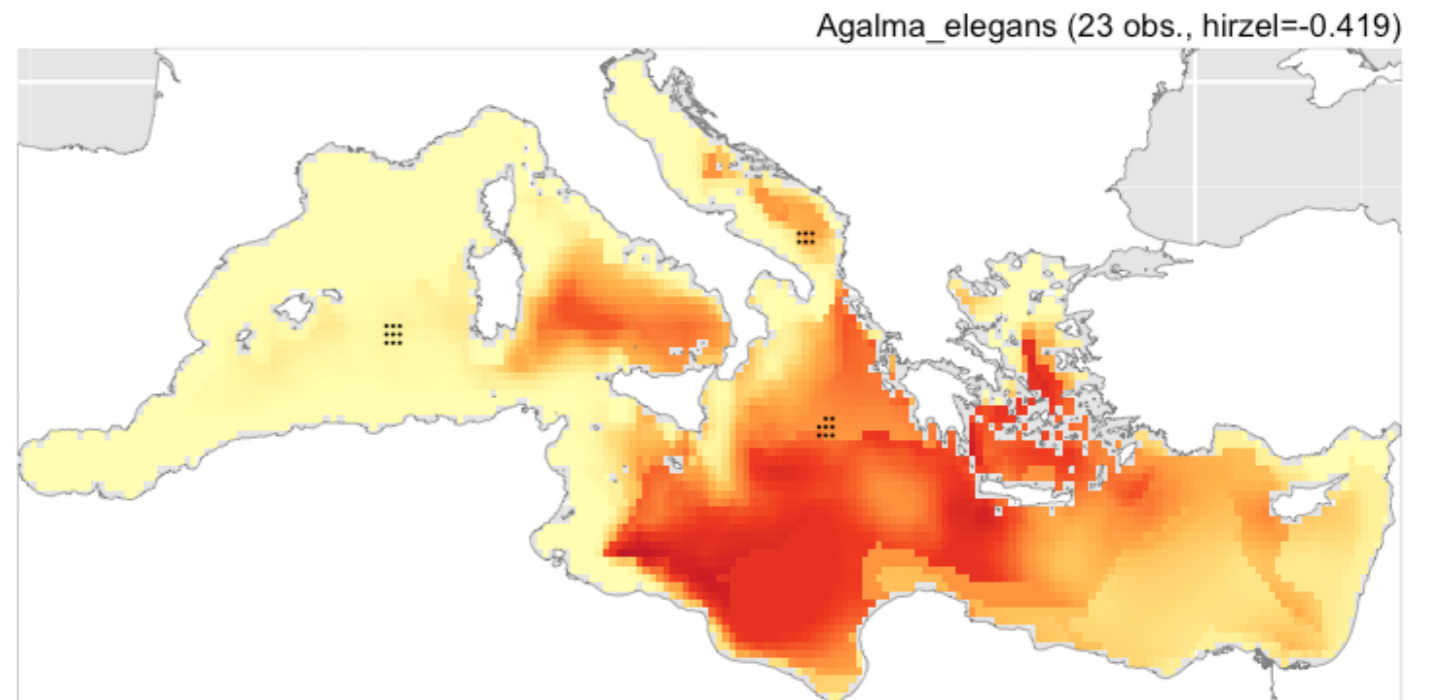
# Bootstrap de la matrice des contributions

---



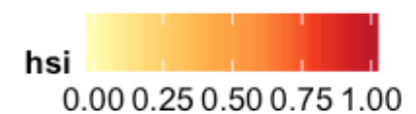
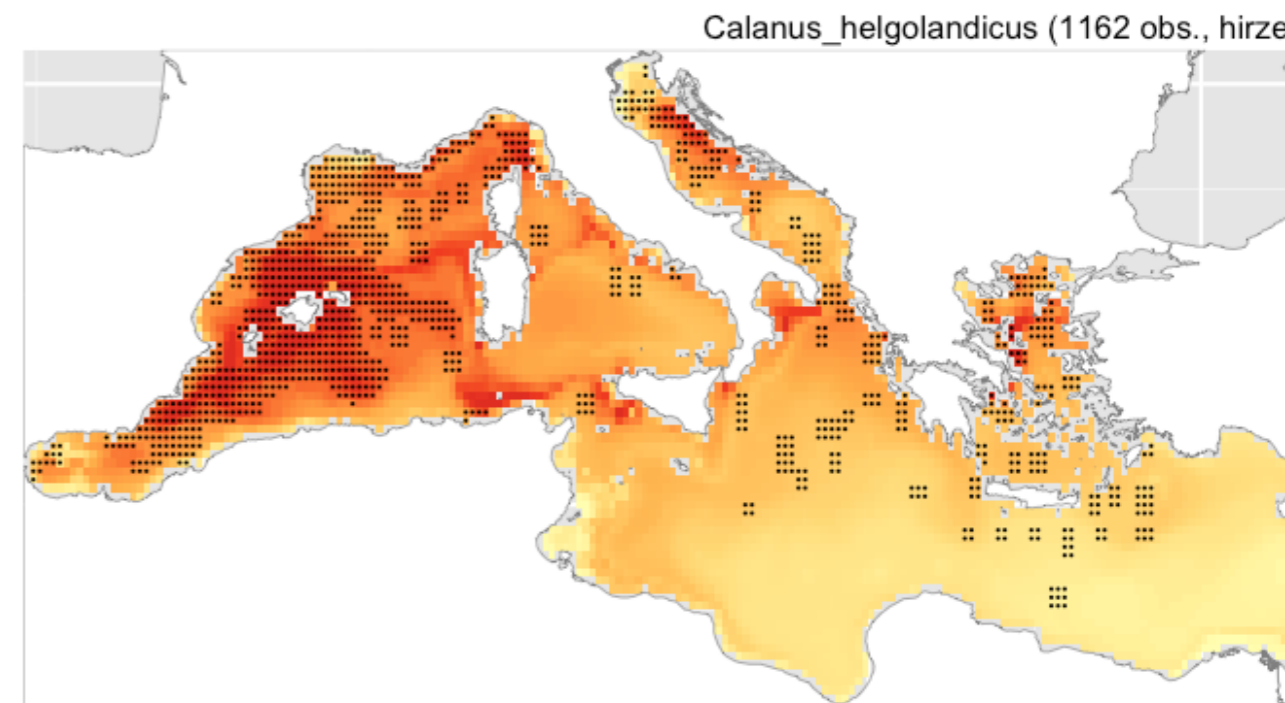
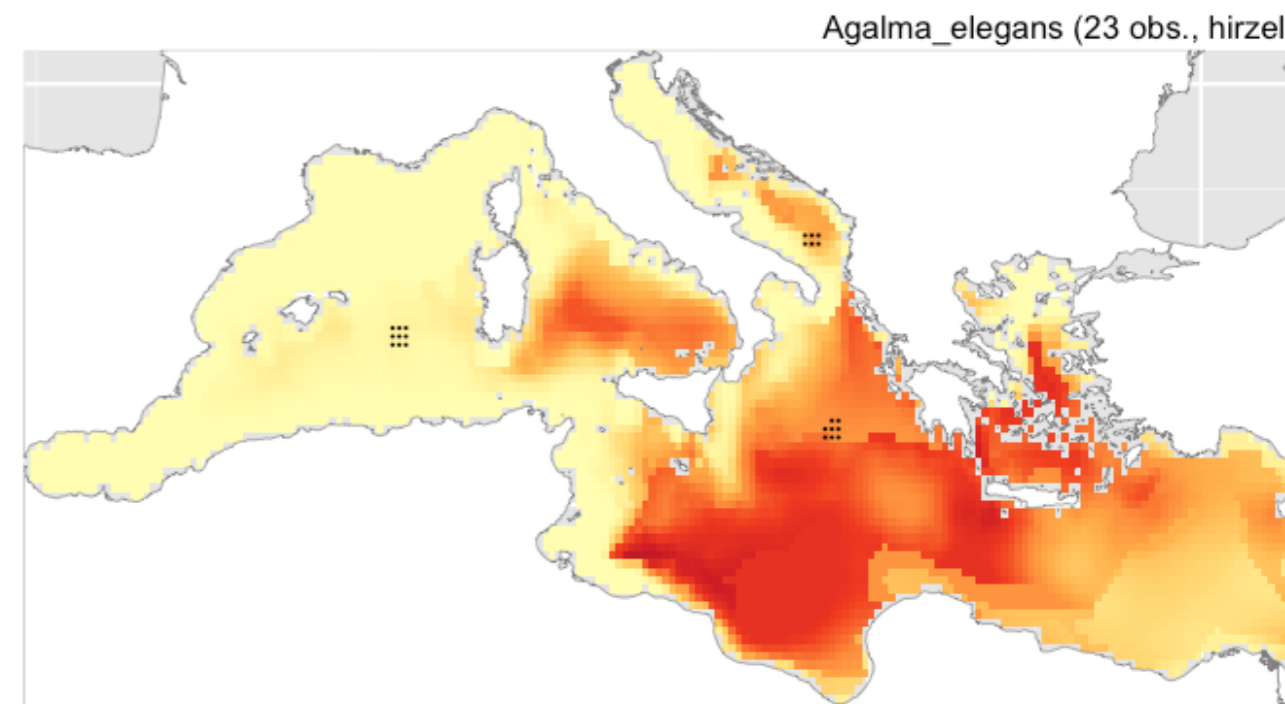
# Sélection des espèces modélisées

Groupe	Nb espèces
Turtles	1
Sharks, Rays	17
Cephalopods	2
Baleen whales	7
Toothed whales	27
Omnivorous fishes	98
Planktivorous fishes	40
Predator jellies	13
Predator crustaceans	93
Predator molluscs	2
Filter-feeding jellies	99
Filter-feeding crust.	96
Filter-feeding mol.	11
Microphytoplankton	66
Pico and nanophyto.	9
<b>TOTAL</b>	<b>581</b>



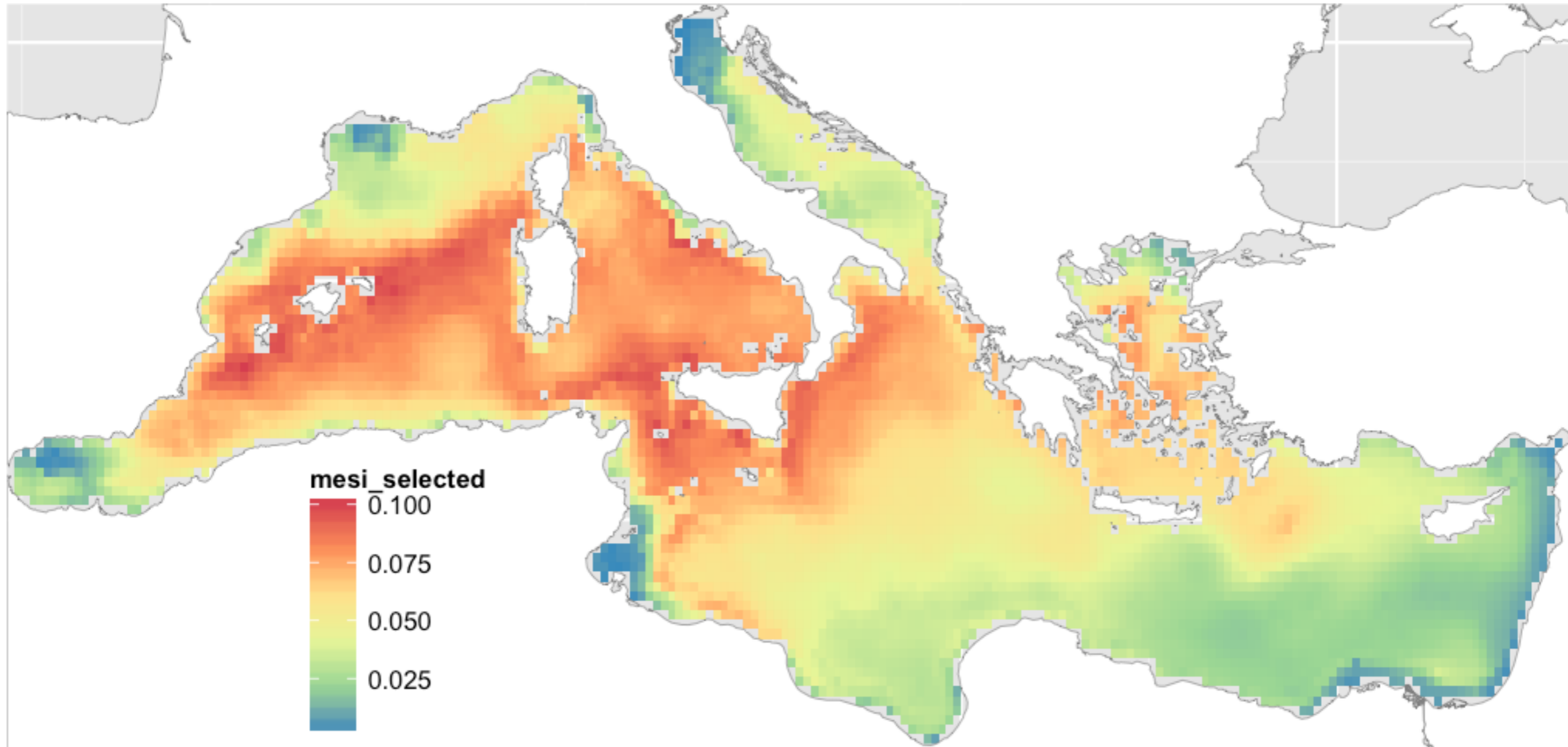
# Sélection des espèces modélisées

Groupe	Nb espèces	Sélection
Turtles	1	
Sharks, Rays	17	11
Cephalopods	2	2
Baleen whales	7	
Toothed whales	27	4
Omnivorous fishes	98	57
Planktivorous fishes	40	22
Predator jellies	13	4
Predator crustaceans	93	83
Predator molluscs	2	2
Filter-feeding jellies	99	44
Filter-feeding crust.	96	90
Filter-feeding mol.	11	9
Microphytoplankton	66	30
Pico and nanophyto.	9	5
<b>TOTAL</b>	<b>581</b>	<b>363</b>



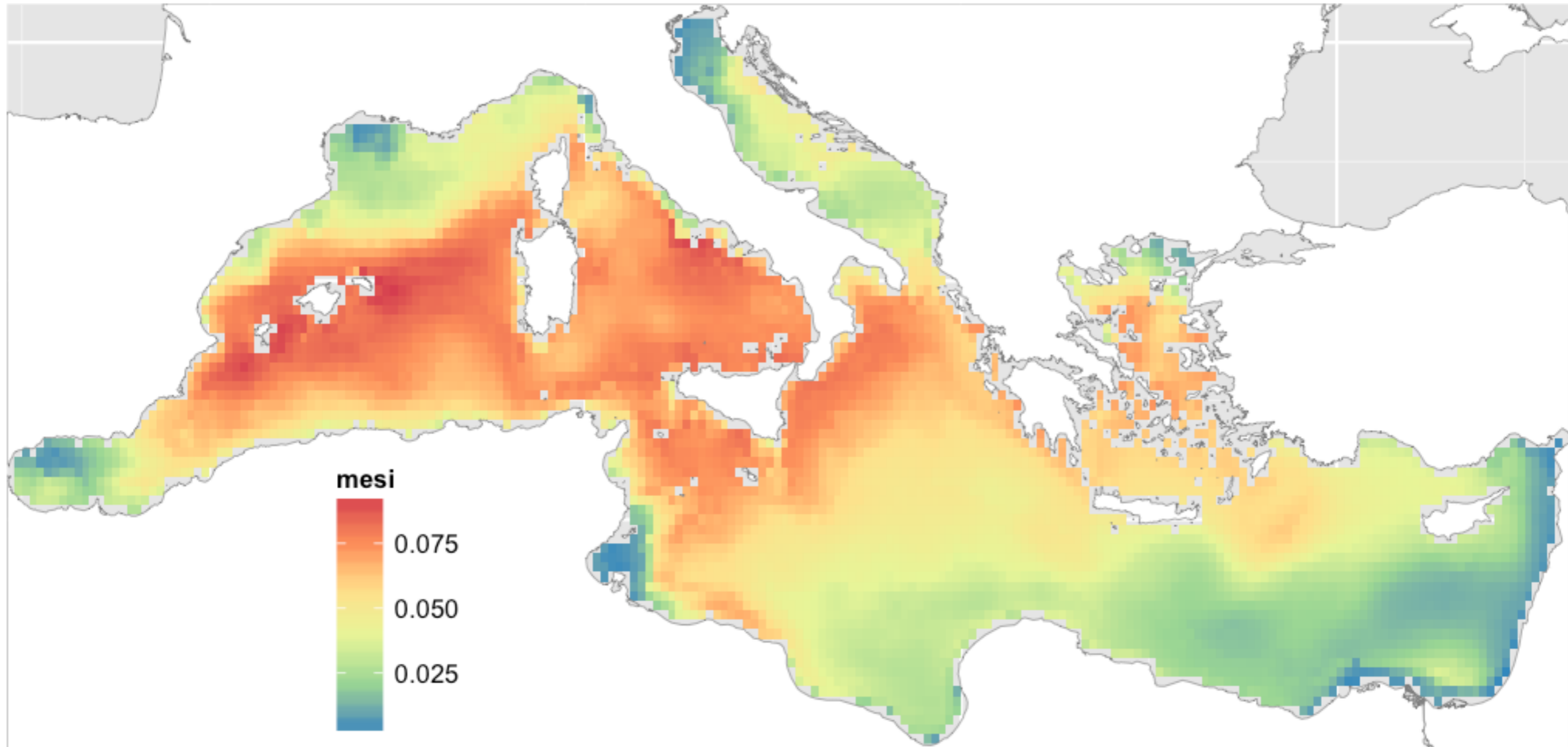
# Sélection des espèces modélisées

---



# Sélection des espèces modélisées

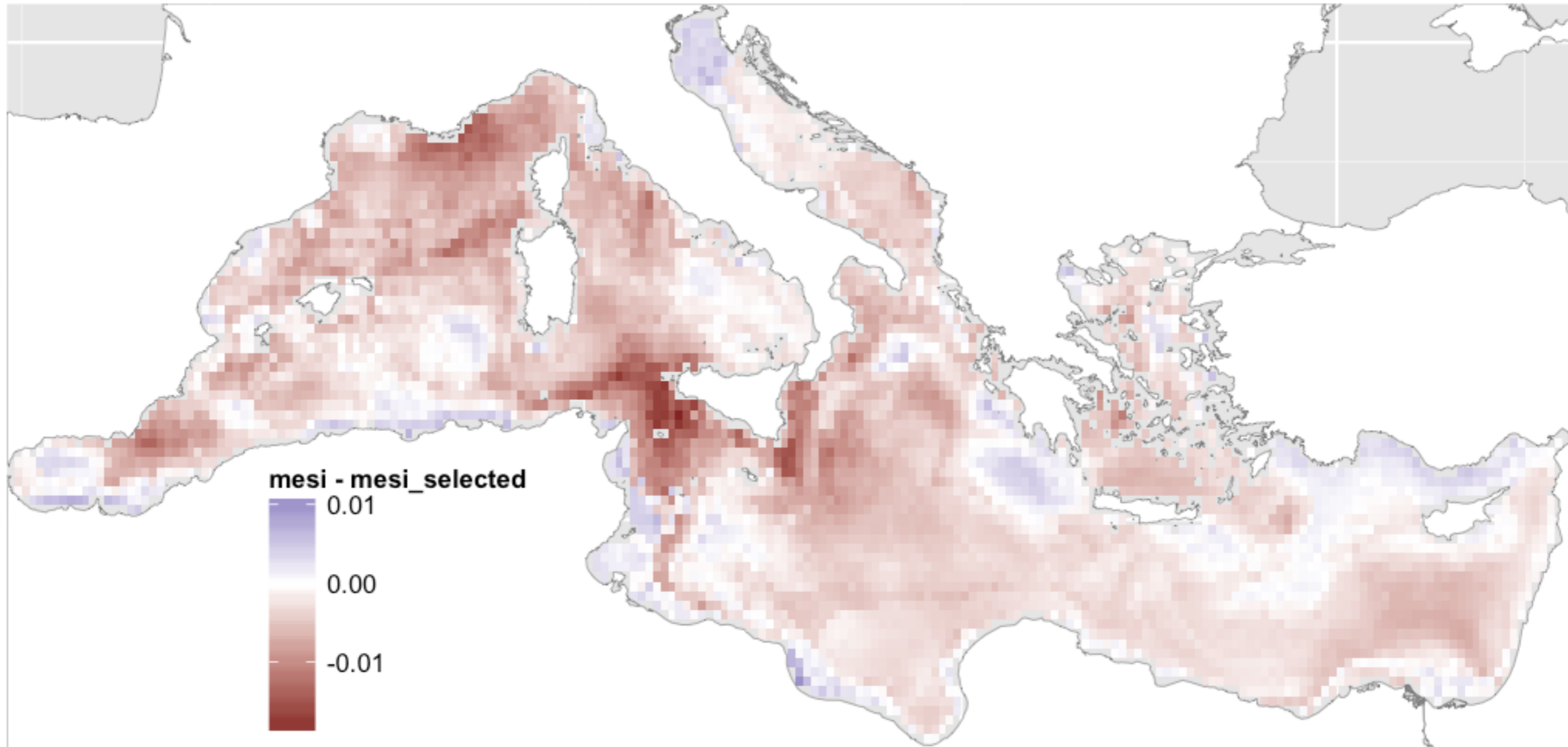
---





# Sélection des espèces modélisées

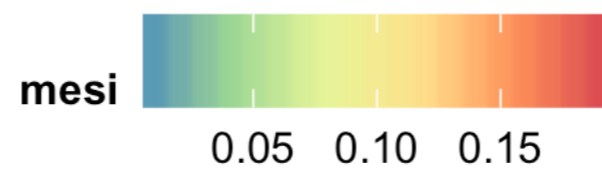
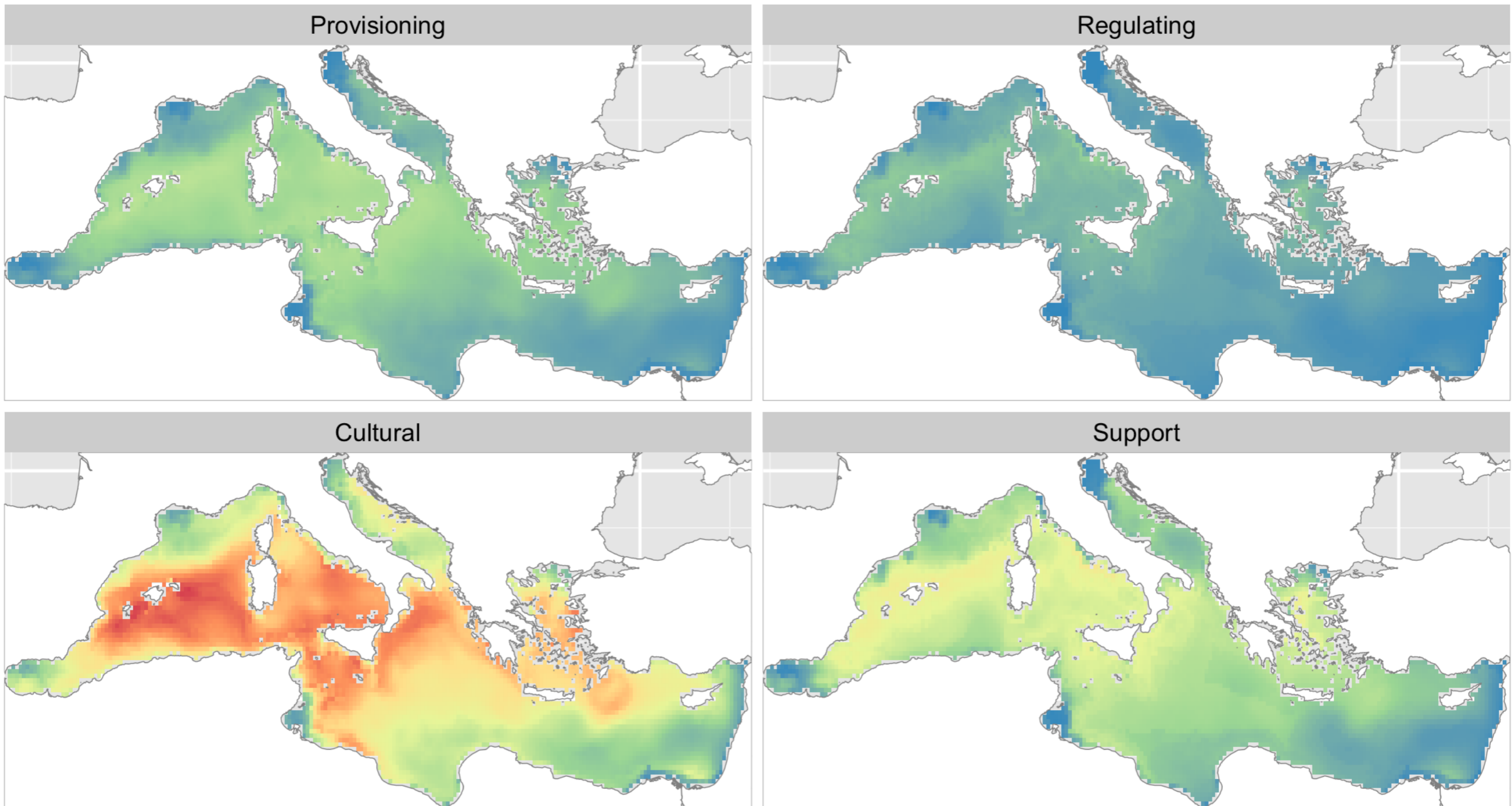
---



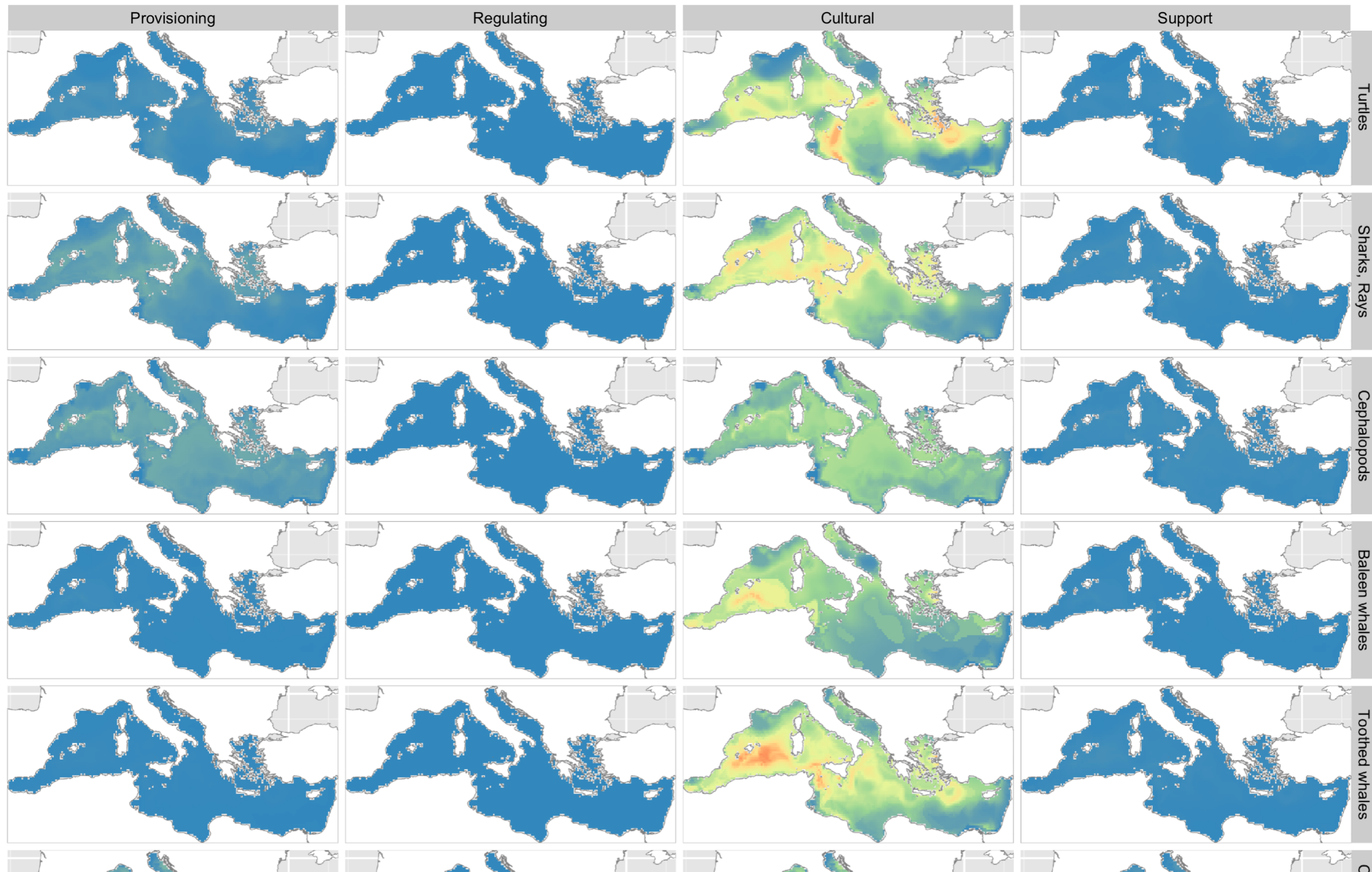


# Décomposition de MESI

---

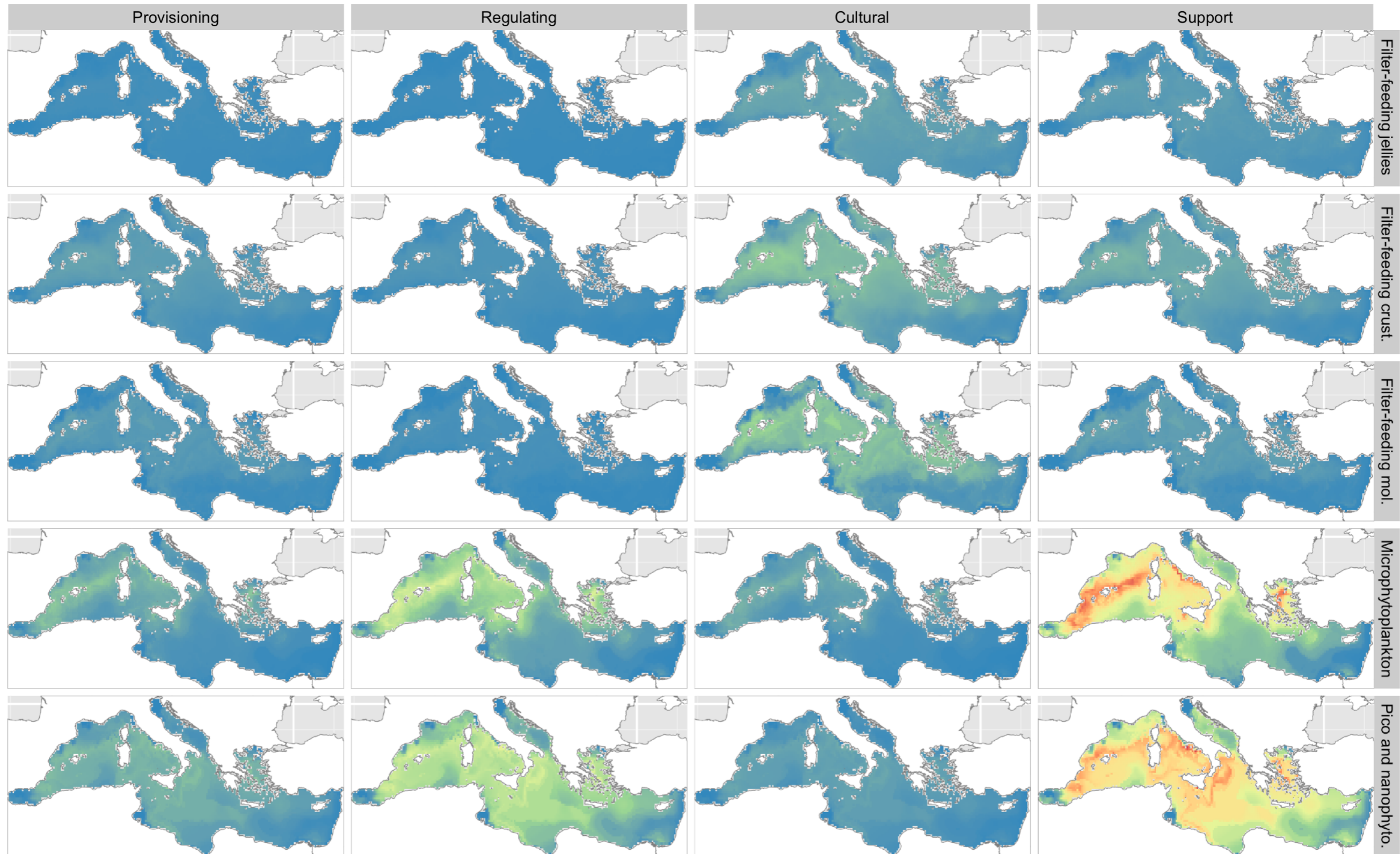


# Décomposition de MESI



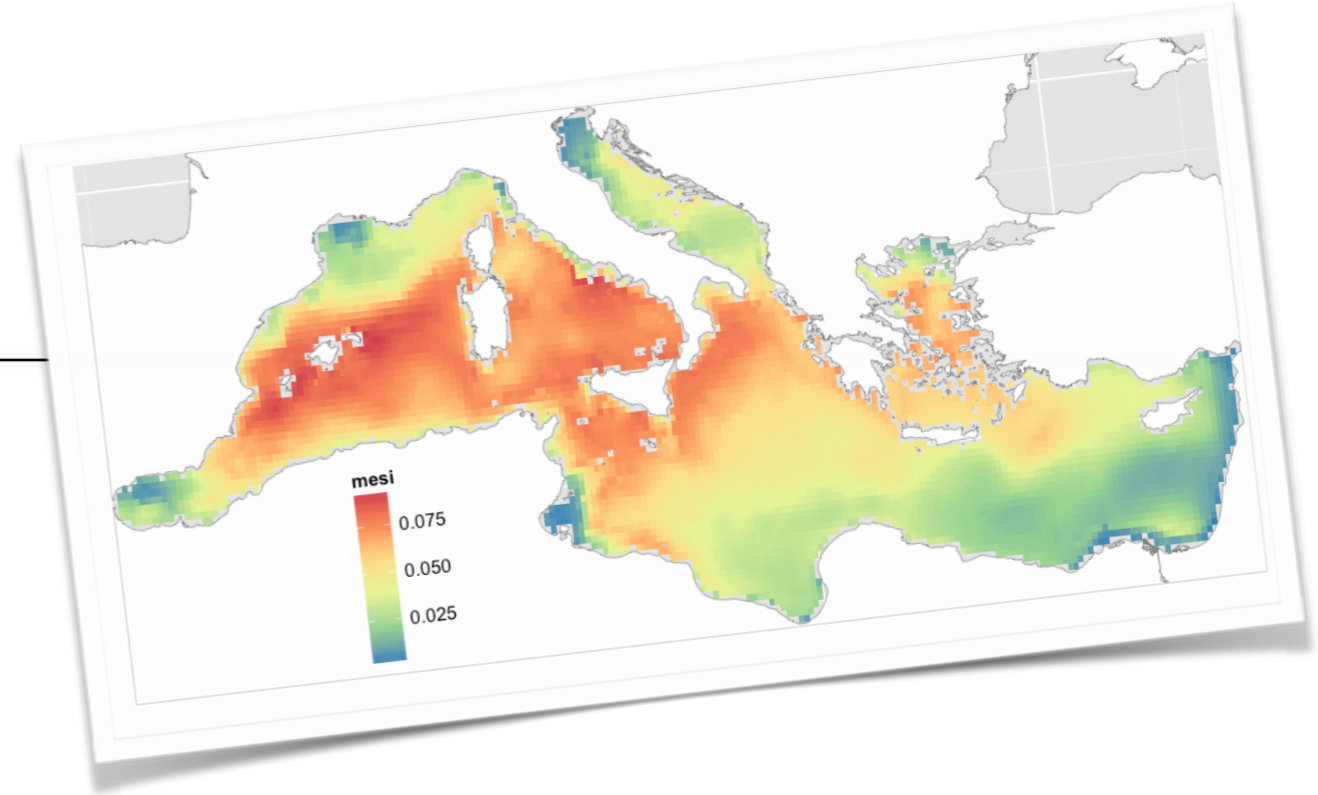


# Décomposition de MESI



# Conclusion

---



MESI = aide à la décision ex-ante

Possibilité de suivre l'évolution de l'indice dans le temps

Peut permettre l'évaluation ex-post d'une politique de protection

Méthodologie transposable dans d'autres contextes

Points faibles : à discuter ensemble...

*Merci pour votre attention !*