Tsunami Risk Perception in Southern Italy
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Why making a research on tsunami’s risk perception and understanding?

- To collect data on citizens’ knowledge and characterization of tsunamis;

- To assess how citizens perceive and understand tsunamis and investigate their related mental models;

- To identify the most appropriate messages and channels to spread risk communication and alert messages;

- To improve communication strategies and their effectiveness through different channels.

- To study the differences in tsunami risk perception for coastal areas and understand how the environmental, social and psychological (and memory) context can influence it.
About risk perception studies

Studies of risk perception examine the opinions people express when they are asked to characterize and evaluate hazardous activities and technologies.

This research aims to aid risk analysis and societal decision making by:

- improving methods for eliciting opinions about risk,
- providing a basis for understanding and anticipating public responses to hazards
- Improving the communication of risk information among laypeople, technical experts, and policy makers.


Perception is not simple knowledge of risk
“Studies of risk perception examine the judgments people make when they are asked to characterize and evaluate hazardous activities and technologies”.

**These judgments almost never depend on real risk.**

However, perception is for humans the first fundamental step to know reality and to know and evaluate risk.
The first phase of the survey

Tsunami risk perception in southern Italy: first evidence from a sample survey

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Abstract. The Italian Tsunami Alert Centre of the Istituto Nazionale di Geofisica e Vulcanologia (Centro di Allerta Tsunami, hereinafter CATINGV) supported a computer-assisted telephone interview (CATI) survey to investigate tsunami risk perception in two pilot regions of southern Italy. The survey was carried out on a stratified sample of 1831 interviews representing about 3.2 million people living in 183 coastal municipalities of the two regions, namely Calabria and Apulia. The main goal of this research is to verify whether and how people’s perception of tsunami hazard compares to the results of PTHA – probabilistic tsunami hazard assessment (TIPMAPS-INGV project; Basili et al., 2018).

As shown by the results of this study, both investigated regions are characterized by high tsunami hazard. Notwithstanding, the long return time of such events could lead people to consider the occurrence of a tsunami in the Mediterranean Sea to be very unlikely.

The survey results reveal that people’s risk perception is low for almost half of the sample. The occurrence of a tsunami in the Mediterranean Sea is considered quite unlikely, with a clear difference between Apulia and Calabria. In the latter region the risk perception is much higher than in the former, probably due to the diverse time-elapsed since the last event. Also, belonging to different coastal areas appears to have a significant influence on the way tsunami hazard is perceived, having a stronger effect on risk characterization: the interviewees of Tyrrhenian Calabria are indeed more likely to associate tsunami risk with volcanoes than the Ionian citizens. This is coherent considering the presence of active volcanoes and related tsunami precursors in the Tyrrhenian.

Television managed as the most relevant source of knowledge for almost 80% of the sample, and the influence of media also results in the way tsunami risk is characterized. In particular, the survey showed that people’s perception and understanding of tsunami are affected by media accounts of large events, such as the 2004 tsunami and the 2011 Japan tsunami. At the same time, it is evident that the risk posed by smaller events is underestimated. Furthermore, the survey showed that the word “tsunami” occupies a different semantic space in comparison to the Italian traditional broad-cast mass media, with differences among sample strata. In other words, the same physical phenomenon would be understood in two different ways by younger, educated people and elders with a low education level. The results of this study, although limited to two regions, provide a first assessment of tsunami risk perception in Italy, also revealing important consequences for both risk communication practice and mitigation policies.

For the purpose of this paper, the term “coastal area” refers to the part of the coastline defined by both sea and regional limits, according to current geographical conventions. Tyrrhenian Calabria includes the coastal region between the municipalities of Terrina and Scilla, Ionian Calabria spans from Ragusa Calabria to Rossano Imperiale Ionian Apulia from Gioia to Cassano del Capo, and Adriatic Apulia from Otranto to Cephalonia.

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The second phase of the survey was carried out between 27 December 2019 and 8 January 2020. 614 CATI (Computer-Assisted Telephone Interviewing) telephone interviews were completed in the regions of Adriatic Molise, Adriatic and Thyrrenian Basilicata and Eastern Sicily (Ionian).

Distribution of interviews:

- **First survey municipalities 2018**: 1021 interviews in 183 coastal municipalities
- **Second survey municipalities 2020**: 614 interviews in 37 coastal municipalities
Stratification variables: Gender and Age

### Reference Universe

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Tsunami risk perception in southern Italy

In the Mediterranean Sea, the possibility of a tsunami is:

- Likely: 42.20% (Adriatic), 45.30% (Ionian), 62.00% (Thyrrenian)
- Neither likely nor unlikely: 10.50% (Adriatic), 8.60% (Ionian), 8.00% (Thyrrenian)
- Unlikely: 29.50% (Adriatic), 47.40% (Ionian), 62.00% (Thyrrenian)

The graph is clear, in southern Italy the perception of tsunami risk is low. It is possible to observe two interesting information detected in the Adriatic coast, where the perception is very low due to the loss of historical memory and the events that occurred in the remote past, even if damaging. The high level of perception of tsunami risk in the Tyrrenian coast is associated with the presence of active volcanoes in the sea (e.g. Marsili), the 2002 Stromboli tsunami and the historical memory of the 1908 tsunami (Messina and Reggio Calabria).
Tsunami risk perception in 1908 tsunami areas

Are the citizens living today in the coastal areas that were hit by the Tsunami generated by the earthquake in 1908, aware that they live in tsunami-prone areas?

Risk perception in coastal areas hit by the 1908 tsunami

51% of respondents living today in coastal areas affected by the 1908 tsunami are aware that they live in an area at risk. It can be seen in the graph that 53.8% of citizens living in coastal areas not affected by the tsunami are not aware of this risk.
Tsunami risk perception & behaviour

If you're near the coast and you feel a strong earthquake, will you run to the beach?

Tsunami awareness indicator

In the graph are represented respectively: in the "X" axis the perception of the tsunami risk in the area where you live and, in the "Y" axis, the answer to the above question. The result shows that those who have a better perception of tsunami risk also have a greater knowledge of the phenomenon. Those who have a low perception of risk, on the other hand, would not behave correctly in case of danger.
- **Tv** is the most relevant source of information on tsunamis: almost **90%** of interviewees rely on **Tv news**.
- There is a considerable gap with respect to other sources.
- Institutional and scientific sources are used only by few.
Causes of Tsunamis by coastal area

- **Earthquakes** are seen as a cause of tsunamis by over 70% of the sample, with slight differences between different coastal areas.
- People living on **Tyrrhenian coast** are more likely to mention **volcanic eruptions**.
- As an hypothesis, it may depend on Stromboli eruption in 2002 along with rumors on a catastrophic eruption of Mount Marsili.
People perceive in a different way the Japanese word “tsunami” and the word “maremoto” from spoken Italian.

- These two words are associated with two different mental models, in which given features are differently recalled and combined together.
- The idea of “big wave” is strongly associated with the word tsunami and, the word “earthquake” is mentioned as the main feature of maremoto.
Conclusion

The two phases of the survey enhance the starting hypotheses:

- The perception of tsunami risk in southern Italy is low and there is no knowledge of the phenomenon.

- The coastal areas affected by the tsunami of 1908 (Tsunami of Messina and Reggio Calabria), preserve a bit the memory of the event.

- The Tyrrhenian coastal areas reveal a greater perception of the tsunami risk induced by the fear of active submerged volcanoes, the frequent eruptions of the island of Stromboli and historical memory.

- The earthquake is seen as the major cause of tsunamis followed by volcanoes (with peaks in the Tyrrhenian areas).

- TV is confirmed as the major source of communication (87.9%).

- The word Tsunami is associated with big waves, while the word Maremoto is more related to earthquake and in the Italian ideal, more evocative of the phenomenon.