Microbiological quality of bathing waters versus sanitary regulation and beach users practices. A case study in Marseilles

Marie-George Tournoud, Samuel Robert, Mylène Toubiana, Marie-Laure Trémélo, Patrick Monfort, Christian Salles

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Microbiological quality of bathing waters versus sanitary regulation and beach users practices. 
*A case study in Marseilles*
TOUROUMI Marie-George1,2, ROBERT Samuel2, TOUBIANA Mylène3, SALLES Christian4, APERS-TREMELO Marie-Laure4, MONFORT Patrick4

1 HSM, Univ Montpellier, CNRS, IRD, Montpellier, France.
2 ESPACE, Aix Marseille Université, Université Côte d’Azur, Avignon Université, UMR 7300, Avignon, France.

- Urban beaches are social and ecological coastal interfaces facing up human and environmental challenges, such as allowing bathing activities free from sanitary issues.
- In France, according to the EC Bathing Water Directive (2006/7/EC), the quality of bathing waters is monitored by the Regional Health Agencies (ARS). Water is sampled once a week during the bathing season, the result is available 24 hours later. In case of insufficient quality, local authorities are in charge of deciding to prohibit bathing.
- In Marseilles, a municipal monitoring of the bathing waters is organized on a daily basis, with a sample made at 5 AM. Though a non-standardized method is used to assess the microbiological quality, the result is available in 2 hours, making thus possible to take a faster decision.

### In-situ co-observations + three co-designed field protocols

**Bathing water quality**
- hourly water sampling
- fecal indicators quantification

**Users’ practices**
- questionnaires
- statistical analysis

**Beach attendance**
- counting beach users
- incoming-outgoing users

### Quality of bathing waters versus number of users

**Prophète beach**
- There is no obvious link between fecal contamination and number of users,
- high bacteria levels are observed on the early hours of the day, but, for some days, the peak of attendance matches with high bacterial levels.

**Pointe Rouge beach**
- Bathing is prohibited despite of a GOOD bacteriological quality

**Lave beach**
- Bathing is allowed despite of a BAD bacteriological quality

Despite of significant efforts to manage wastewater and treated effluents, the urban beaches of a large city such as Marseilles are subject to diffuse contaminations requiring a more suitable sanitary control of bathing waters. The results of the survey of bathers on the use of toilets allow us to say that users themselves could contribute to these contaminations.

Monitoring bathing water quality requires a fine understanding of the temporal variability of contaminants. Moreover it needs to be related to the users practices and better explained.