

# Public Deep Sea Awareness

## Results of an ocean literacy survey in the Azores

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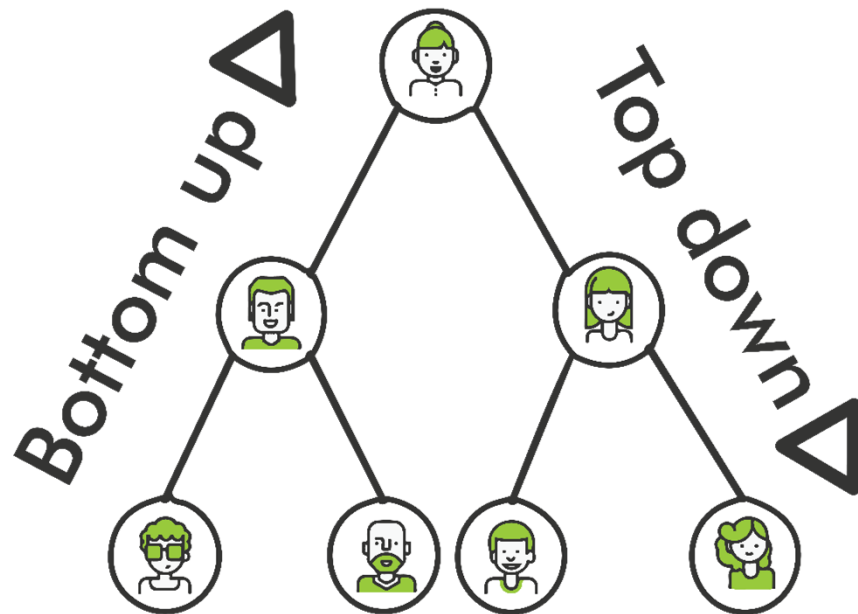
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# Ocean literacy in the literature

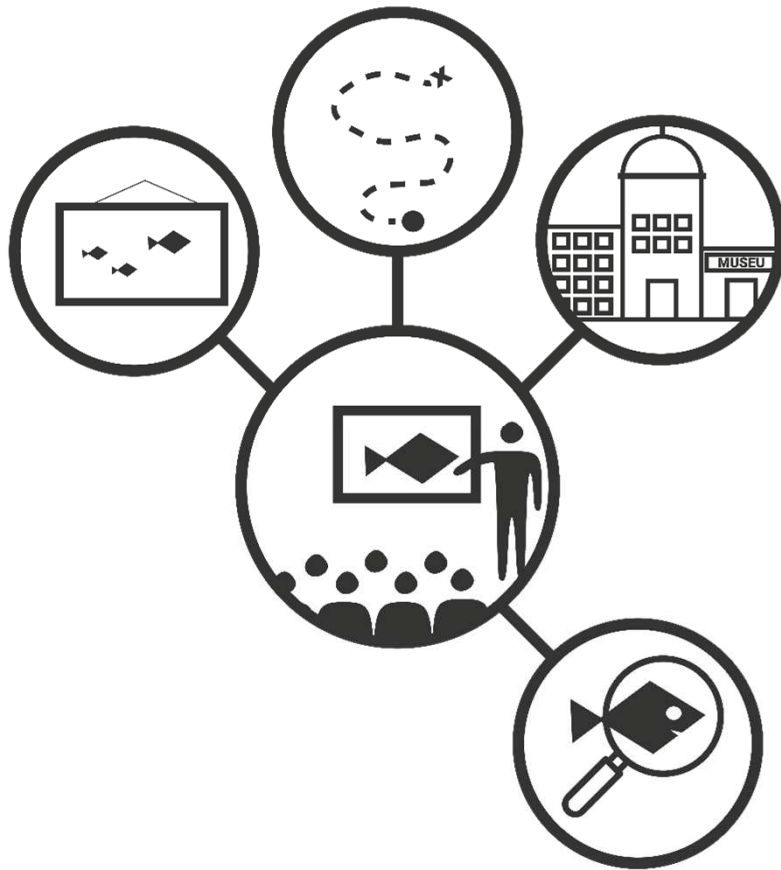
**Ocean literacy** studies are an **underrated** subject in the literature



- Recent **literacy bibliometric analysis: 52 items** (Costa & Caldeira 2018)
- **Geographically biased**, mostly focused on the US and coastal ecosystems
- Deep sea ecosystems **unexplored**

# Ocean literacy principles

**Ocean literacy is one way to bridge the gap between science, management and the society and to promote human behavioural change towards more sustainable choices and uses.**



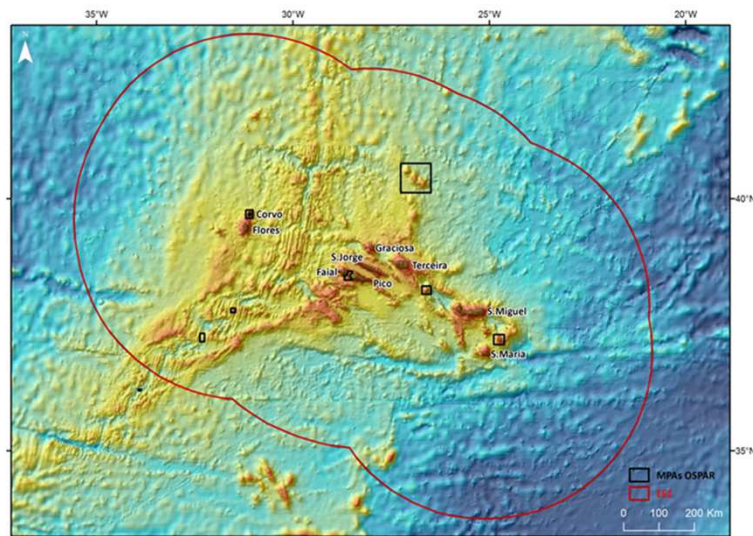
- (i) Able to make informed decisions regarding the ocean and its resources
- (ii) Understands essential principles and concepts about the functioning of the ocean
- (iii) Can communicate about ocean related issues in a meaningful way

# Faial - Azores



Small close knit communities naturally linked with the seascape

Research institute & NGOs based at Horta, Faial residents **more knowledgeable** of ocean issues



Ressurreição *et al.* (2012) (n=735)

**88% residents** consider their wellbeing highly dependent on the ocean

**68% engaged** in marine recreational activities

**27% had** a ocean related professional occupation

Yet ....less than **50%** knew about **MPAs**

# Objectives

Snapshot of public general knowledge on deep sea ecosystems among residents and visitors to the Azores

## Including:

- (i) public deep sea self-assessed and factual knowledge,
- (ii) public level of awareness on deep sea pressures, ecosystem services and blue growth potential,
- (iii) public willingness to participate in deep sea conservation,
- (iv) Test differences between residents & visitors

# The Survey



## Personal interviews

N=250 (20 days, March –April 2018)

125 Residents

125 Visitors

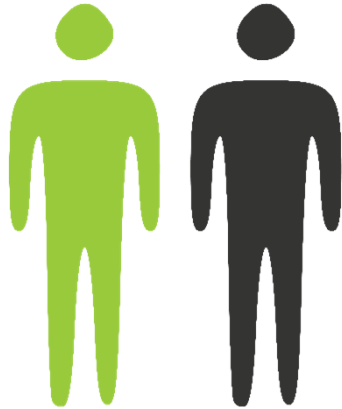
- 95% response rate
- >20% asked for further deep sea information

## Topics of interest

- **Closed-ended questions:** attitude rating scales, true/false
- **Self-assessed knowledge:** measure of a person's perceived level of knowledge
- **Factual-knowledge:** measure of a person's actual knowledge

# Results

## Sample Sociodemographic Profile



**23 nationalities**

**41,5** average age

(visitors 42.9, residents 40.1)

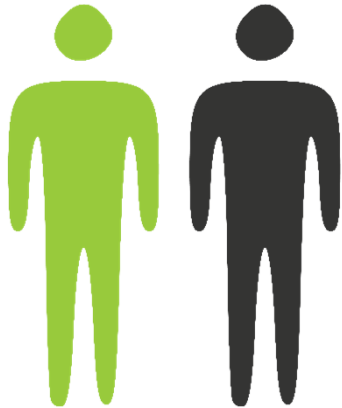
**Visitors** higher education

**Residents** from Faial island

<b>Sociodemographic profile</b>	<b>Frequency of occurrence (%)</b>
<b>Age classes</b>	
30	41,6
40	20,8
50	15
60	21,6
<b>Gender</b>	
Female	49,2
Male	50,8
<b>Education</b>	
basic education	14
secondary education	32,8
higher education/postgraduate	53,2

# Results

## Respondents' attitudes towards deep sea



**77%** wellbeing dependent deep sea

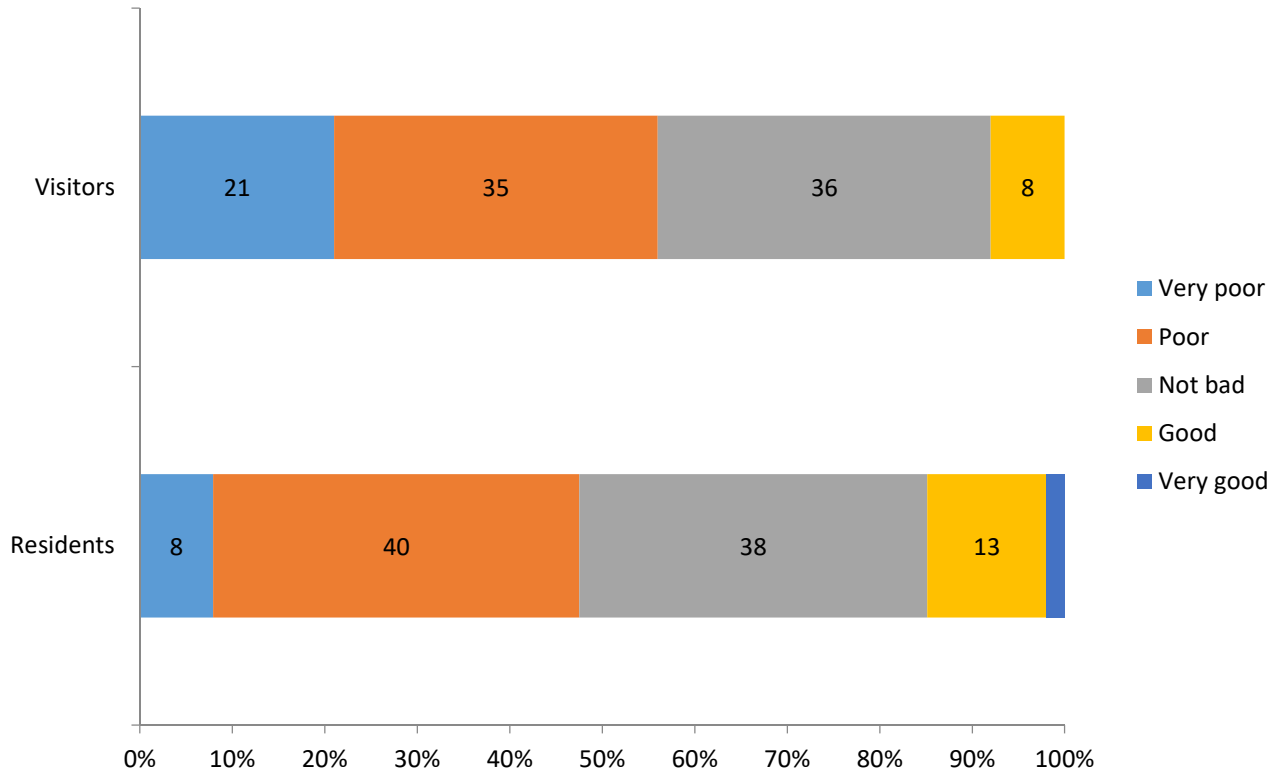
6% deep sea was not important

**10%** deep sea related occupation



# Results

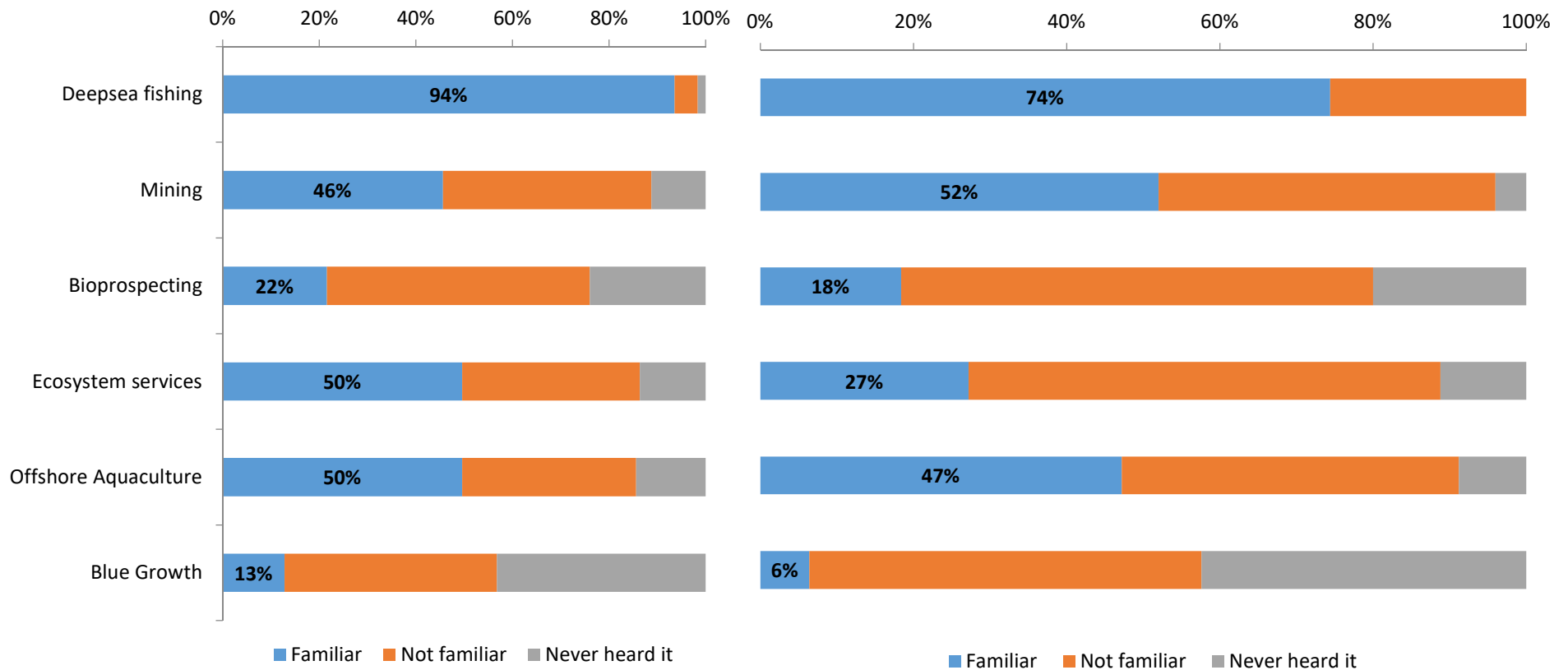
## Self-assessed deep sea knowledge (1/2)



**Residents** considered themselves more deep sea knowledgeable compared to visitors ( $P=0.022$ )

# Results

## Self-assessed knowledge of deep sea concepts (2/2)



# Results

## Factual deep sea knowledge (1/2)

### Respondents' views on deep sea related issues

Statements	Correct response	Residents (%)			Vistors (%)			
		% correct	% incorrect	Don't know	% correct	% incorrect	Don't know	
The deep sea covers 65% of the earth's surface area and provides 95% of its habitable space	yes	48	17	35	48	17	35	$p= 0.03281$
The deep sea is a vast domain almost entirely unexplored	yes	78	18	4	78	18	4	$p=0.02463$
Due to the lack of light the deep sea is a desert in terms of species	no	78	17	5	78	17	5	$p= 0.2274$
Chemosynthetic processes support life at some deep sea ecosystems	yes	47	12	41	47	12	41	$p= 0.02857$
The deep sea is poor on resources useful to man	no	68	14	18	68	14	18	$p= 0.2388$
The average temperature of the deep sea is below 4°C	yes	43	16	41	43	16	41	$p= 0.2568$
The law of the sea convention provides the global framework for the management of the deep sea	yes	30	12	58	30	12	58	$p= 0.1107$
Deep sea species are slow growing, long lived, slow to reproduce and mechanically fragile	yes	57	11	32	57	11	32	$p= 0.2468$

### Correlations between self-assessed and factual knowledge (Spearman's rho, n=250)

	Factual knowledge	
Self-assessed knowledge	0,27541	$p<0,01$

# Results

## Factual deep sea knowledge (2/2)

Respondents' ability to identify deep sea ecosystems

Number of correct responses	Residents (%)	Visitors (%)
0	11%	2%
1	5%	5%
2	7%	10%
3	15%	19%
4	20%	23%
5	18%	19%
6	7%	7%
7	16%	14%

### Pre-defined list

Coral reefs  
Sponge gardens  
Oceanic ridges  
Mud volcanos  
Hydrothermal vents  
Canyons  
Seamounts

**Coral reefs & Sponge gardens** scored badly



# Results

## Public deep sea information sources



### Respondents' preferred source of information for deep sea related issues

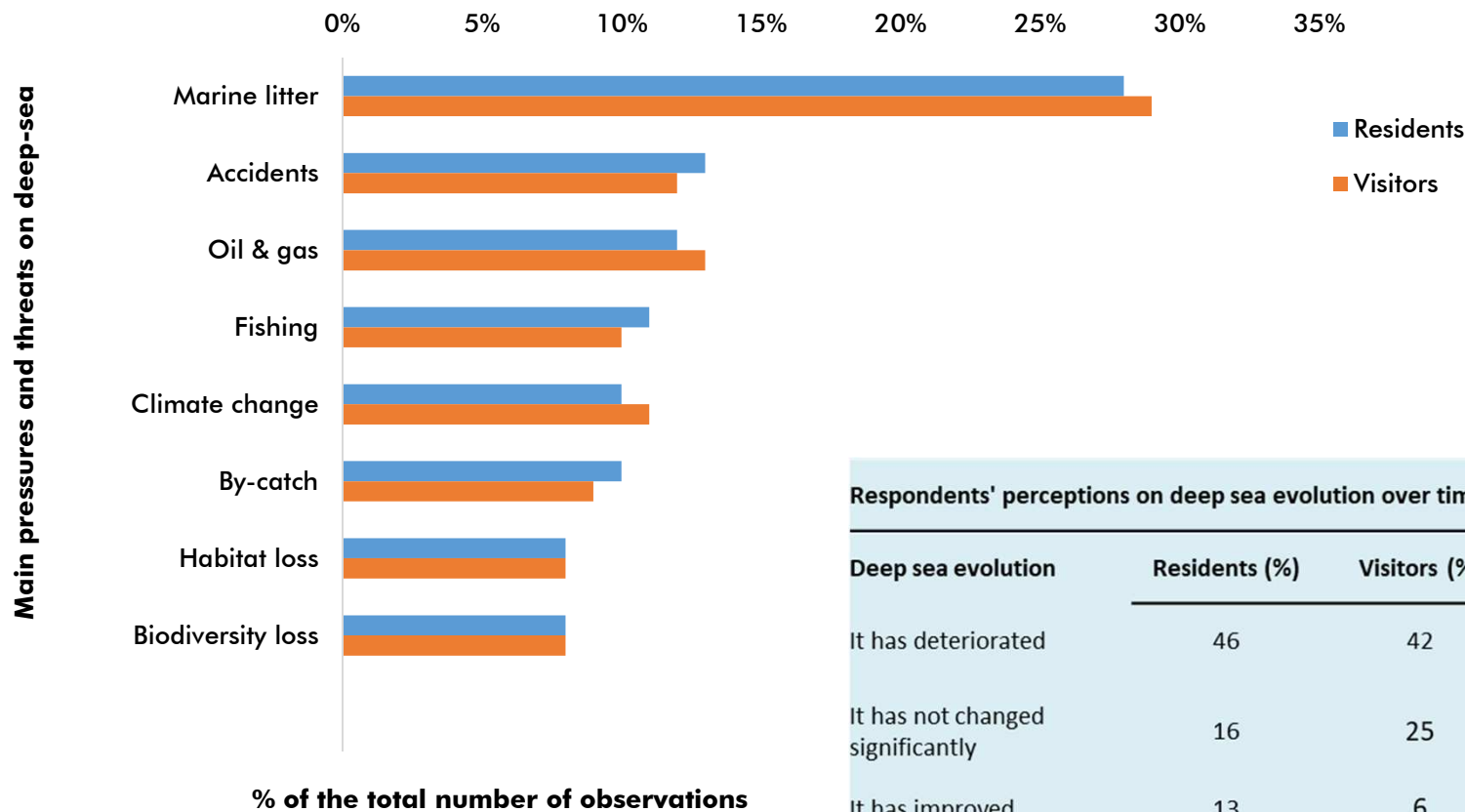
Information sources	Residents (%)	Visitors (%)
Television	50	50
Internet	27	14
Newspaper	5	7
Books	6	13
Social networks	2	0
None	2	2
Other	8	14

### Correlations between information sources and factual/self-assessed knowledge (Spearman's rho, $n=250$ )

	Factual Knowledge		Self-assessed knowledge	
<b>TV</b>	-0,04	$p=0,4885$	-0,13	$p=0,03602$
<b>Internet</b>	-0,08	$p=0,2333$	0,11	$p=0,08596$
<b>Newspaper</b>	0,08	$p=0,2099$	0,07	$p=0,2865$
<b>Books</b>	0,06	$p=0,3438$	-0,03	$p=0,6074$
<b>Social networks</b>	-0,11	$p=0,09378$	-0,06	$p=0,3839$

# Results

## Public perceptions on deep sea pressures

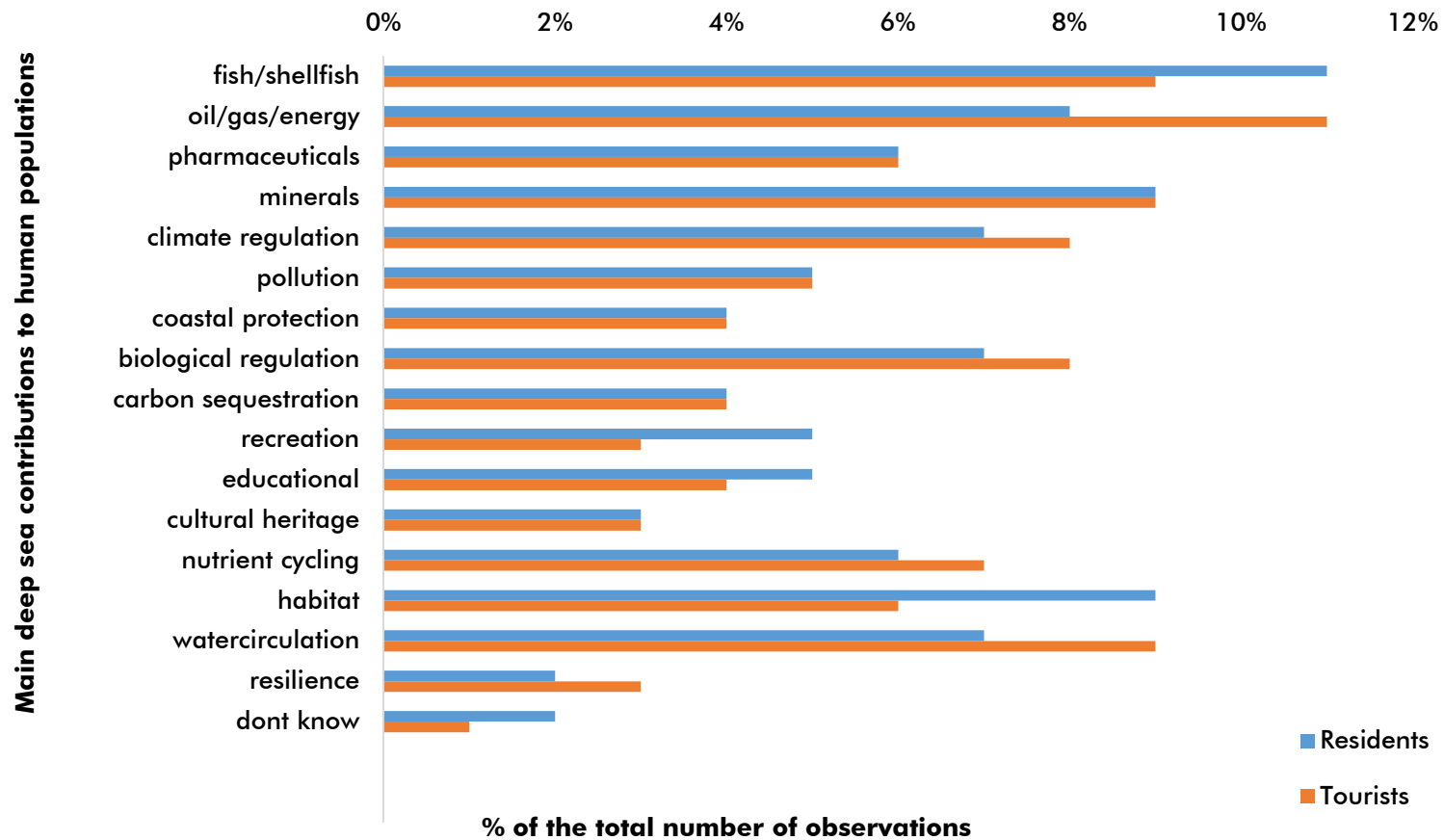


Respondents' perceptions on deep sea evolution over time

Deep sea evolution	Residents (%)	Visitors (%)
It has deteriorated	46	42
It has not changed significantly	16	25
It has improved	13	6
I don't know	26	26

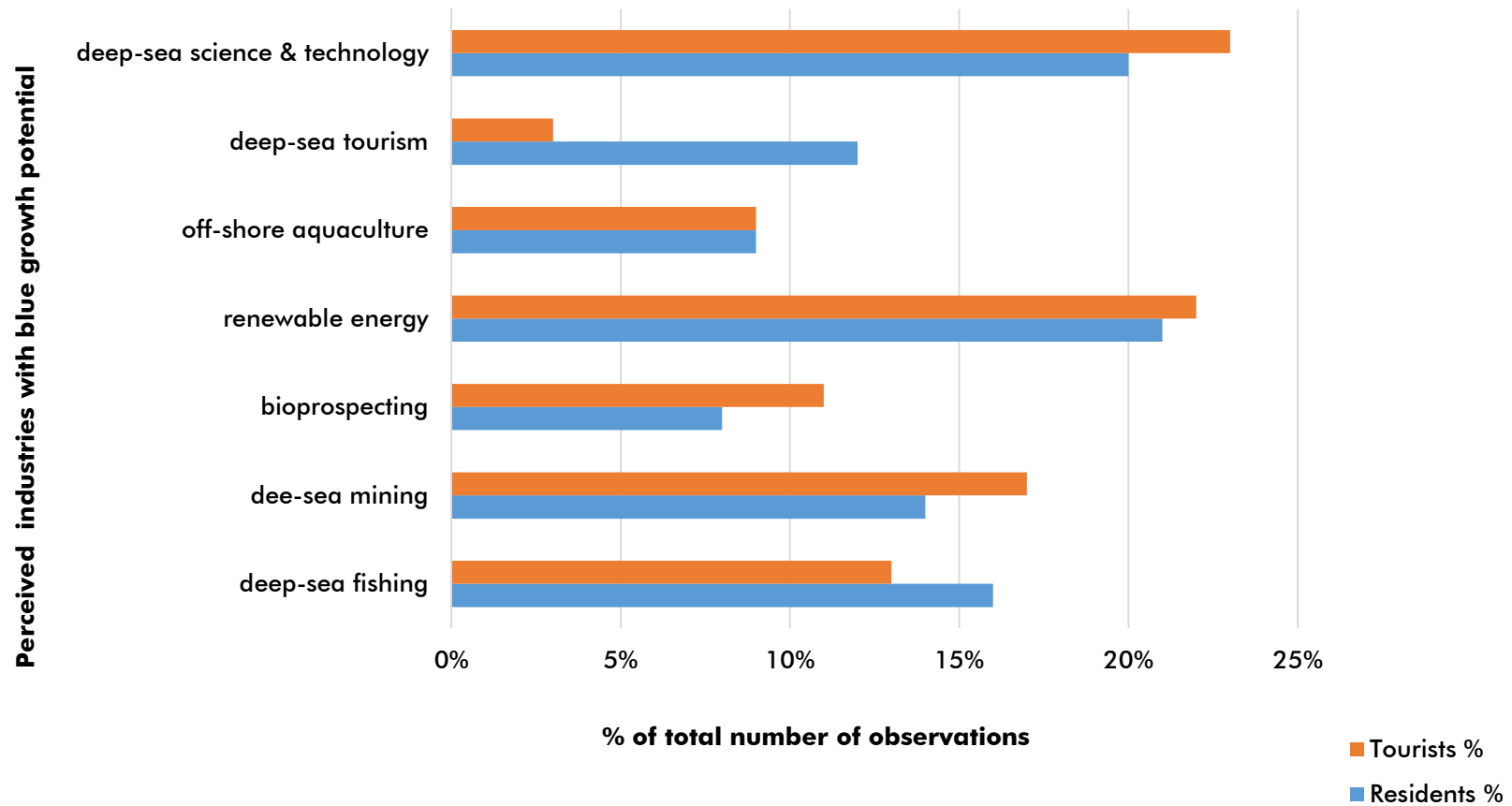
# Results

## Respondents' views on deep-sea ecosystem services and blue growth potential (1/2)



# Results

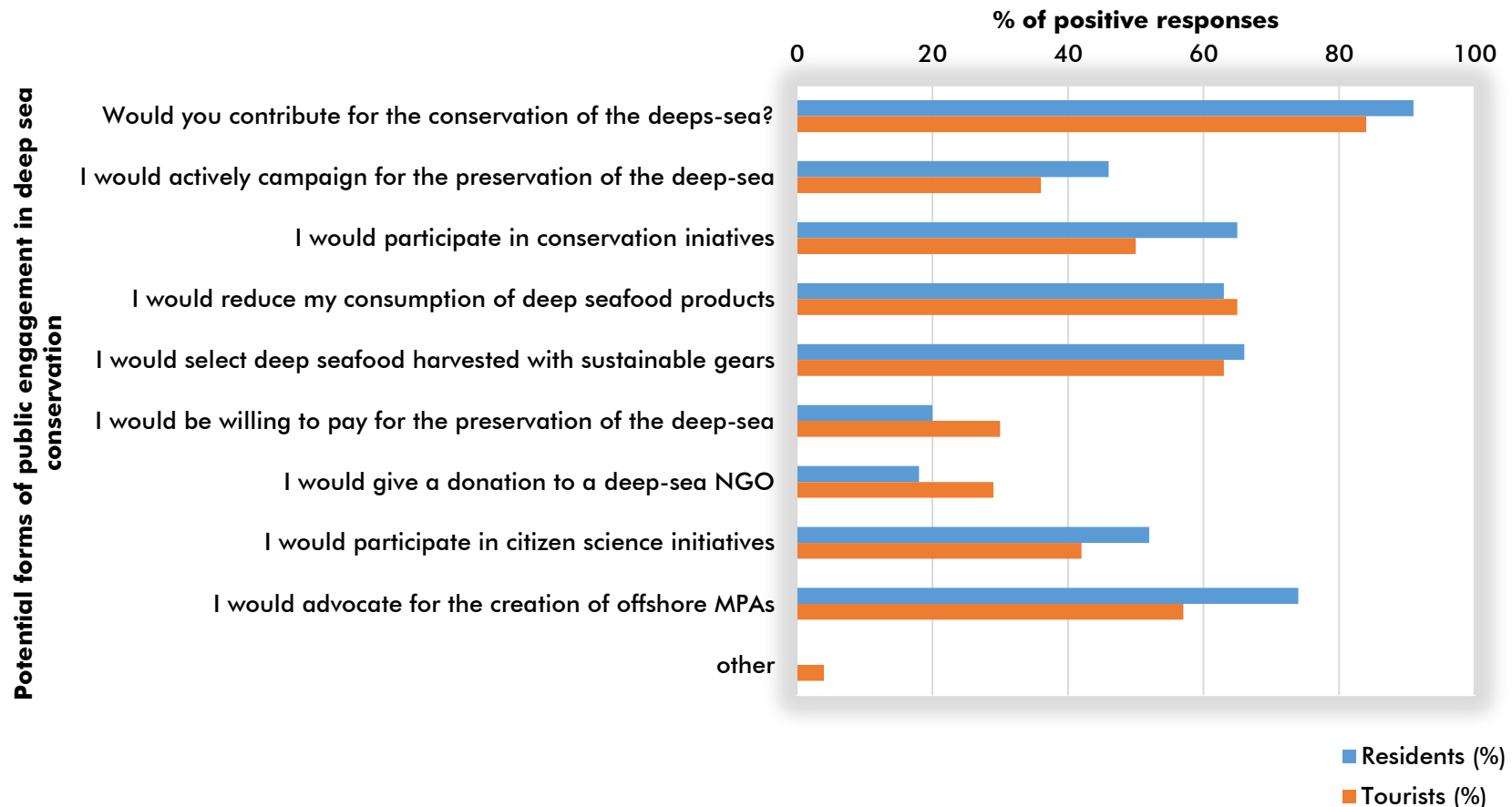
## Respondents' views on deep-sea ecosystem services and blue growth potential (2/2)





# Results

## Potential preferences for public participation on deep sea conservation



# Results

## GLM model

	Estimate	Std. Error	z value	Pr(>  z )
(Intercept)	-0.50116	0.88944	-0.563	0.5731
factor(gender)1	0.37825	0.3128	1.209	0.2266
factor(age)30	1.18771	0.53094	2.237	0.0253*
factor(age)40	0.06369	0.5284	0.121	0.9041
factor(age)50	0.15281	0.55715	0.274	0.7839
factor(age)60	-0.29923	0.58977	-0.507	0.6119
factor(age)70	-0.03232	0.7355	-0.044	0.965
factor(wellbeing)2	1.0001	0.60653	1.649	0.0992.
factor(wellbeing)3	1.51144	0.64864	2.33	0.0198*
factor(wellbeing)1	0.67693	0.67391	1.004	0.3152
factor(occupation02)1	1.95874	0.85787	2.283	0.0224*
factor(resident)1	-1.18575	0.36118	-3.283	0.001**
factor(education)2	0.25195	0.49399	0.51	0.61
factor(education)3	-0.66479	0.51844	-1.282	0.1998
factor(livelihood)1	0.74562	0.60338	1.236	0.2166

Signif. codes: 0 '\*\*\*\*' 0.001 '\*\*\*' 0.01 '\*\*' 0.05 '.' 0.1 ' ' 1

## Factual Knowledge (P2)

P2 threshold,

Dichotomized above mean 1,  
0 else

Resident

Aged 30-40

Wellbeing dependent deep sea

Deep sea related occupation

# Conclusions

- **High public interest** on deep sea
- **Deep sea self-assessed knowledge** as “poor” or “not as bad”,
- **Not familiar with relevant concepts** : ecosystem services, blue growth, mining, bioprospecting, etc.)
- **Factual knowledge** showed mixed results  
vast, rich on resources useful o man, vulnerable ecosystems , sp. but scored badly on more specific concepts, unable to correctly identify deep sea ecosystems
- **Self-assessed knowledge** correlated factual knowledge
- **More knowledgeable profile**: resident, aged 30-40, well being dependent on deep sea , deep sea related occupation

# Take home message

Understanding what the public knows and perceives about the deep sea allows decision-makers to adapt management to site-specific characteristics and to anticipate social acceptability towards specific conservation strategies.



Thank you!



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