LANGUEDOC BEACHES IN THE FACE OF COASTAL FLOODING RISK

DEFINING MANAGEMENT POLICIES WHILST TAKING INTO CONSIDERATION USERS' PERCEPTIONS

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Objectives

- Aim = to analyze the coastal flooding risk perceptions
  - Comparison of perceptions between different types of users
  - Final aim = to being to fine-tune adaptive policies to submersion, in particular concerning acceptance of the managed retreat
    - Supposed to be promoted by scientists and public managers

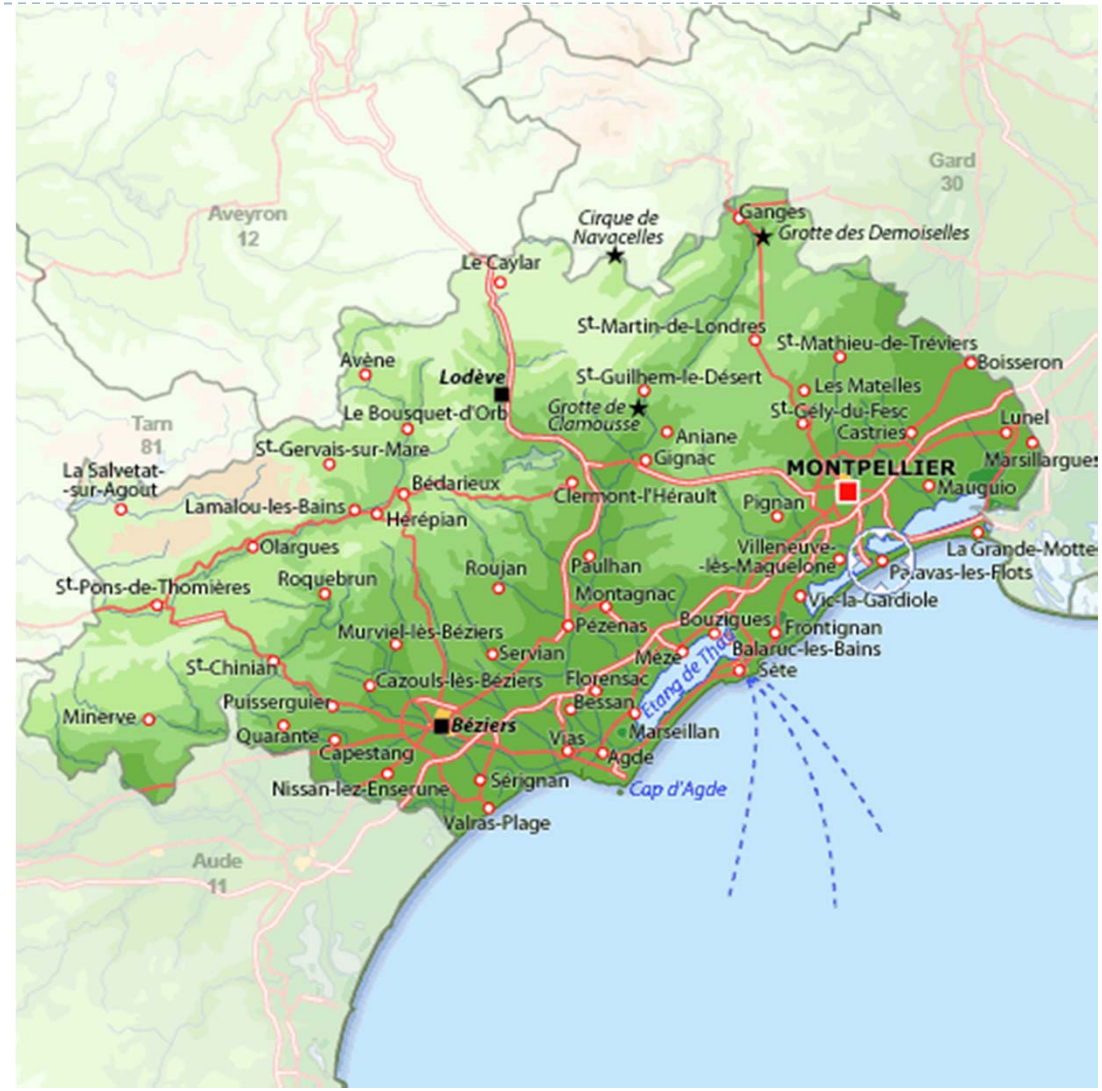
- This research was conducted as part of MISSEVA (Marine inundation hazard exposure, modelling and Social, Economic and Environmental Vulnerability Assessment)
  - This project is coordinated by BRGM (C. Vinchon)

Method

- Study area = local districts of Palavas-les-flots, Carnon-Mauguio and Pérols
  - Fragile sandbar, very exposed to erosion and to coastal flooding and because there are significant urban and tourism issues

- Data collection:
  - 881 surveys on users carried out in 2009 using a questionnaire jointly designed by geographers, sociologists and economists
  - A complementary survey on public and private actors involved in coastal management

Study area


Gard
30
Aveyron
12
Cirque de
Navacelles
Ganges
Grotte des Demoiselles
Le Caylar
St-Martin-de-Londres
St-Mathieu-de-Tréviers
Boisseron
Avène
Lodève
St-Guilhem-le-Désert
Les Matelles
Le Bousquet-d'Orb
Grotte de
Clamousse
St-Gély-du-Fesc
Lunel
Tarn
81
Aniane
Castries
St-Gervais-sur-Mare
Gignac
Marsillargues
La Salvetat-
-sur-Agout
MONTPELLIER
Bédarieux
Clermont-l'Hérault
Mauguio
Lamalou-les-Bains
Pignan
Hérépian
Villeneuve-
-lès-Maguelone
La Grande-Motte
Olargues
Roujan
Paulhan
Palavas-les-Flots
St-Pons-de-Thomières
Roquebrun
Montagnac
Vic-la-Gardiole
Pézenas
Bouzigues
Frontignan
Murviel-lès-Béziers
Servian
Mèze
Balaruc-les-Bains
St-Chinian
Cazouls-lès-Béziers
Sète
Florensac
Puisserguier
Bessan
Minerve
Béziers
Marseillan
Quarante
Vias
Capestang
Agde
Sérignan
Nissan-lez-Enserune
Cap d'Agde
Valras-Plage
Aude
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The surveys

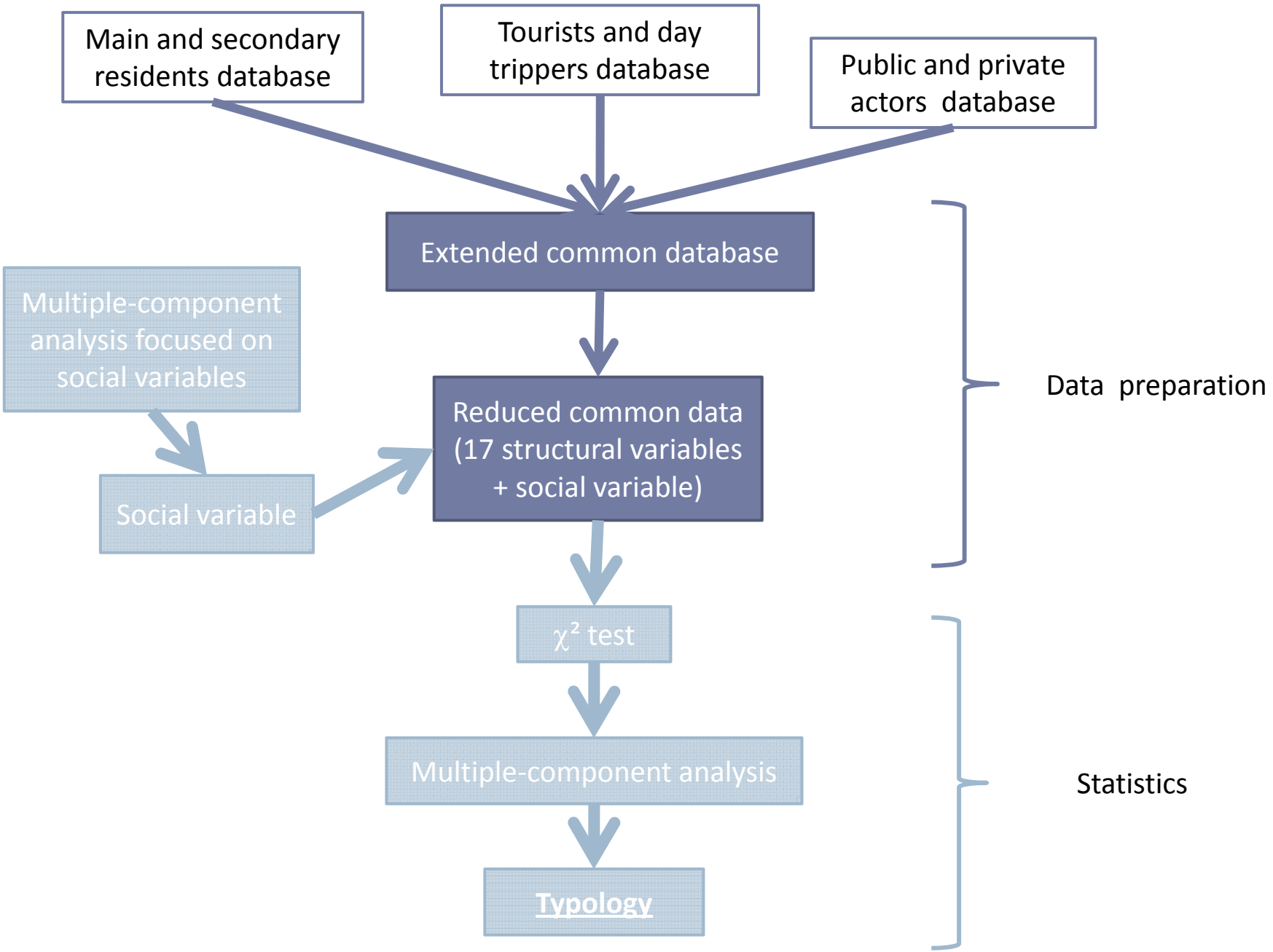
	Main residents	Non-permanent residents	Tourists	Day-trippers	Actors
Sample size	318	163	301	99	36
Place	At home		On the beach		Working place
Length	30 to 45 min		About 20 min		1 h 30 min
Time	April and July 2009		July and August 2009		2010
Sampling	Quotas		Quotas		Reasoned selection
Questionnaire	Closed format (158 questions)		Closed format (94 questions)		Semi-directive (30 questions) and closed format (15)

The “actors” surveys

	Size	%	% men
Public managers	11	31	64
National authorithies	*6*	*17*	*67*
Local authorithies	*5*	*14*	*60*
People representing professions	8	22	75
Researchers	5	14	100
Associations	5	14	60
Local managers	7	19	43
Total	36	100	86

Common based

Part of the questionnaire	Variables	Issues
Caractéristiques	5	Sex, Age, Degree, Income, Household size
Social profiles 4 classes	1	**Retired:** mostly retired people, usually living with another person, mostly well educated **Active:** active persons with only one working in the household, mainly women living alone and some widowers retired **Active young:** well educated, generally living with a familly, usually 2 incomes **Active +:** older active people, usually men living with their familly, quite all with 2 incomes
Beach uses	3	Frequentation, activities
Risk perception	3	Sensibility, reference institution in risk appreciation, anticipated consequences
Preferences regarding adaptation/mitigation	6	Methods, preferences regarding assets protection


Main and secondary residents database
Tourists and day trippers database
Public and private actors database
Extended common database
Multiple-component analysis focused on social variables
Social variable
Reduced common data (17 structural variables + social variable)
Data preparation
χ^2 test
Multiple-component analysis
Typology
Statistics

How urgent is adaptation?

	Main residents	Non-permanent residents	Tourists	Day-trippers	Total	Actors
Within 10 years	44%	37%	73% (+)	78% (+)	57%	20%
Later	37%	38%	14%	14%	27%	64% (+)
Not proven	19%	25% (+)	13%	8% (-)	17%	16%
Total	100%	100%	100%	100%	100%	100%

- Feeling of urgency more important for non residents
  - Non-permanent residents deny the risk
- Actors more realistic
- Users mainly trust scientists for risk appreciation (79%)

How to protect beach and adapt collectively?

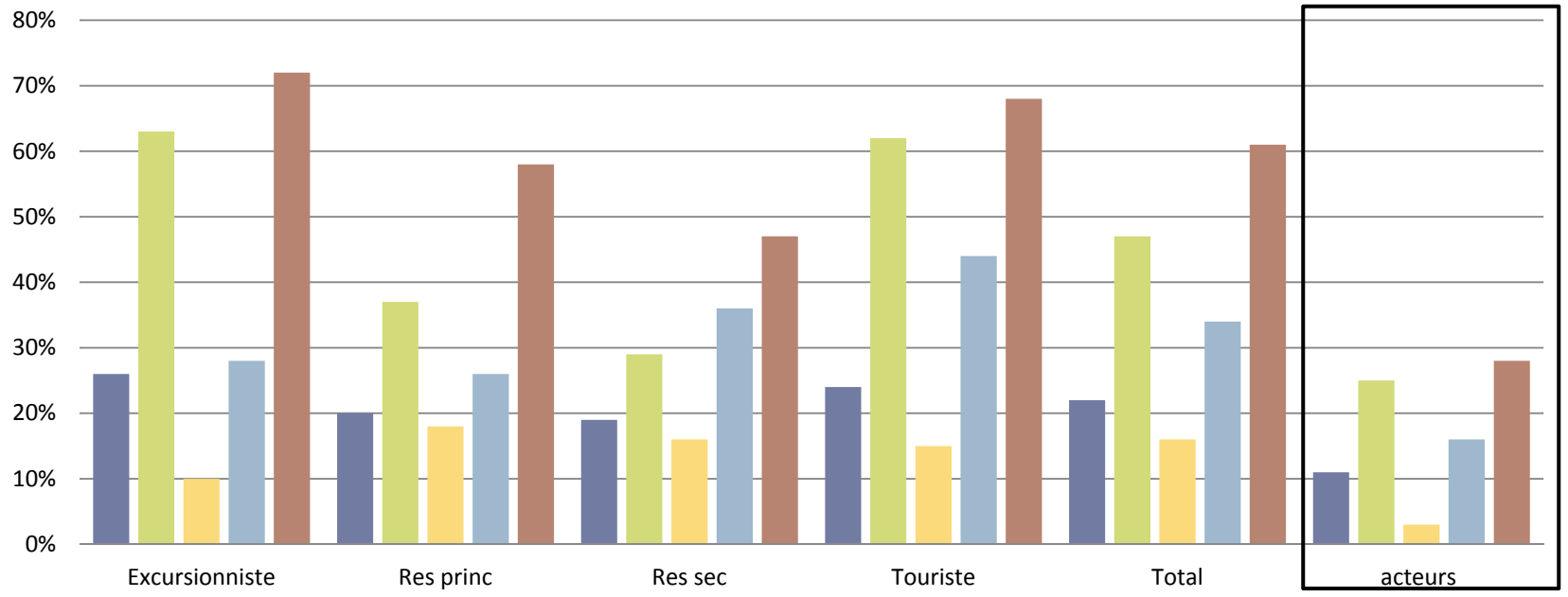
- Equilibrated between hard and soft approaches
- Managed retreat, highly preferred by actors, becomes to be socially accepted by users, especially day-trippers

	Main residents	Non-permanent residents	Tourists	Day-trippers	Total	Actors
Hard methods (breakwaters…)	39%	45%	44%	23% (-)	40%	16% (-)
Soft methods (beach nourishment…)	45%	44%	31%	29%	38%	23%
Retreat (+ laissez-faire*)	16%	10% (-)	25%	48% (+)	22%	61% (+)
Total	100%	100%	100%	100%	100%	100%

* 2 or 3%

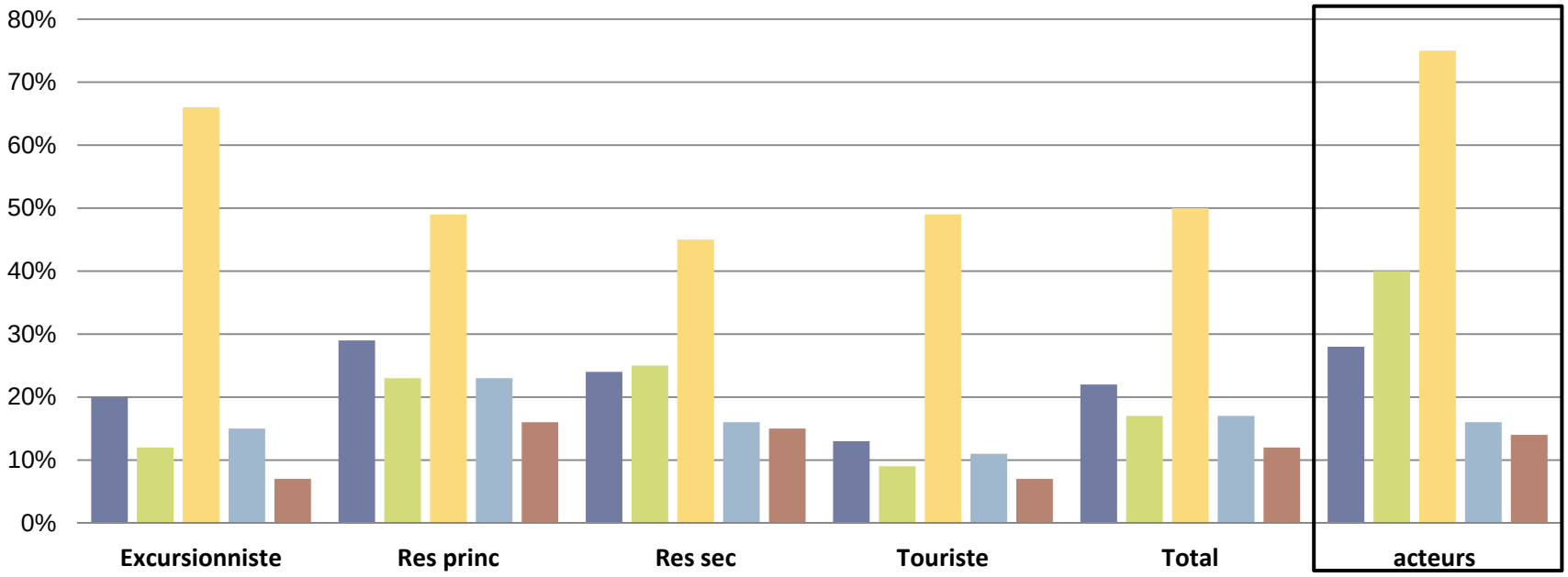
What to protect?

- Protection, whatever the cost, not very frequent within actors
- Users
  - Attached to collective equipements
    - Less true for non permanent residents
  - Tourists and day-trippers attached to natural assets
  - Tourists and non permanent residents attached to cultural heritage



What not to protect?

- No protection (too expensive or not worth it)
  - Houses (especially day-trippers and actors)
  - In general, more important for residents
  - Actors less attached to touristic infrastructures and natural assets



Can social profiles explain these differences?

		Social profiles
Coastal flooding risk perception	Urgence	Highly correlated (χ^2 - 99%)
	Appreciation	Highly correlated (χ^2 - 99%)
	Consequences	No link
Adaptation methods		Highly correlated (χ^2 - 99%)
Collective protection	Collective equipments	FHighly correlated (χ^2 - 99%)
	Touristic infrastructures	No link
	Nature	Highly correlated (χ^2 - 99%)
	House	No link
	Cultural heritage	No link

Multiple-component analysis

Libellé	Relative weight	Distance to origin	Axe 1	Axe 2	Axe 3	Axe 4
Socio-economic characteristics						
Active -	5,221	3,78804	1,30	3,82	8,82	40,79
Retired	7,406	2,37548	24,61	0,43	4,90	0,12
Active young	5,420	3,61257	5,40	18,76	3,41	10,81
Active +	6,952	2,59592	4,33	23,42	1,80	8,90
Beach frequentation						
Plage ++ (> 50 d)	8,059	2,10211	1,85	4,27	3,87	9,69
Plage + (30-50 d)	8,485	1,94649	15,88	0,02	1,49	0,05
Plage - (< 30 d)	8,456	1,95638	7,09	4,63	0,49	10,61
Risk perception						
Risque ++	14,160	0,76553	11,12	0,30	2,75	0,00
Risque+	6,697	2,73305	11,03	0,17	6,21	7,36
Risque no/don’t know	4,143	5,03425	3,77	0,23	38,82	11,65
Preferred method						
Hard methods	10,017	1,49575	0,95	24,55	0,64	0,01
Soft methods	9,535	1,62202	2,12	18,27	13,10	0,00
Managed retreat	5,448	3,58854	10,56	1,13	13,72	0,02

Typology

	Relative weight	Activity	Beach frequentation	Risk perpection	Preferred method	% choosing managed retreat
1	23%	-	++ (> 50 days)	Urgent	Soft	
2	29%	++	- (< 30 days)			30%
3	36%		+ (30 to 50 days)		Hard	
4	13%	-	Mixte	Not proven (100%)	Retreat	35%

Managed retreat

- Seen by 61% of actors as the most realistic solution but not an easy one to implement
  - Increase in storms → population may be more sensible and accept this policy
- 70% of actors think that should be publicly funded
- Day-trippers are the users that are the most favourable to this approach; retired people and non permanent residents are the less favourable ones

Who are these 159 people choosing the managed retreat?

- They:
  - Feel sea level rise will have consequences but after 10 years (67%)
  - Trust scientists in risk appreciation (80%)
  - Think rising sea level will lead to a beach disappearance (42%)
  - Are against the protection of the houses (69%)
  - Are young (43% are less than 40 years), mainly well educated (57% have a higher degree), living with another person and thus two incomes (52%) and have children (48%)

Conclusion: how can acceptability be increased?

	%
Tourists	41%
Day-trippers	28%
Main residents	23%
Non permanent residents	8%

Do not live there and are thus not directly concerned

Are more exposed to the risk but less favourable, especially non-permanent residents, who may be more attached and are less mobile

- A real need to sensibilise local populations
- Results must be confirmed via a survey on all people living there and not only those living close to the sea