Webinar on tsunami risk perception studies

"Results of risk perception studies from ASTARTE project"

NEAM

Working Group 4

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

the NEAM region

November 9, 2022

Title: Assessment, STrategy And Risk Reduction for Tsunamis in Europe

Instrument:
FP7 – Collaborative Project

Total Cost:

7,884,882.47

EC Contribution:

5,999,677.80

Duration:

3 years (2013-2016)

Start Date:

01 November 2013

Consortium:

26 partners, from 16 countries

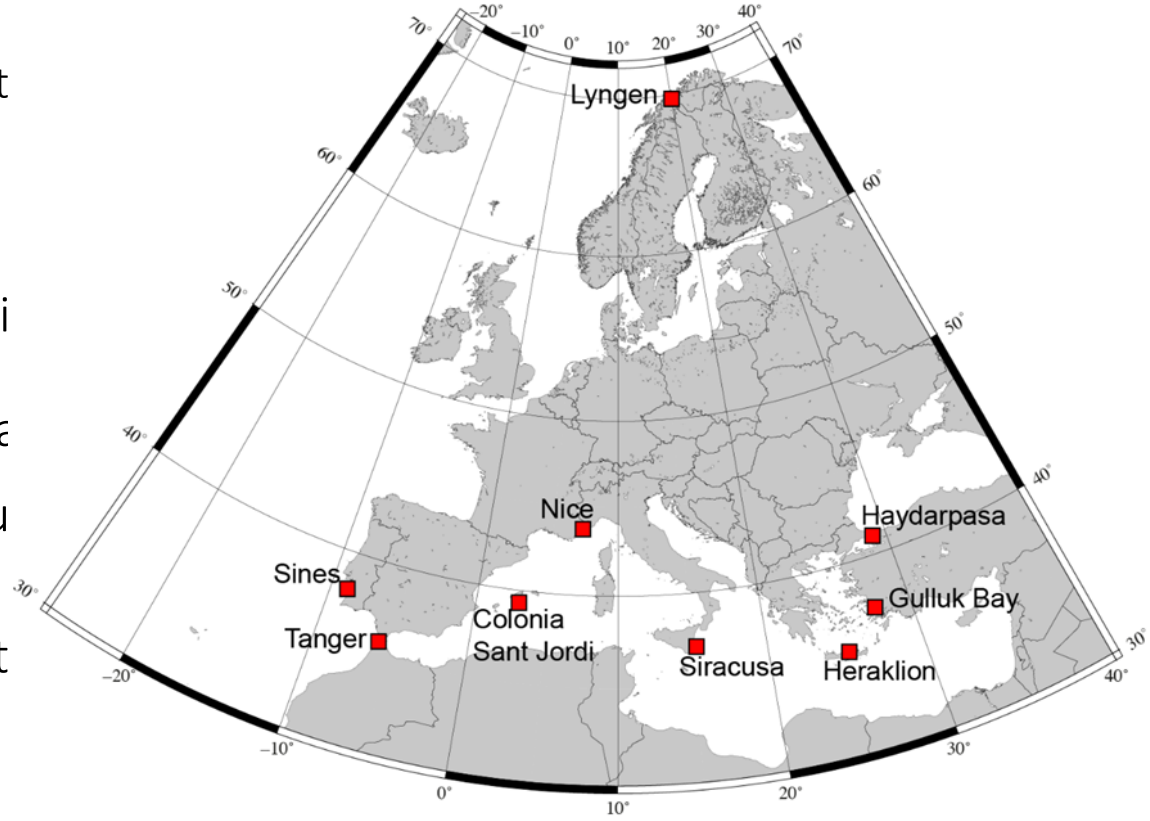
Project Partners	Country
INSTITUTO PORTUGUES DO MAR E DA ATMOSFERA	PT
FUNDACAO DA FACULDADE DE CIENCIAS DA UNIVERSIDADE DE LISBOA	PT
MIDDLE EAST TECHNICAL UNIVERSITY	TR (TURKEY)
BOGAZICI UNIVERSITESI	TR (TURKEY)
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	FR
ALMA MATER STUDIORUM-UNIVERSITA DI BOLOGNA E VULCANOLOGIA	IT
ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA	IT
UNIVERSIDAD DE CANTABRIA	ES
UNIVERSITAT DE BARCELONA	ES
TECHNICAL UNIVERSITY OF CRETE	GR
NATIONAL OBSERVATORY OF ATHENS	GR
UNIVERSITAET HAMBURG	DE
HELMHOLTZ-ZENTRUM POTSDAM DEUTSCHES GEOFORSCHUNGSZENTRUM	DE
UNIVERSITAET BREMEN	DE
STIFTELSEN NORGES GEOTEKNISKE INSTITUTT	NO (NORWAY)
UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND	IE
NATURAL ENVIRONMENT RESEARCH COUNCIL	GB
DANMARKS TEKNISKE UNIVERSITET	DK
NSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA PAMANTULUI	RO
SPECIAL RESEARCH BUREAU FOR AUTOMATION OF MARINE RESEARCHES FAR EAST BRANCH RUSSIAN ACADEMY OF SCIENCE	RU (RUSSIAN FEDERATION)
CENTRE NATIONAL POUR LA RECHERCHE SCIENTIFIQUE ET TECHNIQUE	MO (MOROCCO)
U.S. DEPARTMENT OF COMMERCE	US (UNITED STATES)
PORT AND AIRPORT RESEARCH INSTITUTE	JP (JAPAN)
UNIVERSITY OF SOUTHERN CALIFORNIA	US (UNITED STATES)
UNIVERSITY OF TOKYO	JP (JAPAN)

"Results of risk perception studies from ASTARTE project"

The test sites of ASTARTE included three sites in the North East Atlantic Ocean and six in the Mediterranean Sea.

Test sites in the Mediterranean Sea: Colònia Sant Jordi, a tourist spot in the Balearics Islands, Spain;

- The locations in the Atlantic included Lyngen, a fjord-based community in Norway; Sines, an industrial harbor i the Portuguese coast; and Tangier, a tourist area and commercial port in Morocco besides the Strait of Gibralta
- The tourist area and airport of Nice-Antibes in Cote d'Azu France;
- The cities of Siracusa and Heraklion in Sicily,Italy and Cret Greece;
- In Turkey, he intensive fish farming Gulluk Bay in southwest Turkey, and Haydarpasa harbour in the Marmara Sea.



METHODS

Our database is based on a single questionnaire for all the test sites. In addition, specific questions have been added for each test site.

The questionnaire is divided in 5 topics:

- Interviewee's relation to the site (7 questions)
- Information on interviewed people (12 questions)
- Hazard knowledge/risk perception (10 questions)
- Evacuation issue (5 questions)
- Awareness of warning system, information, communication (17 questions)

This questionnaire has been translated in 5 languages: English, French, Portuguese, Spanish, Greek, Turkish, Norvegian, Italian and Russian, and will be soon translated in Romanian for a comparative study.

Table 1. Number of questionnaires per test site

Achieved

In process

Postponed

Field works have been carried out in Haydarpasa in summer 2014. Results are still in process. They will be delivered before the end of this year.
For diplomatic reasons, field works using questionnaires in Tangier and Syracusa were not possible in 2014. They are postponed in 2015 if the conditions are fulfilled.

Test site	Questionnaires
Tangier	
Sines	133
Colonia Sant Jordi	175
Nice	400
Syracusa	
Heraklion	113
Haydarpasa	112
Gulluk Bay	237
Lyngen	101

"Results of risk perception studies from ASTARTE project"

ASTARTE Project - Deliverable 9.7 - LYNGEN / NORWAY/ 2014

Report on preparedness skills, resources and attitudes within the communities

1.1. Location

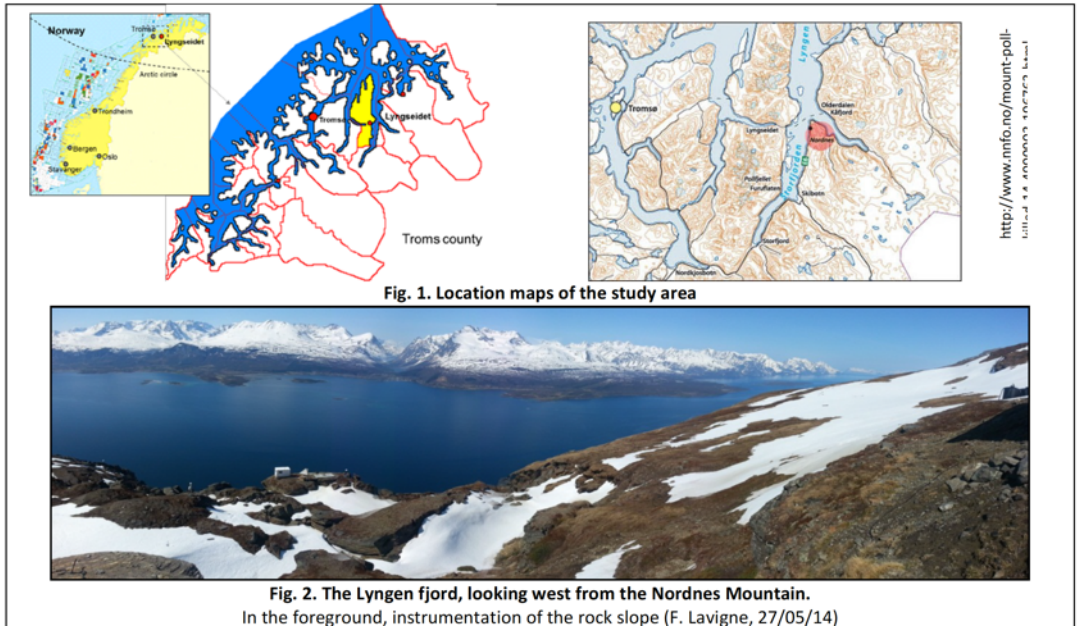


Fig. 1. Location maps of the study area

Fig. 2. The Lyngen fjord, looking west from the Nordnes Mountain.
In the foreground, instrumentation of the rock slope (F. Lavigne, 27/05/14)

The Lyngen fjord test site is located in northern Norway (69°34'38" N 20°20'58" S). The area is remote and sparsely populated compared to the other test sites, but there are several villages close to the fjord, with less than 900 inhabitants each).

The total population is 6000 (2014 census) and growing, owing to positive immigration.

1. **that the local population has a fairly clear perception of the tsunami hazard, associated with the potential rockslide from a flank of the mountain into the fjord**.
2. However, a number of local inhabitants do not know how much time is available for evacuation, and are unaware that a warning system exists or how they would evacuate.

ASTARTE Project -Deliverable 9.7– COLONIA SANT JORDI/SPAIN/2014

Report on preparedness skills, resources and attitudes within the communities

In **Colònia Sant Jordi** there is a record of in the past 2003, 1980, 1856 and 1756.

Nevertheless, **there is no memory of past tsunamis** hitting the study area, although some interviewees referred to the most recent tsunami of May 2003.

In contrast, about half of the respondents thought that **Mallorca cannot be impacted by tsunamis**, and neither report precise escape routes. Whereas a proper tsunami warning system does not exist in the study area, **people asked for education and training in order to improve their awareness**.

When comparing the answers of, **local population with tourist during high the social perception** changes depending on the survey period. Despite a rather bad knowledge of the past events – **only one of seven respondents think that Colònia Sant Jordi has already been affected by a tsunami** - the almost half of interrogated people are aware of the existence of a risk in the zone, and the majority know precursor signs.

ASTARTE Project - Deliverable 9.7 - GULLUK BAY/ TURKEY/ 2014

Report on preparedness skills, resources and attitudes within the communities

The three main hazards reported by participants that could affect Gulluk Bay are earthquakes (24.2%), fires (10.8%), and sea pollution (7.7%) (Fig.5). Tsunami is ranked only at the seventh position indicating relatively low risk compared to earthquakes.

Despite the fact inhabitants have an appropriate tsunami knowledge, tsunamis are not considered as a major hazard for Gulluk Bay.

On the other hand local problems such as fire, sea and environmental pollution, which the people directly suffer from, are potentially considered as more pronounced hazards.

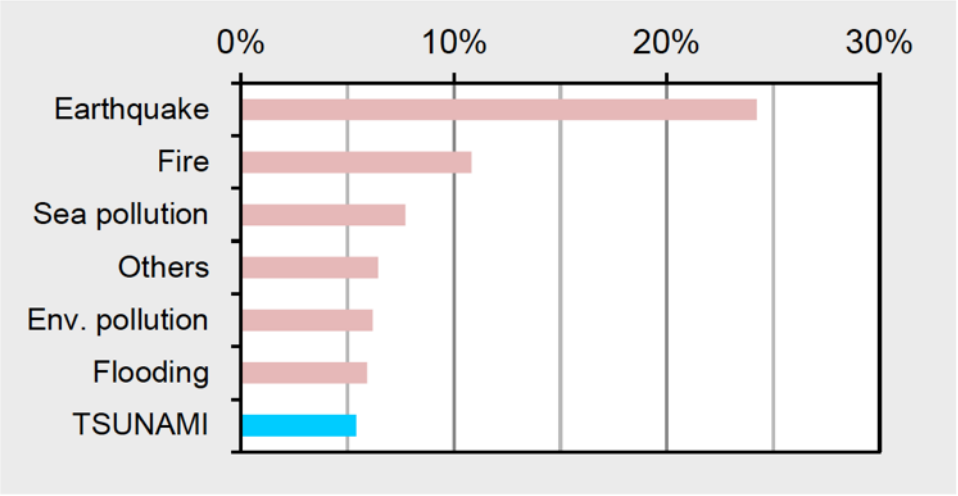


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Fig. 5. Possible hazards that could affect Gulluk Bay region
Open question, in %, ASTARTE survey, 101 answers (ASTARTE survey, open question, 237 questionnaires, 388 answers)

of 2004 and 2011, respectively. It is important to note that only 16.9% of the people heard or learned the word tsunami at the school.

ASTARTE Project - Deliverable 9.7 - SINES / PORTUGAL / 2014

Report on preparedness skills, resources and attitudes within the communities

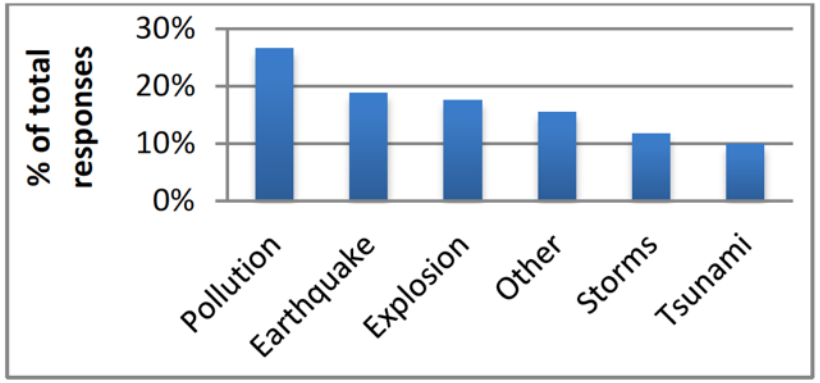


Fig. 6. Possible hazards that could affect Sines. Open question, ASTARTE survey, 133 answers.

In **Sines test site an industrial harbor in the Atlantic,** the great majority people are aware of the existence of a risk in Sines – 71.4% think that Sines could be affected by a tsunami.

Early warning systems are less well-known and local people are not well prepared for an evacuation. Indeed, the majority (66.2%) of the interviewees don't know if there is a tsunami warning system. Only a little more than a quarter (26.3%) answers that there is not – which is true because up to now there is no tsunami warning system specifically designated by authorities. NOTE: at the time the survey was completed, Portugal was still not a TSP

Among them, **the majority would prefer that this tsunami warning system uses sirens**.

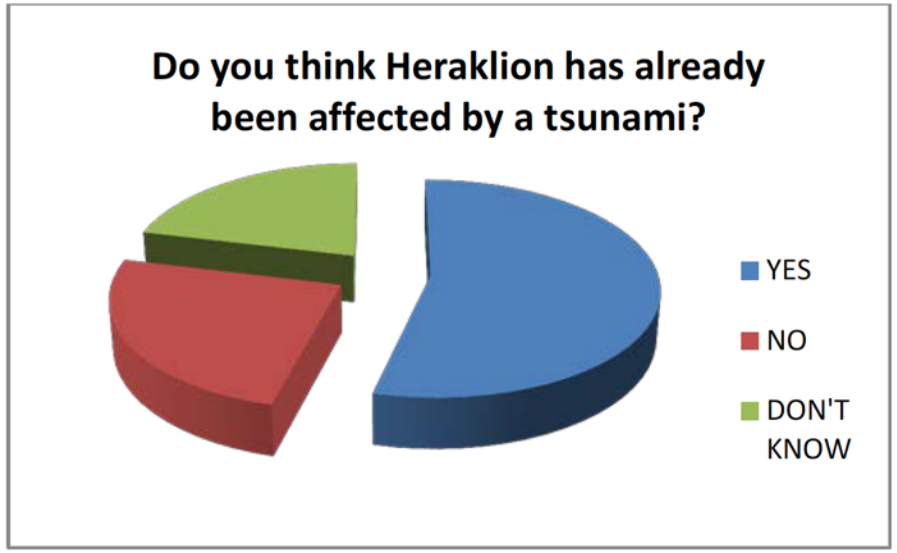
ASTARTE Project - Deliverable 9.7 – HERAKLION / GREECE / 2014

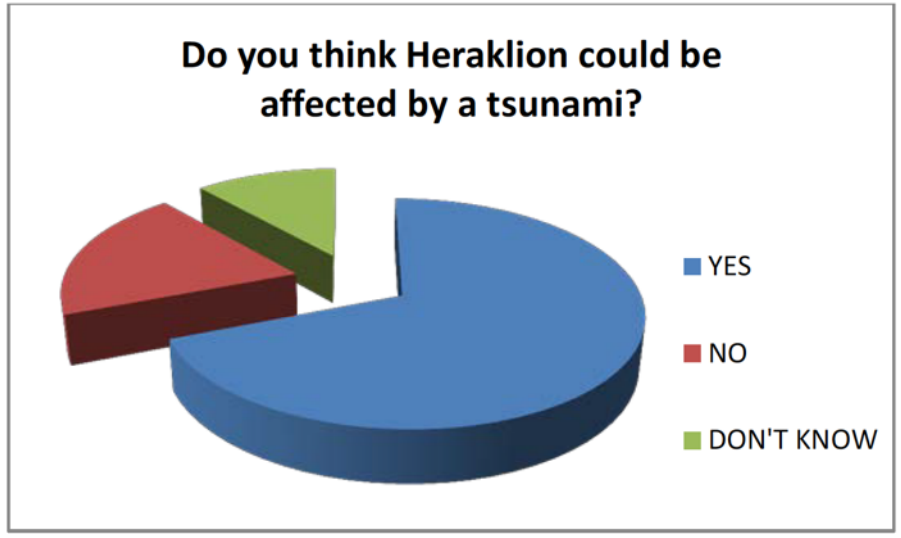
Report on preparedness skills, resources and attitudes within the communities

Here the question: “What is a tsunami?”, 46.2% gave a general answer and said that a tsunami is a big wave, 24.5% answered that it is a huge wave in the sea caused by an earthquake, 19.8% answered that it is a tidal wave and 8.5% answered that they don’t know.

The **social knowledge on tsunamis comes in a large part from TV** (32.3%) and media coverage of big events (15%).

Also, 12.3% of the respondents learned about tsunamis from school and 11.2% from internet. In the question “In your opinion, how is a tsunami created?” 71.7% answered “from earthquakes” and 12.4% answered “from volcanoes”.





ASTARTE Project - Deliverable 9.7 - NICE / FRANCE / 2014

Report on preparedness skills, resources and attitudes within the communities

Tsunamis can originate here by earthquakes from the **North-African faults** and **by submarine landslides or local coastal landslides.** On 16 October 1979, a part of a new harbor built along Nice airport collapsed situated a few km to the west of the Baie des Anges. It triggered a tsunami that killed 1 person and swept away several boats at Antibes. Effects of the tsunami were reported along 120 km of the coastline between the Levant Islands and Menton.

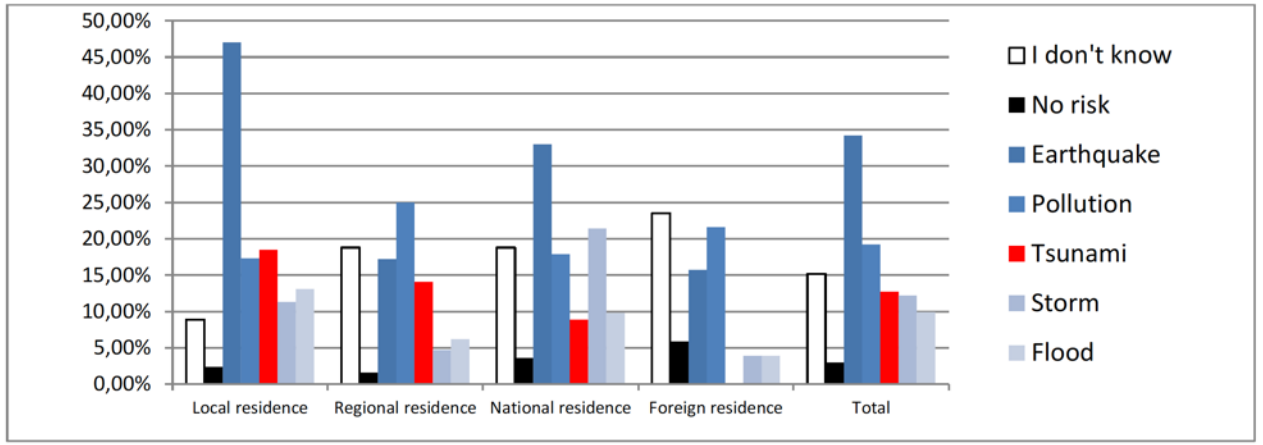


Fig. 6. Spontaneously evoked hazards that could affect Nice. (Open question, 400 answers)

IDENTIFICATION OF PERCURSORY SIGNS

In the case of **Sines**, 77% of the people interviewed know about tsunami precursor signs: sea withdrawal, earthquake, big wave and animal behaviour.

There are no important contrasts between the responses given by “local”, “regional”, “national” and “foreign” residents in this respect. Though it is important to mention that **17% of the residents and the foreign people think there are “no precursor signs” of tsunamis**. The great majority of the interviewed people (91%) would go away from the sea front if feeling an earthquake and two thirds (65.4%) if seeing a sea's withdrawal. Only a fifth (20.3%) would look for a higher site. The knowledge of those precursor signs does not necessarily mean that people adopt an adequate evacuation behaviour.

In the case of **Colonia San Jordi 75%** of inquires responded that they would go away from the sea front if they felt an earthquake and 66% if the sea level had suddenly retreat. It is interesting to indicate that almost a quarter would look for a higher site. The majority would evacuate by walking or by running and **more than a third of the respondents envisage an evacuation by car**. Almost all people declare not having planned or prepared equipment to protect themselves from a tsunami.

In the case of **Heraklion**, most of the participants interviewed consider that **earthquake** and **sea withdrawal are precursors of a tsunami**

Concluding Remarks

The highly populated shoreline with the continuous growth of tourism and economic activity increases the potential losses caused by tsunamis. Tsunami waves can reach the shore minutes after an earthquake, a volcanic eruption or a submarine-landslide. Local citizens and occasional tourists reveal a low level of tsunami aware-ness and do not recognize the natural signs of an approaching tsunami

Concluding Remarks

- This presentation **illustrates some of the results of the project**; it was not intended to be exhaustive

- Reports ASTARTE deliverable D9.7 and D10.48 can be made available to all participants in WG4 and in the NEAMTIC website

- To assess preparedness skills, resources and attitudes within the communities and among inhabitants of the ASTARTE test sites, **a single questionnaire was elaborated. A total of 1512** interviews were held in the different test sites.

- The conclusions vary **strongly** according to the environment, the different coastal communities and the different level of perception on tsunami risk and early warning systems in place.

- In future inquiries, about tsunami perception we need better data treatment otherwise it is difficult to get strong conclusions. Moreover, we should keep local language (as in ASTARTE) but more care should be put in interviewing tourists and local

- Astarte ended in 2017, since then progress has been made for the preparation and to raise awareness on tsunamis namely through the activities organized at member states on the occasion of Tsunami World Awareness Day

The author wishes to thank all contributors and colleagues that made ASTARTE a successful project!!