



Assessing beach attendance and practices in a large coastal city

A case study in Marseille (France)



Plage du Prophète, Marseille



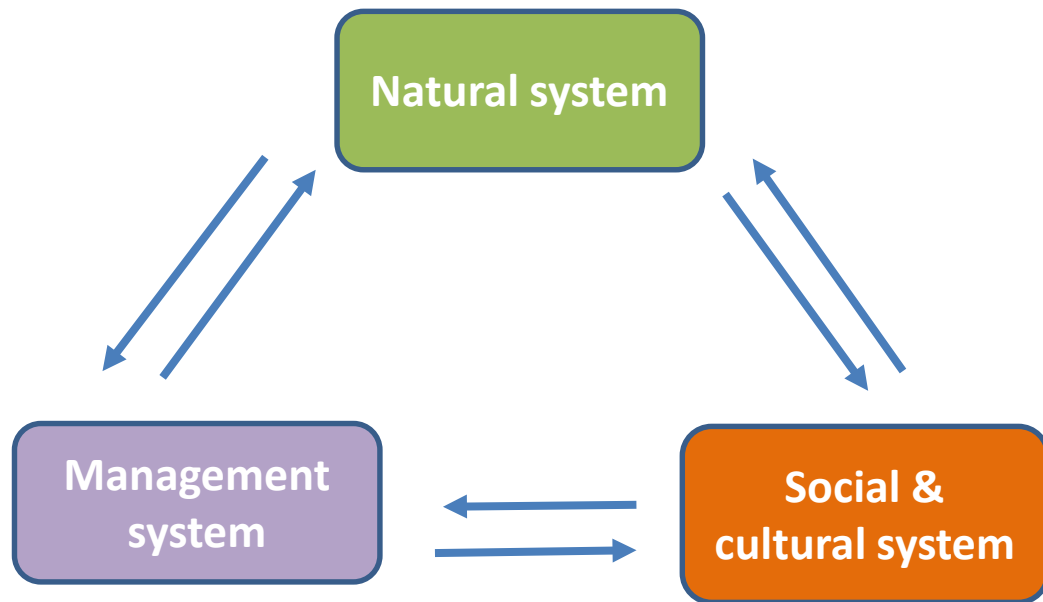
Plage de la Lave, Marseille

Samuel ROBERT and Marie-Laure TREMELO
CNRS, Aix-Marseille Université, Univ. Avignon, Univ.
Côte d'Azur, ESPACE (UMR 7300)
samuel.robert@univ-amu.fr



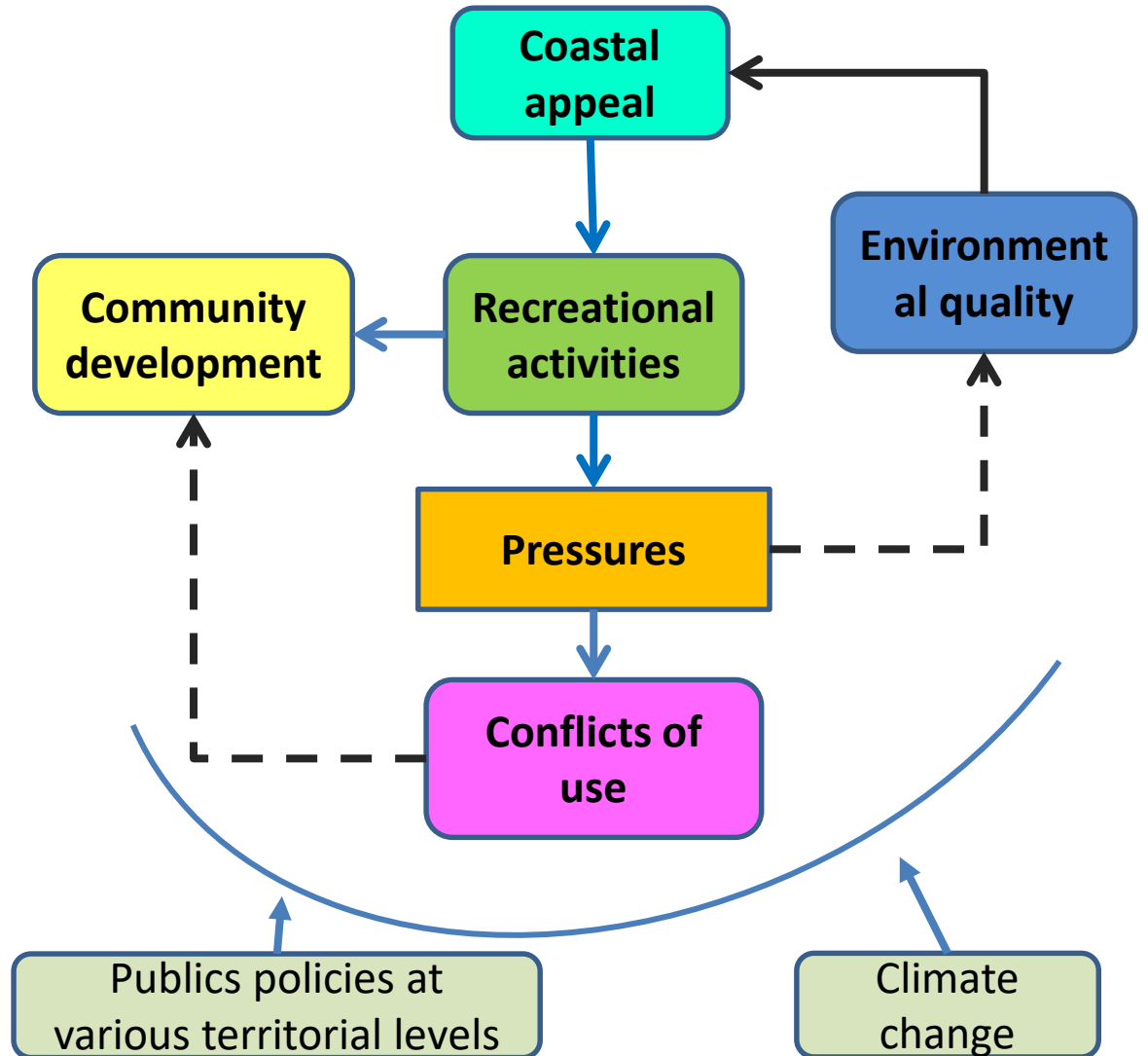
Beach : a complex system from a management perspective

1) Area characterized by physical, biological and social dynamics, with numerous management issues



James (2000)

2) Part of a larger system : the coast as a recreational area



Issues specific to beaches in large cities

Places 'wedged' between the city and the sea

High visitor numbers
all year round

Expectations from
many users / conflicts
of use

Bathing water quality
compromised by
urban waste and
various uses of the
coast and sea

Physical integrity
threatened by
coastal dynamics and
climate change



Beach attendance and practices are key data.

... but very few cities know about their beach
attendance

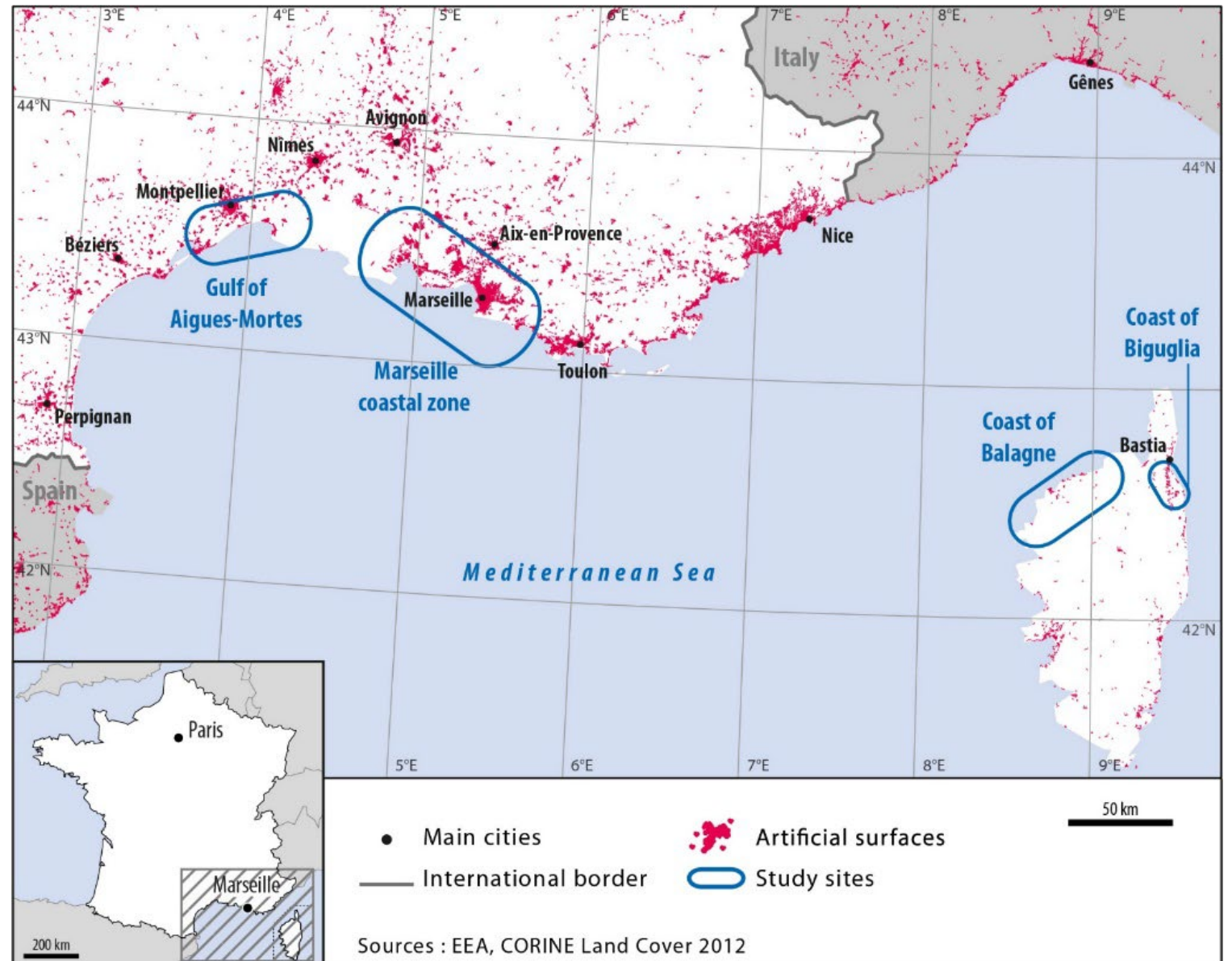


An exploratory initiative to assess beach attendance and practices in Marseille with OHM Littoral méditerranéen

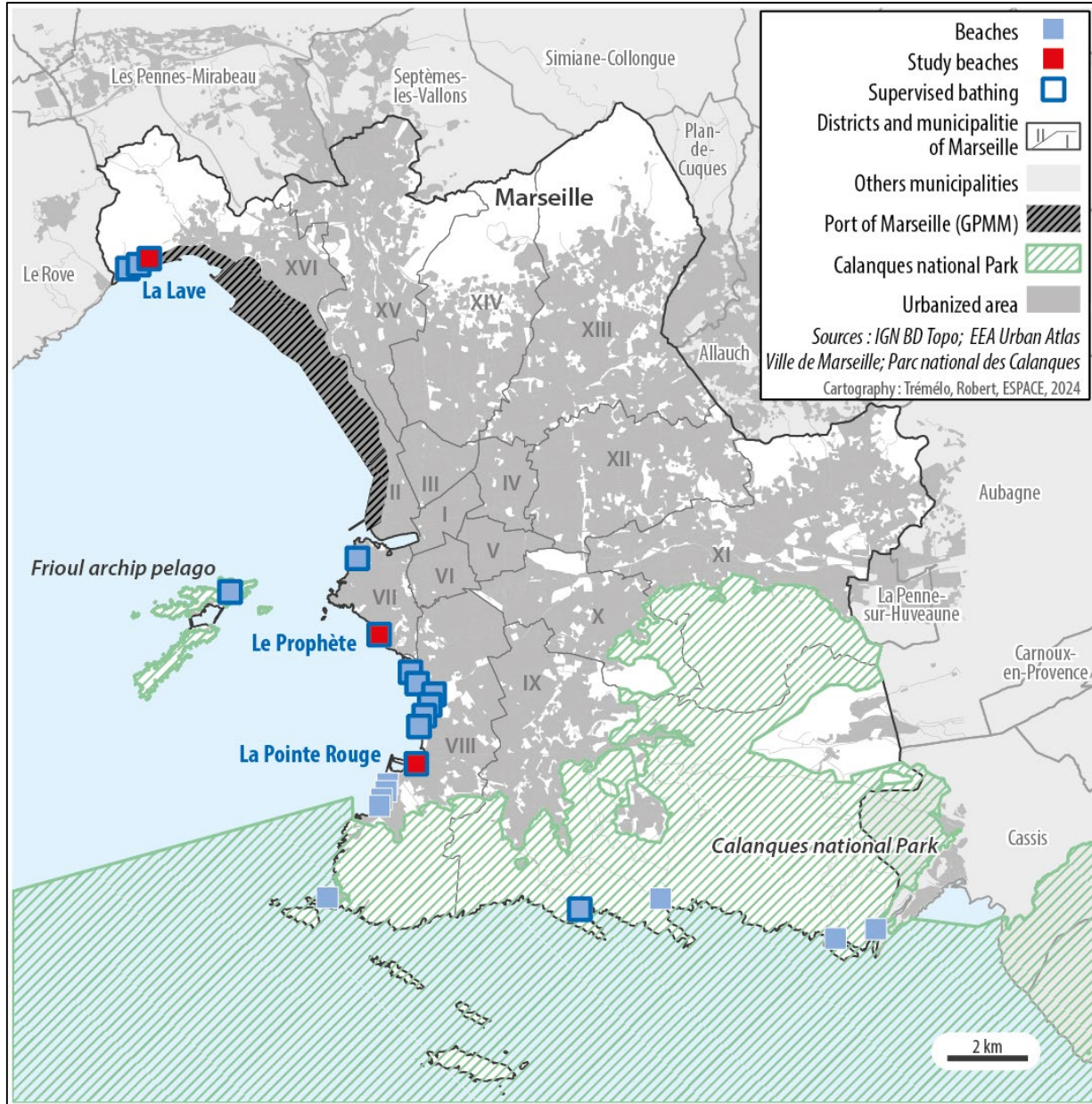
OHM Littoral méditerranéen (Human-Environment Observatory French Mediterranean coasts)

- Observing and analysing coastal pressures and management in **4 study sites**
- Created in **2012** by Ecology and environment Institute + Human and social sciences Institute of the French CNRS
- Part of a network (LabEx DRIHM - www.drihm.fr)
- 30 research units, around 230 persons on the mailing list
- **Beaches**, coastal lagoons, ports, protected areas

<http://www.ohm-littoral-mediterraneen.fr/>



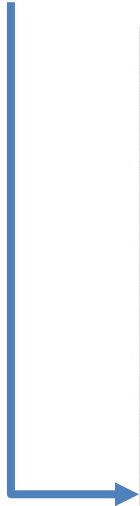
Marseille : a port city with 21 beaches



Beach attendance and practices very poorly known (2 to 2.5 millions users each summer ?)



Exploratory study



**2016-2020
12 days surveyed
in July**

Beach attendance assessment by manual counting

Hourly counting of beach goers' entrances and exits at entry points from 8 am to 8 pm



OHM Littoral méditerranéen. Projet QHyMed 2016.

Comptages – Flux entrants et sortants sur la plage du Prophète, Marseille

DATE : 19/07/2016

ENTREE : Nord / ~~Sud~~

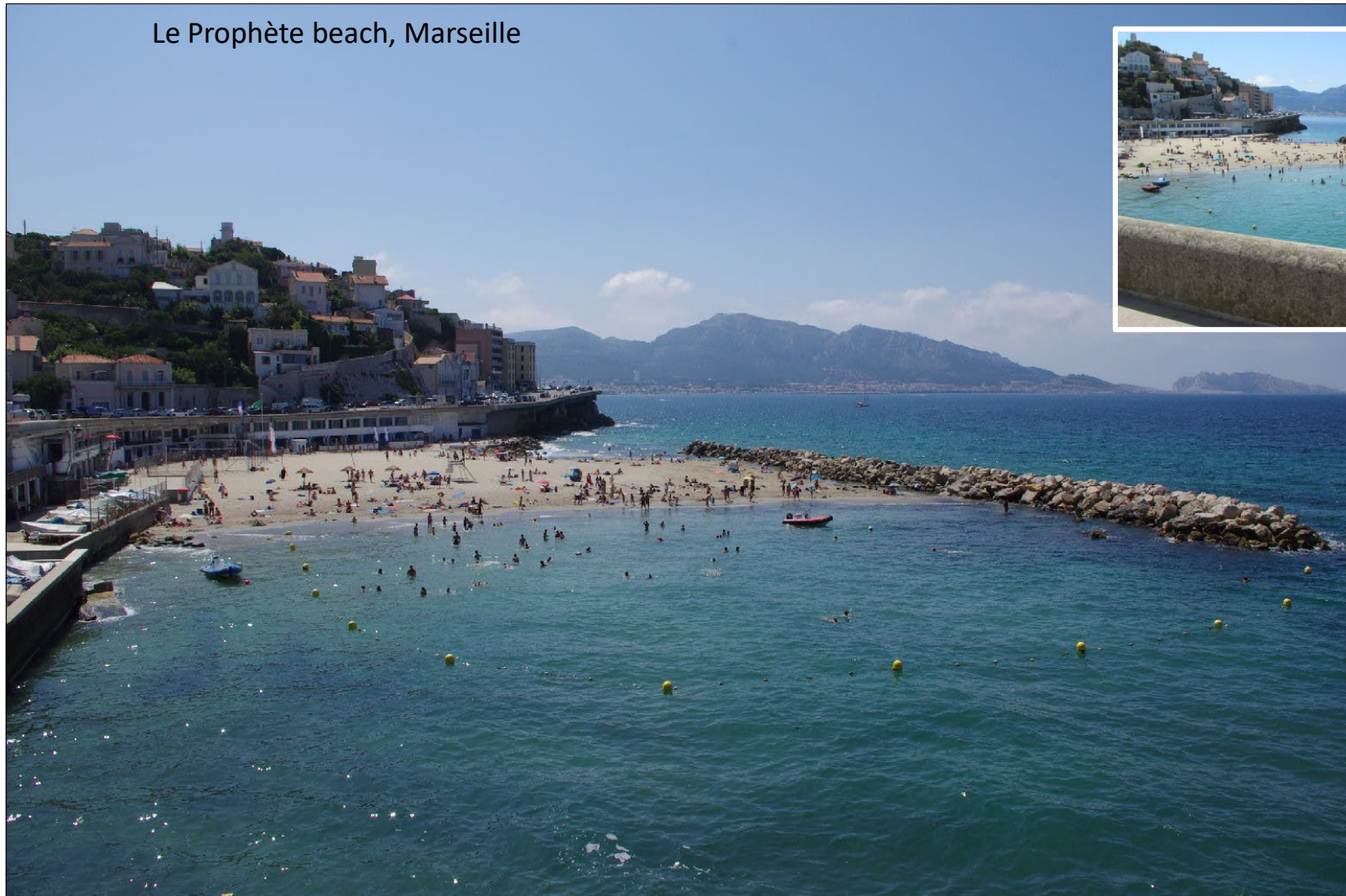
Protocole : Faire des carrés à la main, toutes les 5 personnes. Bien différencier les entrées et les sorties.

Tranches horaires	Entrées	Sorties
De 8h à 9h	☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ (73)	☑ ☑ ☑ (15)
De 9h à 10h	☑ (139)	☑ ☑ ☑ (12)
De 10 à 11h	☑ (168)	☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ ☑ (70)
De 11h à 12h	☑ (159)	☑ (105)

Beach attendance assessment with photographs

Hourly photographs → photointerpretation → users on the sand and users in the bathing zone

from 8 am
to 8 pm



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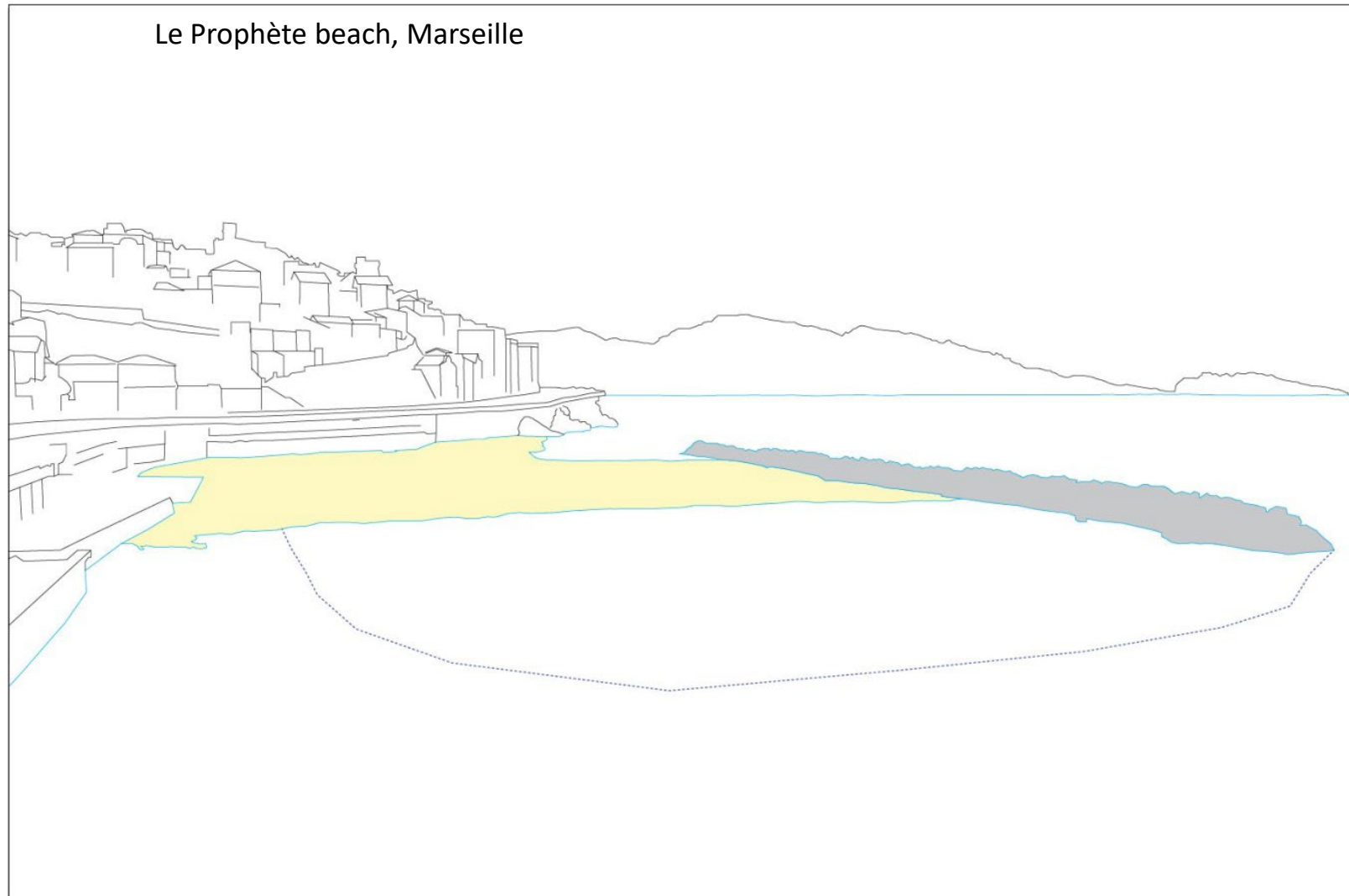
Le Prophète beach, Marseille



Beach attendance assessment with photographs

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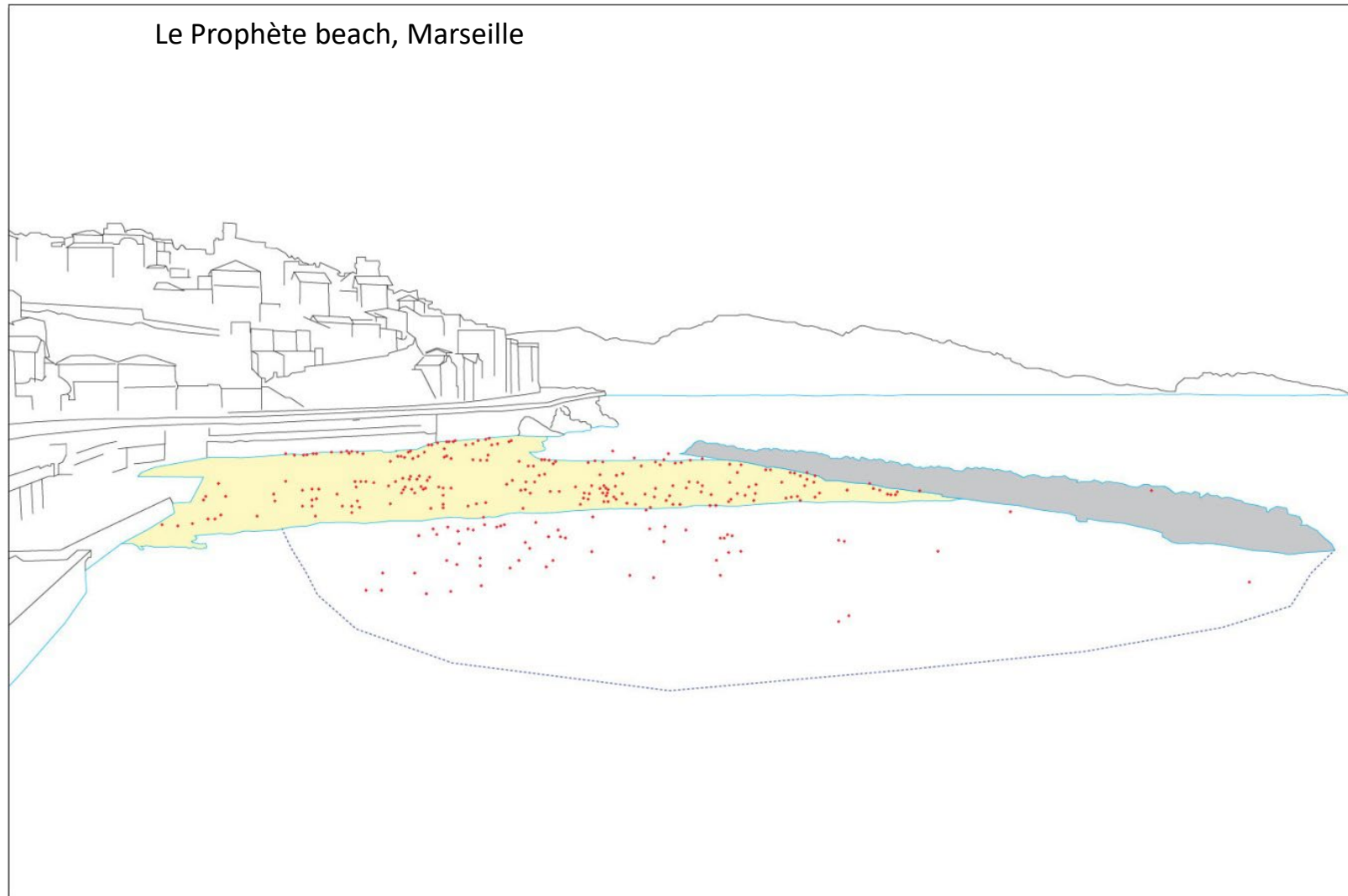
from 8 am
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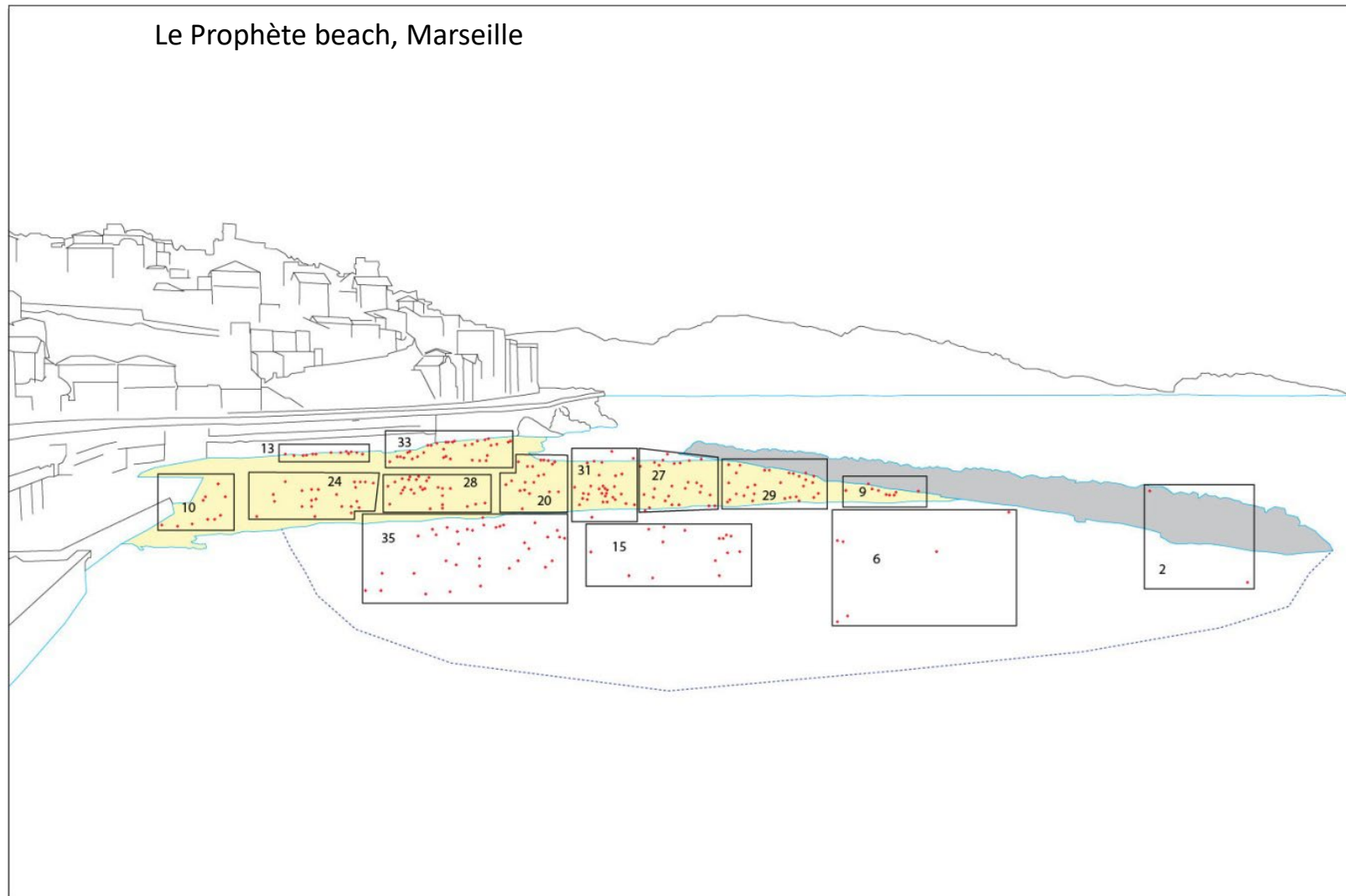
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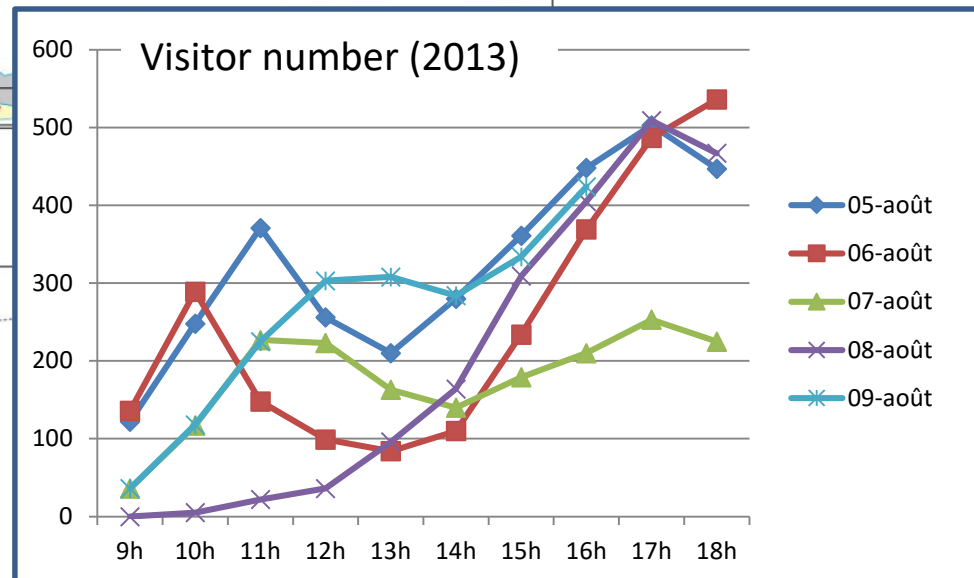
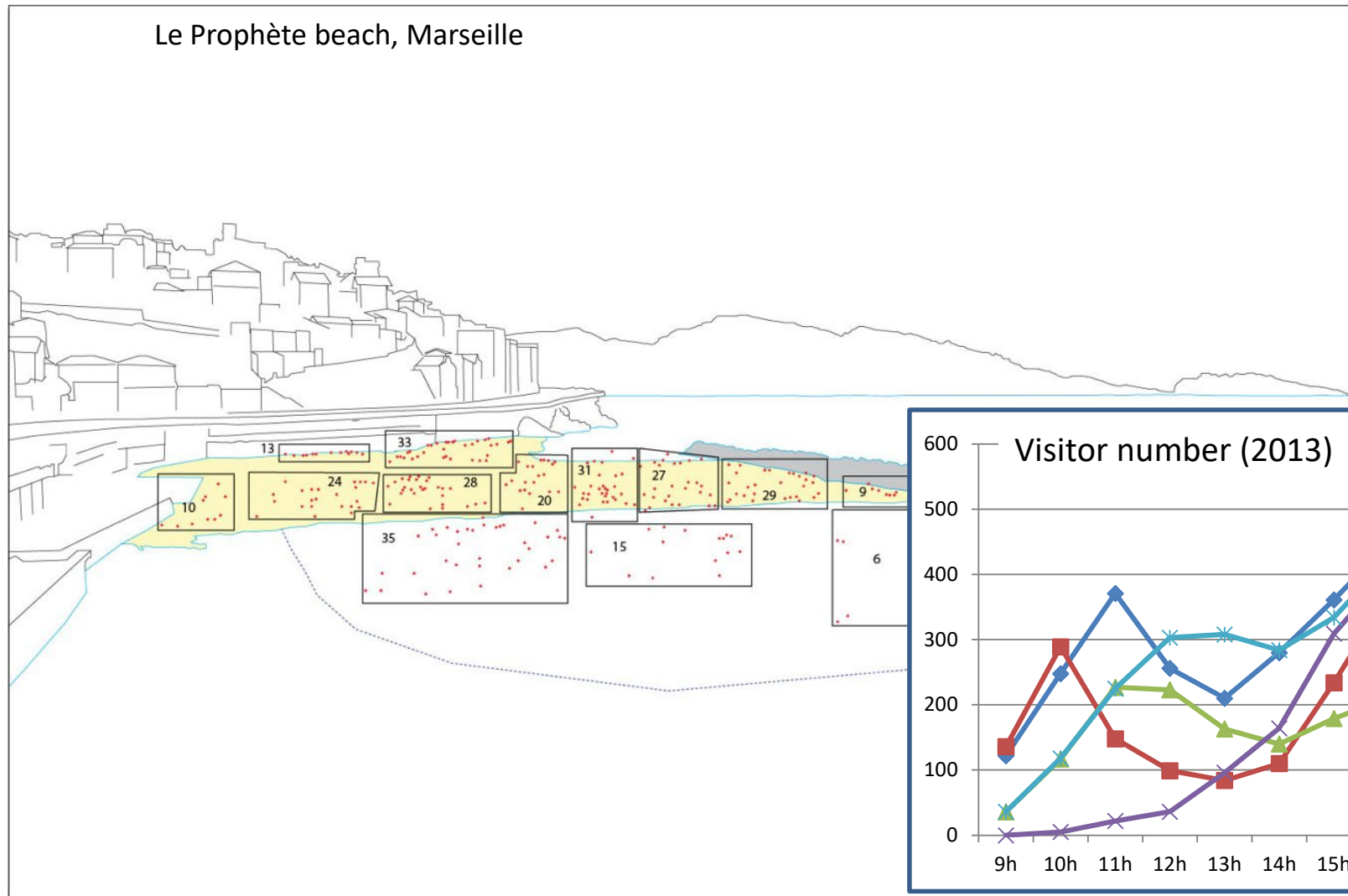
from 8 am
to 8 pm



Beach attendance assessment with photographs

Hourly photographs → photointerpretation → users on the sand and users in the bathing zone

from 8 am
to 8 pm



Beach practices assessment by questionnaire

Sections	Topics
Relationship with the beach	Frequency of visits; preferred time to come; time spent on site; means of transport used; motivation for coming on that day; habit of visiting other beaches
Activities and practices	Usual location on the beach; usual activities; bathing practices; use of sanitary facilities; look at the weather forecast before coming; look at the water quality data sheet; use of sun cream (in 2017); return to the beach after Covid-19 (in 2020)
Perception of the place	Personal assessment of the quality of the beach; of the attendance; of the bathing water quality Wishes for change in 10 years' time
Socio-demographic profile	Gender; Age; Status (resident, tourist, visitor); Place of residence; Professional activity; Accompanying persons
Context of the questionnaire	State of the sky when questioning; colour of the beach flag; special remarks



Pratiques, usages et fréquentation des plages urbaines en Méditerranée

Date et heure : Le/...../..... àh.....

N° de questionnaire : Initiales enquêteur / n° de l'enquête

Votre rapport à cette plage

- 1) Etes-vous un(e) habitué(e) de cette plage ? Oui Non
- Jamais -Un peu -Souvent
- 2) Venez-vous ?
- Chaque fois que vous vous rendez à la plage
- 3) En général, quand préférez-vous venir à la plage?
- Le matin : avant 10h - après 10h - Le soir : avant 22h - après 22h
- Midi - Pas de préférence
- L'après-midi : avant 16h - après 16h

Qu'est-ce qui motive cette préférence ?

- 4) Combien de temps restez-vous en général sur la plage (indiquez la durée approximative) ?
- Moins d'une heure -1/2 journée
- Entre 1h et 2h inclus - Une journée entière
- Entre 2h et 3h inclus

- 5) En général, venez-vous seul ou accompagné ? - Seul
6) Aujourd'hui, comment êtes-vous venu ? (Si plusieurs modes de transport, indiquez-les)
- A pied - En t...
- En voiture - Aut...
- En bus - Com...
- En vélo - jusqu'ici ?

7) A quelle heure êtes-vous arrivé ?

- 8) Qu'est-ce qui a motivé votre venue sur cette plage (veuillez donner une note) ?
(0 NSP/ sans réponse, 1 pas important du tout, 2 plutôt pas important, 3 plutôt important, 4 très important)

- Proximité de votre lieu de résidence
- Accessibilité/ facilité pour venir malgré la distance
- Facilité de stationnement
- Equipements proposés sur la plage/services
- Beauté du lieu/paysage
- Tranquillité/ calme
- Sociabilité/ convivialité (l'ambiance)
- L'habitude
- Autre :

- 9) Vous arrive-t-il d'aller sur d'autres plages :
- De la commune ? Si oui, lesquelles ?

Nearly 700 people surveyed in total

Two multidisciplinary studies

1 Beach attendance and practices vs microbiological and geochemical water quality

↳ what is the relationship between people attendance and water quality ?

People counting on site

Survey by questionnaire

Water sampling, microbiological and chemical analysis

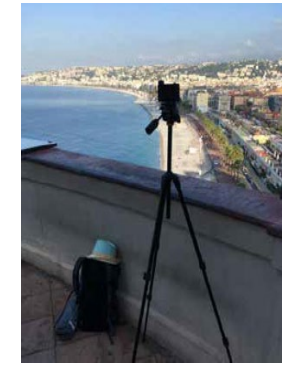


2 The return to the beach after the pandemic lock down in 2020

↳ how did people go back to the beach in Marseille, just after the pandemic lock down ?

Comparison with Nice – Barcelona - Valencia
80 persons in each town during one day

Field observation / Survey / Users counts



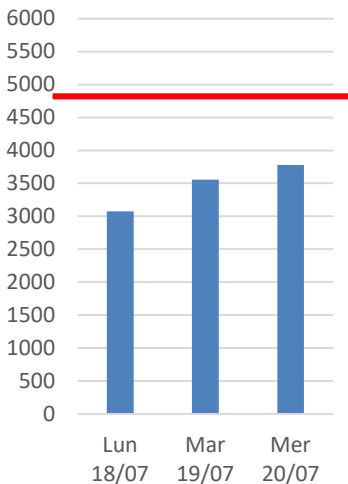
A few results

Beach attendance – how many users ?

Daily entries (8 am-8 pm), between 2016 and 2020 at Le Prophète beach, Marseille

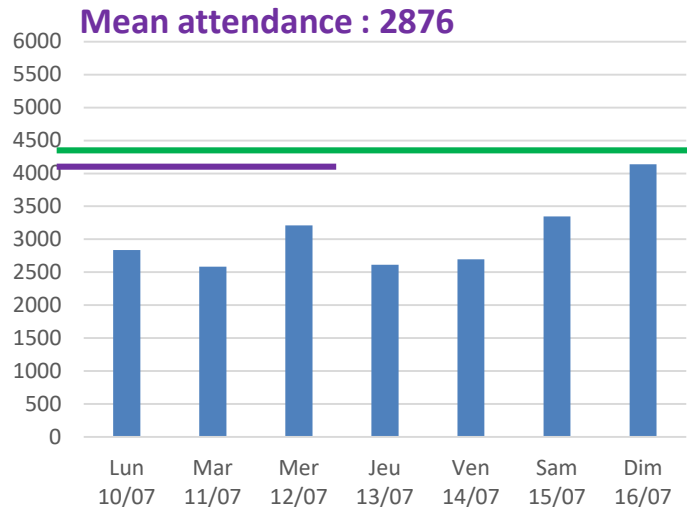
Apart from variations related to weather conditions, some rules can be observed/confirmed

Mean attendance : 3470

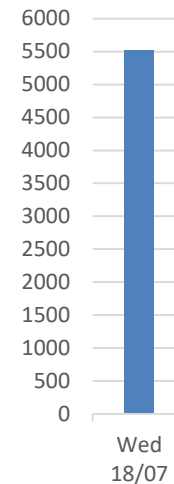


2016

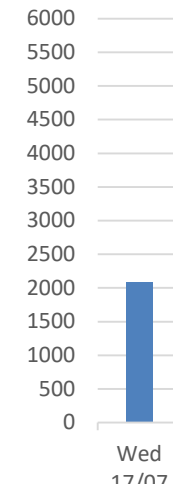
Mean attendance: 3060



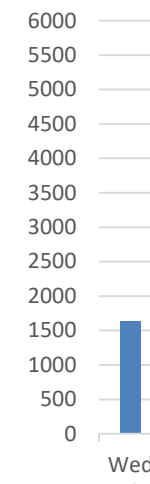
2017



2018



2019



2020

- More people after mid-July (3470) than before (2900)
- More during the week-end (3700) than during week days (2800)
- More on Wednesdays than the other days of the week

Beach attendance – how many users ?

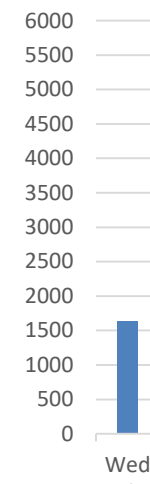
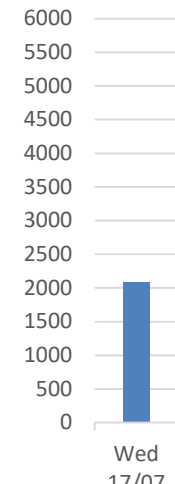
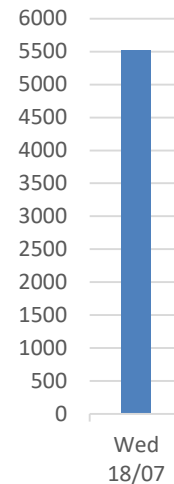
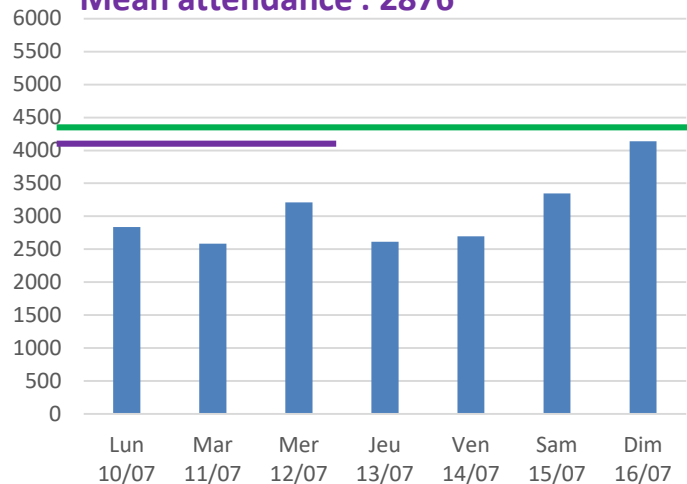
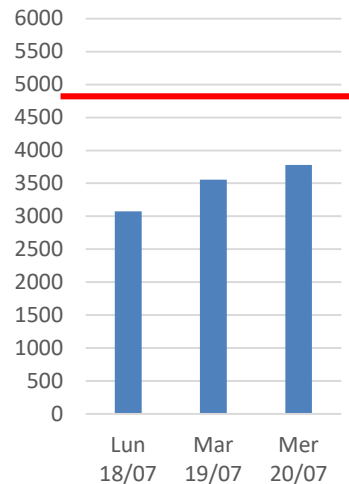
Daily entries (8 am-8 pm), between 2016 and 2020 at Le Prophète beach, Marseille

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Between 2500 and 4100 persons / day (even 5500 in 2018)

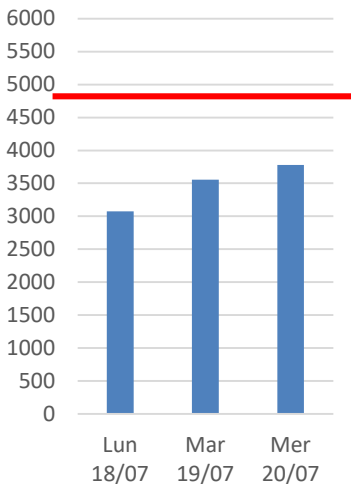
Health Services underestimate the real attendance (beach profile : 1300 users/day)

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Daily entries (8 am-8 pm), between 2016 and 2020 at Le Prophète beach, Marseille

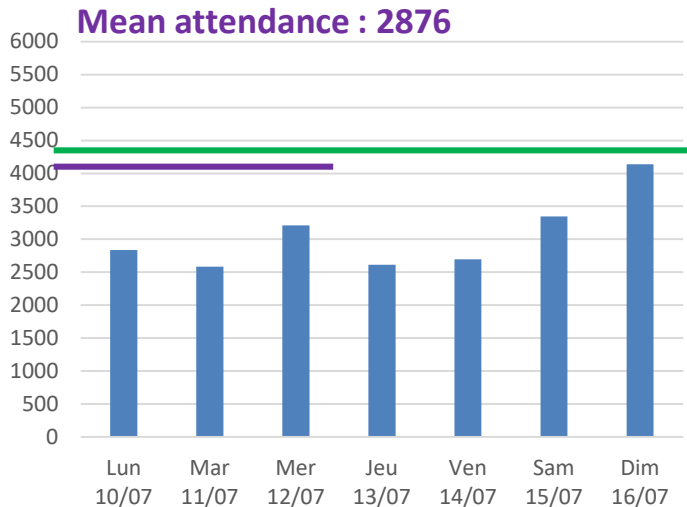
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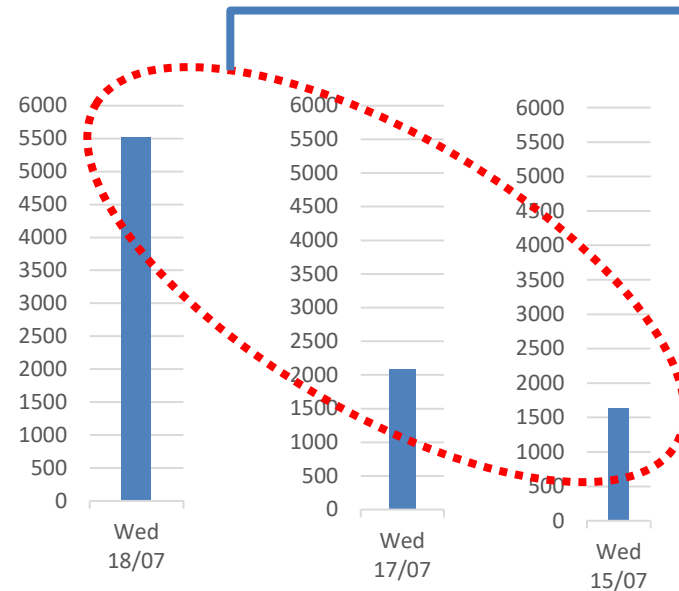


2016

Mean attendance: 3060



2017



2018

2019

2020

Strong drop in 2019 and after, due to the reduction of car parking facilities

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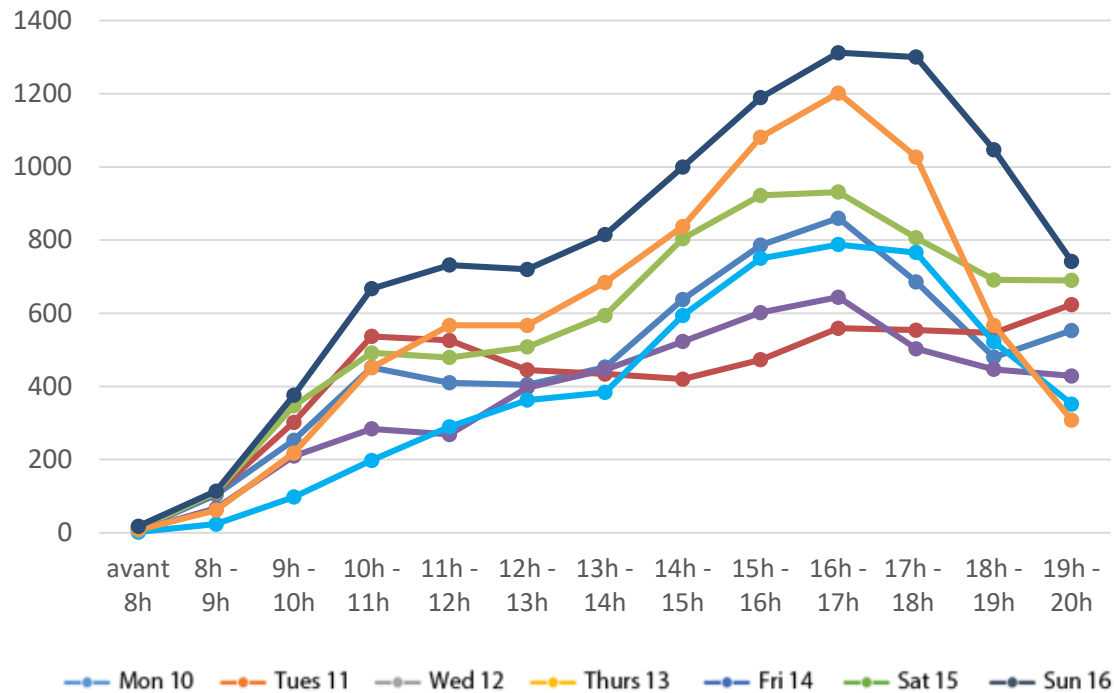
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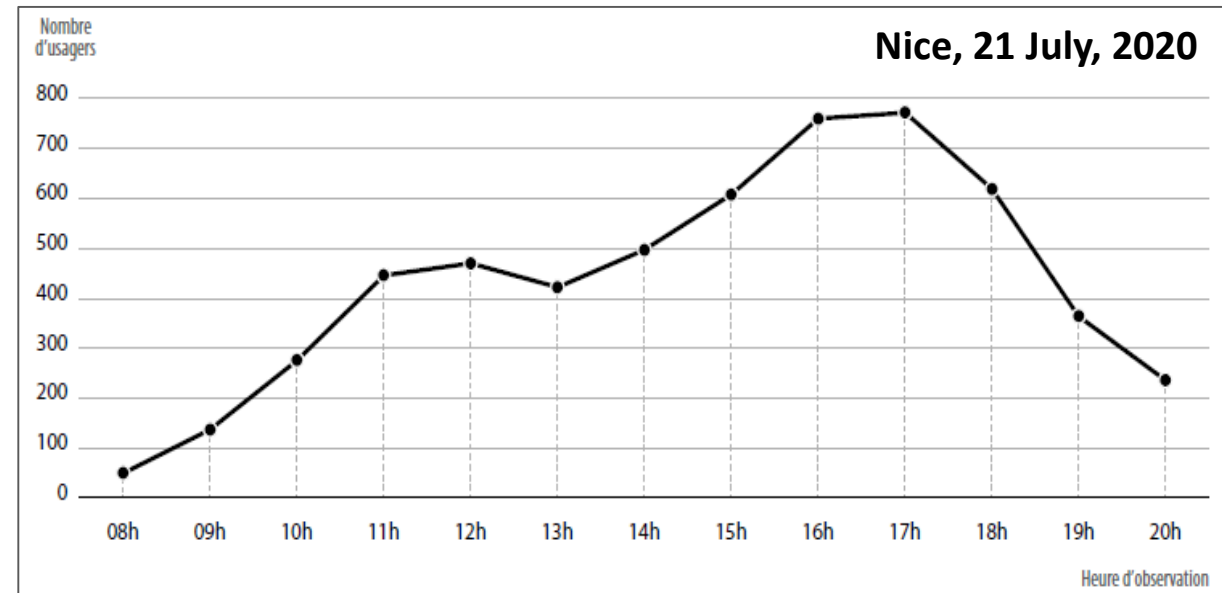
Beach attendance – hourly variations

General model with 2 pics : 11 am and 5 pm
But **variations** can be strong and frequent.

Prophète beach (10-16 July 2017)



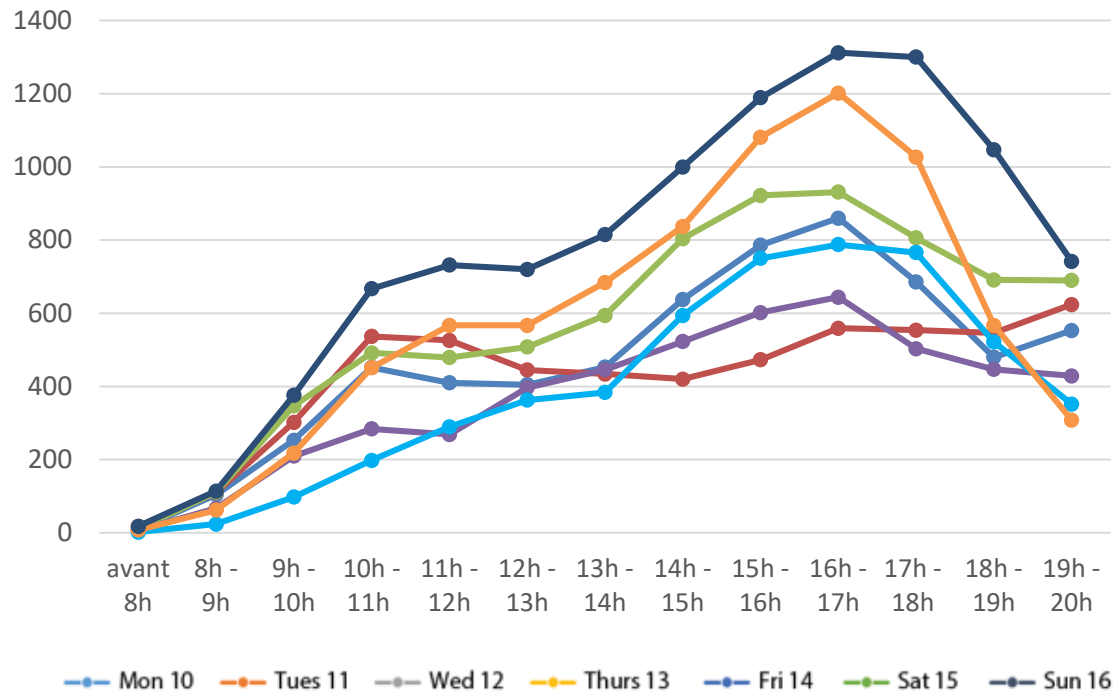
Compliant with other measurements made in other studies



Beach attendance – hourly variations

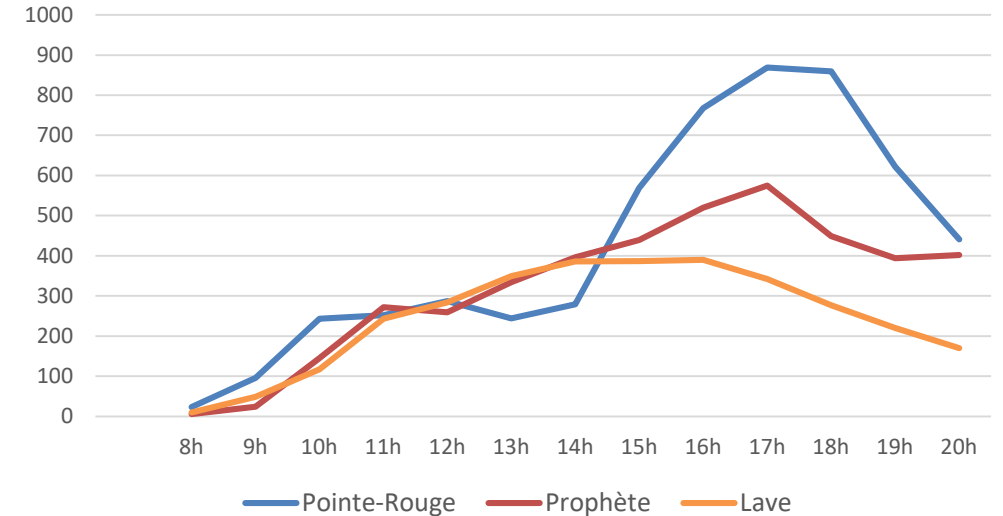
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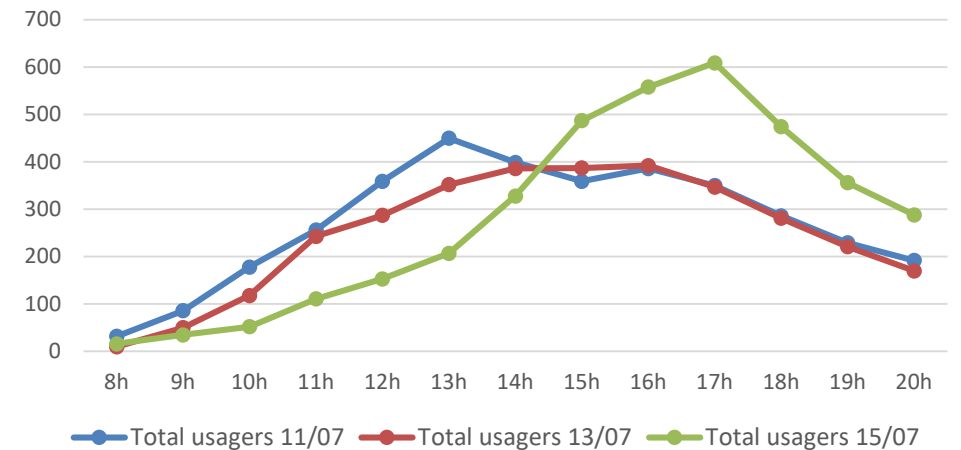


But variations within the same day, from one beach to the other

Lave, Prophète, Pointe Rouge (13 July 2017)



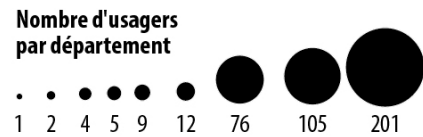
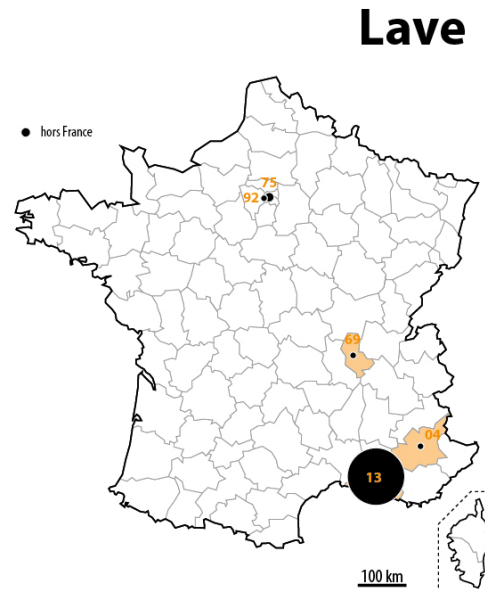
Lave beach (11, 13 and 15 July 2017)



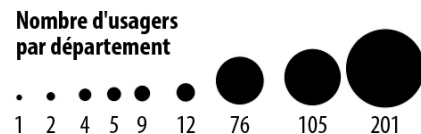
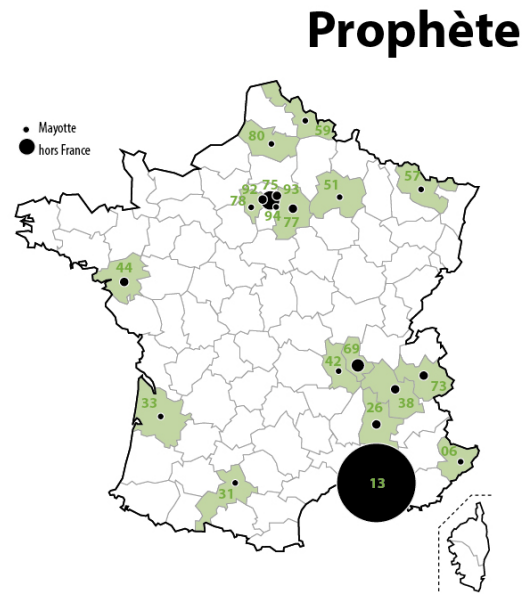
Beach attendance – who ?

More locals than tourists, particularly in the beach located in the northern district (with less middle and upper classes among residents).

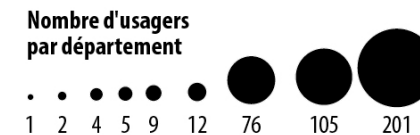
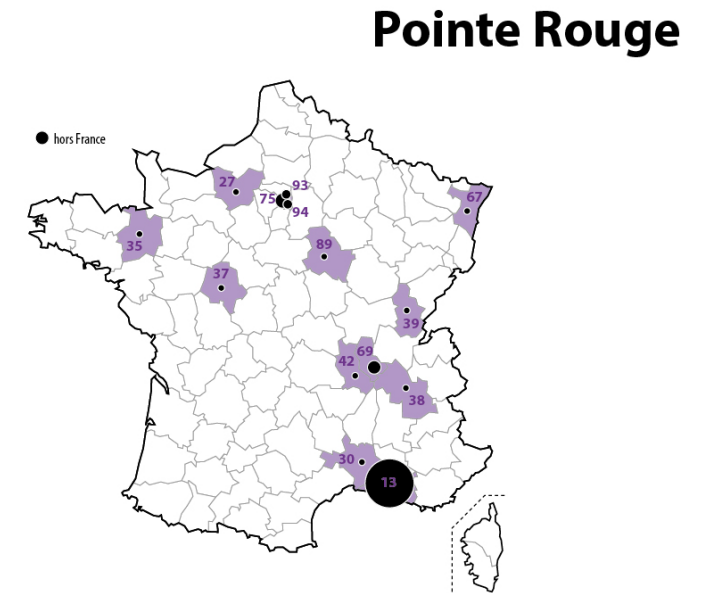
Geographical origin of people surveyed (july 2017).



Source : ESPACE, enquêtes de terrain, mai et juillet 2017



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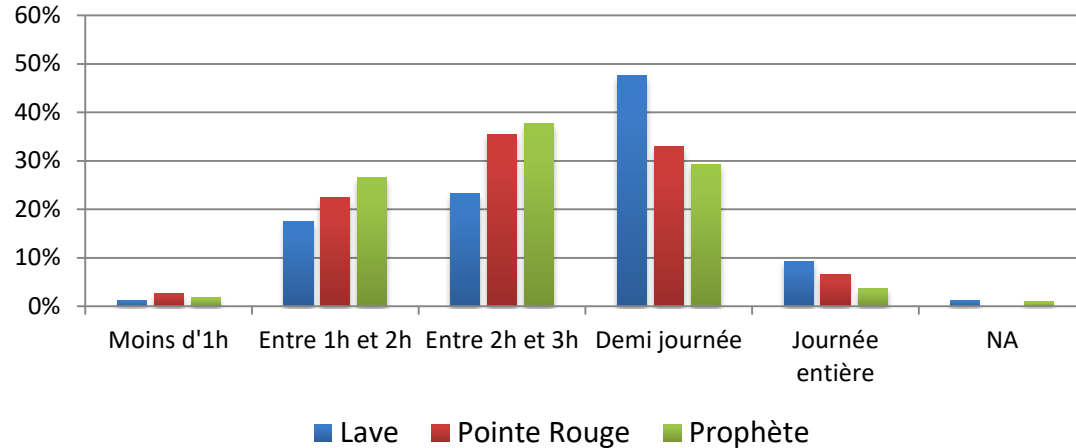


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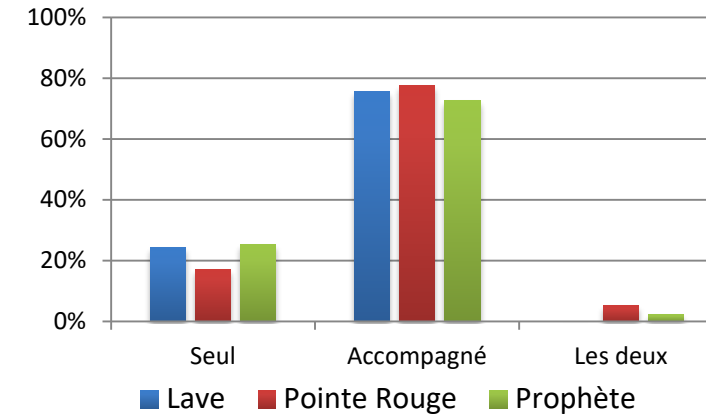
Beach practices/habits in July

People mainly come for a few hours, by car, with someone and take rarely less than 30 minutes to come.

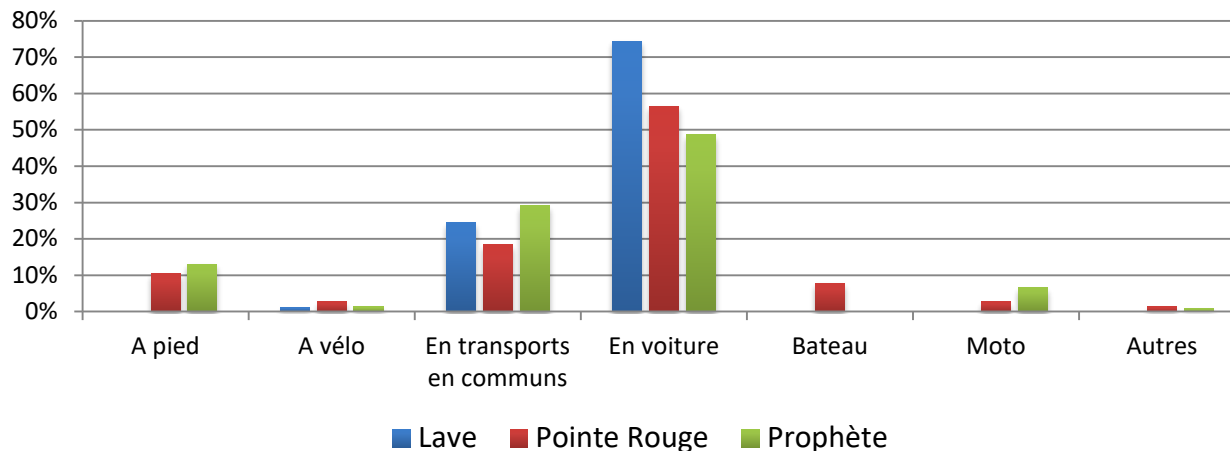
How long do you stay at the beach?



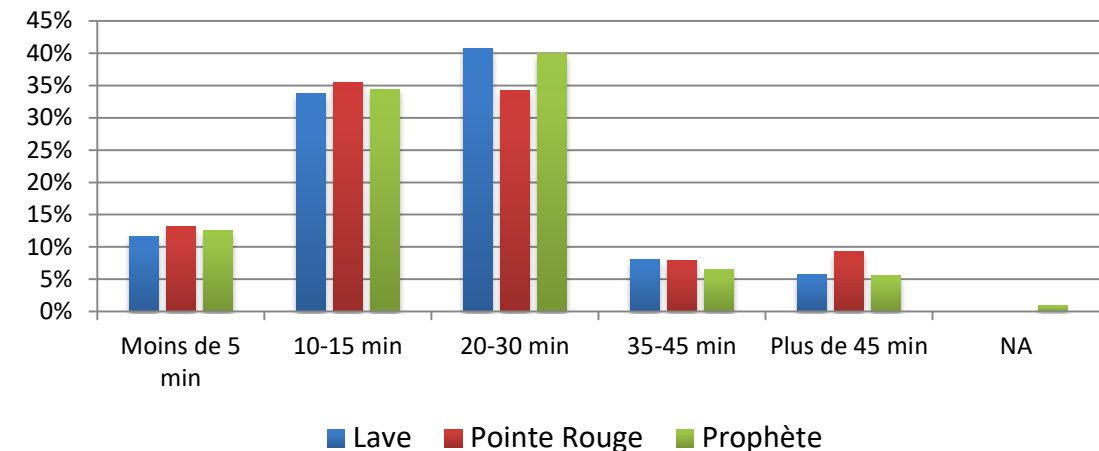
In general, do you come alone or accompanied?



Which mode of transport did you use to come here?



How much time did it take to come?



Relationship between people attendance and water quality

The hourly assessment of visitor numbers and the survey of visitor habits have enabled us to...



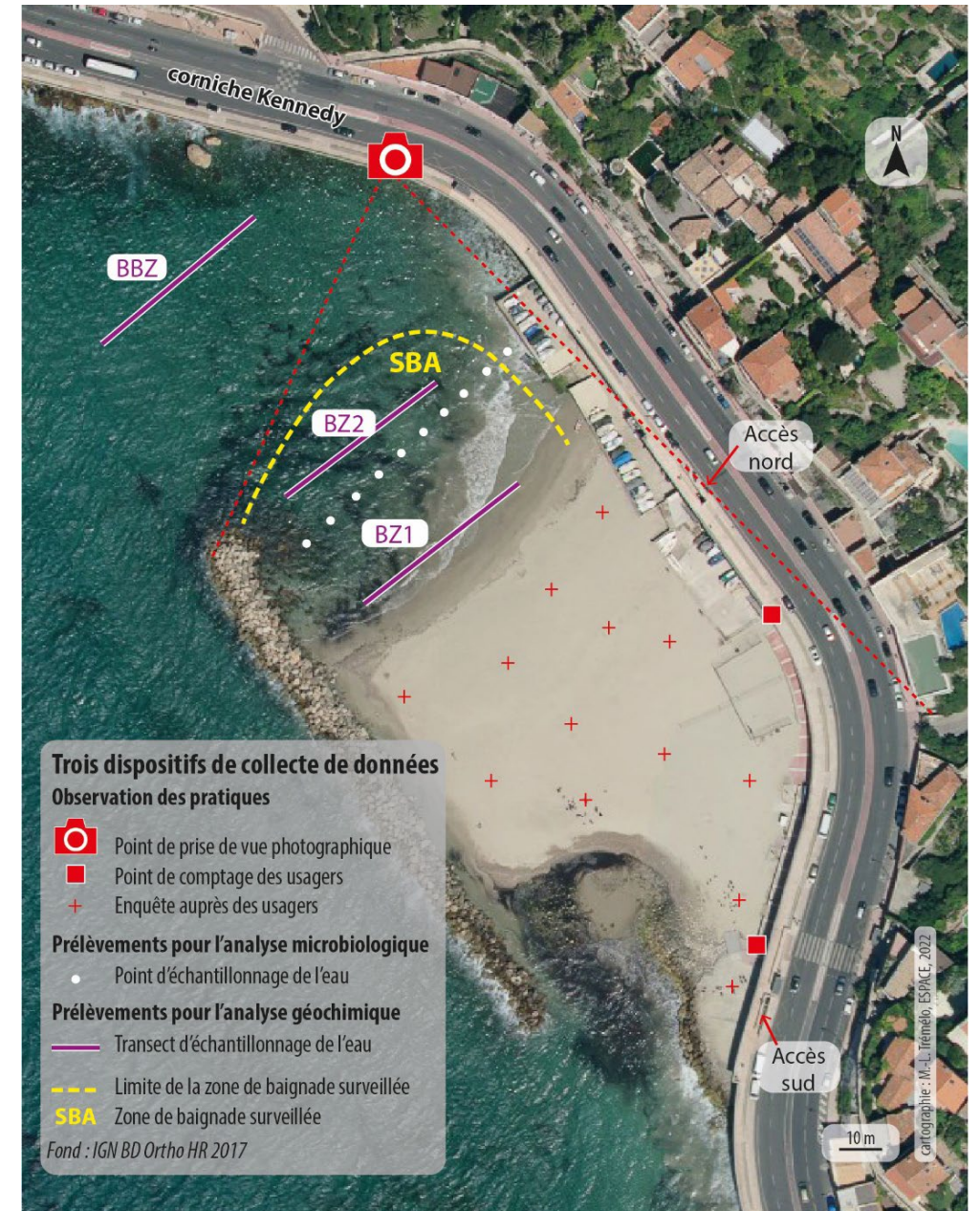
Assess sunscreen products transferred into water:

Mean mass : 50 kg of sun cream per day is likely to be discharged into the bathing water when 3,000 people visit the site daily, i.e. 1.4 t/month (Labille et al., 2020),

Mineral and organic UV filters concentrated in the bathing area (BZ1 and BZ2), mainly on the surface

Validate the hypothesis of **faecal contamination of bathing water** by a large number of bathers (Toubiana et al., 2021), consistent with users' responses concerning their use of public toilets on the beach.

Bathing water quality is measured each day in the early morning, but **microbiological contamination can exceed sanitary norms in the afternoon.**



Beach perception and COVID-19 impact on the return to the beach

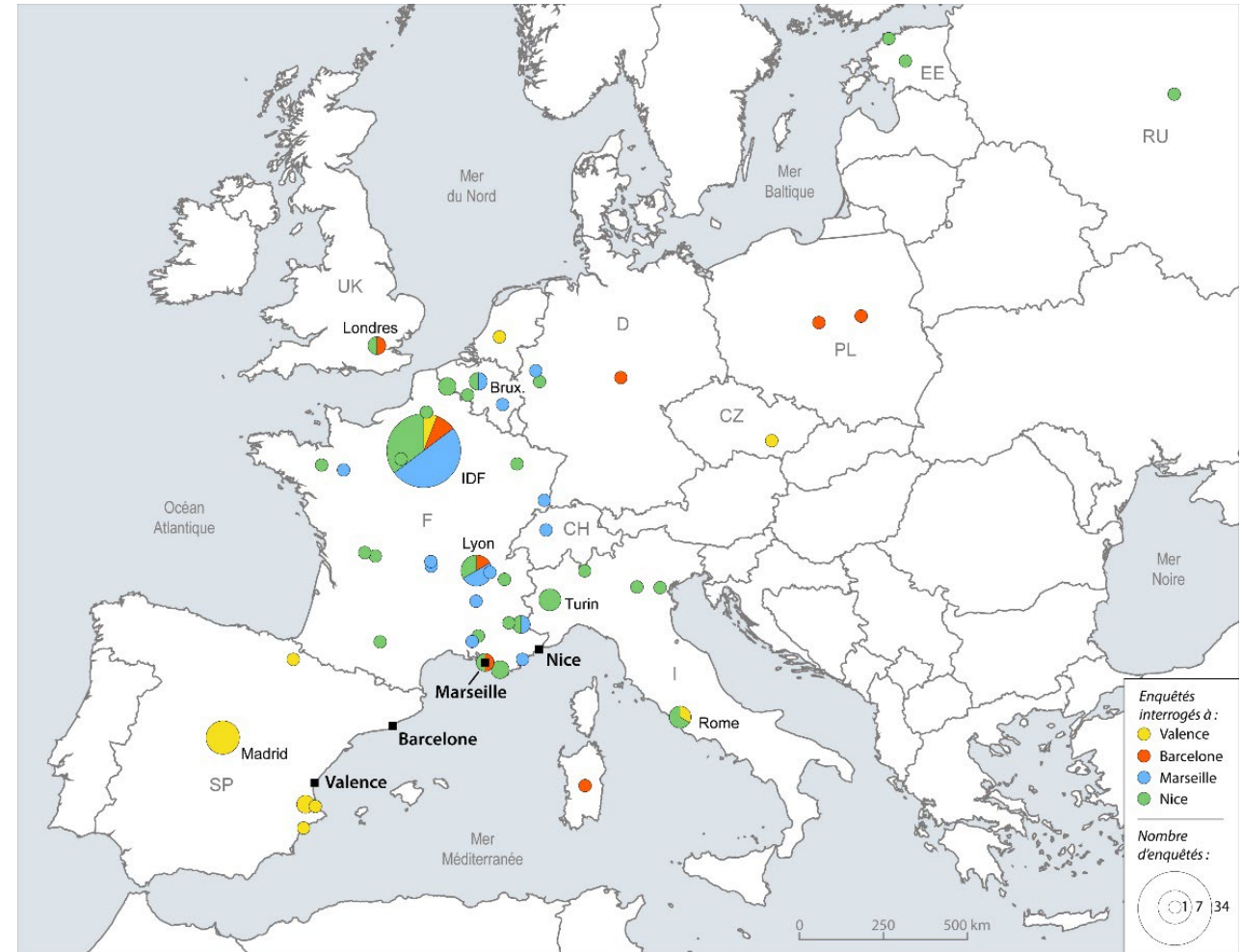
A rather positive perception

Except for cleanliness, and sometimes excessive attendance



Covid-19 impact stronger in Spain

Place of living of the non resident people surveyed in each city



**Research perspectives
and publications**

Research perspectives

Explore new topics



Epluchures beach cette semaine, après la pluie. #Marseille #déchets



23:50 - 26 nov. 2016

12 Retweets 2 J'aime

Ecological management of urban beaches (nature-based solutions)

Macro waste

Floating structures as an alternative to beach in a context of beach vanishment

Workshops with the City of Marseille



Explore beaches in other large cities

Nice



Naples



Publications

Cabioch B., Robert S., 2022. « Integrated beach management in large coastal cities. A review ». *Ocean and Coastal Management*, 217, 106019, <https://doi.org/10.1016/j.ocecoaman.2021.106019>

Labille J., Slomberg D., Catalano R., Robert S., Apers-Trémélo M.-L., Boudenne J.-L., Manasfi T., Radakovitch O., 2020. « Assessing UV filter inputs into beach waters during recreational activity: A field study of three French Mediterranean beaches from consumer survey to water analysis ». *Science of the Total Environment*, 706, pp.136010.

doi.org/10.1016/j.scitotenv.2019.136010 (hal-02414659)

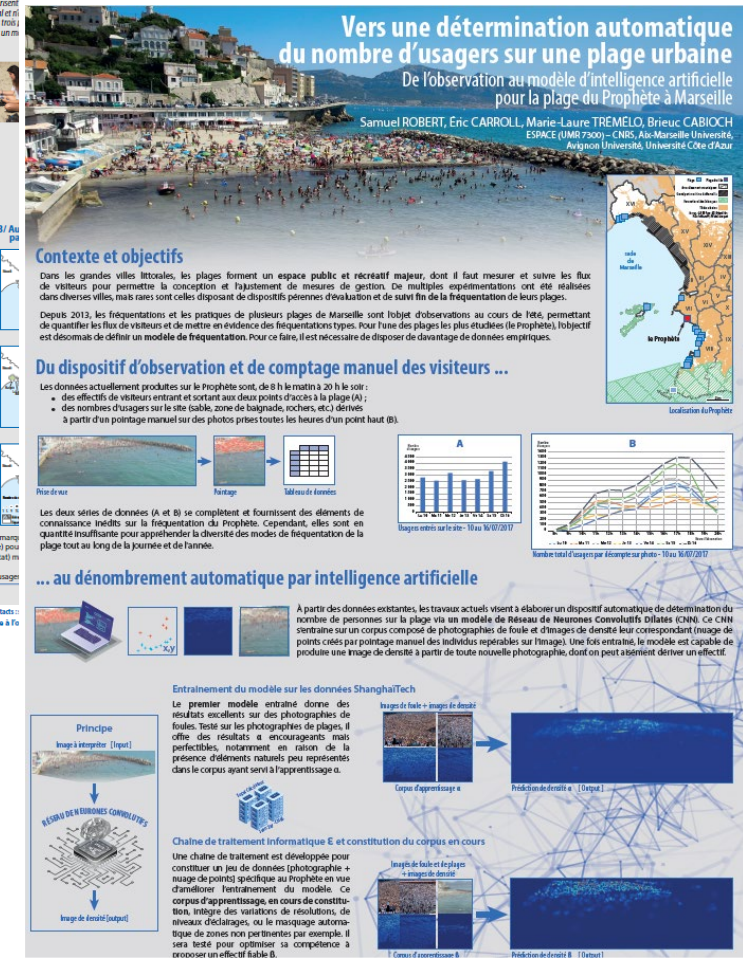
Toubiana M., Salles C., Licznar-Fajardo P., Zorogniotti I., Trémélo M.-L., Jumas-Bilak E., Robert S., Monfort P., 2021. « Monitoring Urban Beach Quality on a Summer Day : Determination of the Origin of Fecal Indicator Bacteria and Antimicrobial Resistance at Prophète Beach, Marseille (France) ». *Frontiers in Microbiology*, 12, 710346.

doi.org/10.3389/fmicb.2021.710346

Robert S., Cabioch B., Trémélo M.-L., Parès N., Carroll E., Schleyer-Lindenmann A., 2022. « COVID-19. Le retour à la plage dans quatre grandes villes méditerranéennes après le confinement du printemps 2020 : Marseille et Nice (France), Barcelone et Valence (Espagne) ». *Développement durable et territoires*. <https://doi.org/10.4000/developpementdurable.21189>

Schleyer-Lindenmann A., Mudaliar R., Rishi P., Robert S., 2021. « Climate change and adaptation to coastal risks as perceived in two major coastal cities: An exploratory study in Marseilles and Nice (France) ». *Ocean and Coastal Management*, 225, 106209.

<https://doi.org/10.1016/j.ocecoaman.2022.106209>



Thanks for your attention

***And to many colleagues
involved in this research
group***

*CEREGE : Ricardo Catalano, Jérôme Labille, Olivier Radakovitch, Danièle Slomberg
ESPACE : Briec Cabioch, Eric Carroll, Nelly Parès, Samuel Robert, Alexandra Schleyer-
Lindenmann, Marie-Laure Trémélo
HSM : Estelle Jumas-Bilak, Patricia Licznar Fajardo, Patrick Monfort, Christian Salles,
Mylène Toubiana, Marie-Georges Tournoud
LCE : Patrick Boudenne, Tarek Manasfi*

As well as many Master students.

Plage des Catalans, Marseille

