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Improving Tsunami Resilience in Europe — ASTARTE

ASTARTE aims:

Assessment of generation mechanisms, evaluation of uncertainties, development of new numerical and experimental techniques for propagation, coastal amplification and inundation, networking in detection and warning, and building structural and social resilience against tsunamis by 26 partners from 16 countries.

ASTARTE at the 36th IAHR World Congress in Den Haag, the Netherlands

ASTARTE was presented at the 36th International Association for Hydro-Environment Engineering and Research (IAHR) World Congress in Den Haag, the Netherlands held on 28 June – 3 July, 2015. The congress, bringing about 1400 delegates together, provided a special emphasis on cross-cutting themes related to Deltas of the Future.



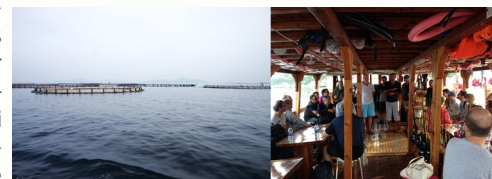
The ASTARTE presentation was made under the session "Coasts at threat in Europe" – a special one-day session jointly organized by the projects PEARL, ASTARTE, RISES-AM and RISC-KIT and coordinated by Dr. Ap van Dongeren from Deltares. The title of the ASTARTE presentation was entitled "Astarte An Fp7 Initiative on Tsunamis" (by Maria Ana Baptista and the ASTARTE Team). It was presented on June 30, 2015 by Ms. Nilay Dogulu (on behalf of the coordinator) who works at the Middle East Technical University in Ankara, Turkey — one of the partners in the ASTARTE consortium.

2nd Annual Meeting and 3rd ASTARTE General Assembly in Bodrum, Turkey

The 2nd Annual Meeting and the 3rd General Assembly of ASTARTE was held on 15 – 17 October, 2015 in Gulluk Bay (Torba, Bodrum), Turkey — one of ASTARTE's test sites. The meeting was organized by the Middle East Technical University (METU) and Boğaziçi University (BONKOERI). In the first two days representatives from partner institutions and universities presented their progress in the last one year concerning scientific achievements and field studies realized as part of various work package (WP) activities they are involved. During the meeting there was also parallel sessions for WPs which encouraged fruitful discussion on deliverables due for month 24 and future planned activities.

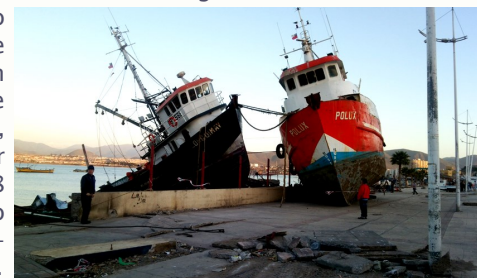


The meeting programme together with the presented abstracts can be found HERE. The meeting was honored by the attendance of the deputy governor of Muğla, Mr. Rıza Dalan. Christa Von Hillebrandt-Andrade (ICG CARIBE, NOAA Caribbean Tsunami Center), and Hitomi Murakami (Yamaguchi University, Japan) from the External Advisory Board of the project as well as Vasily Titov (NOAA – PMEL, USA) were also present at the meeting. On the last day there was a fieldtrip organized to see the aquaculture facilities in the Gulluk Bay.



Field survey following the 2015 Illapel earthquake and tsunami in Chile

Dr. Takashi Tomita, who is the Deputy Director-General of Asia-Pacific Center for Coastal Disaster Research in Port and Airport Research Institute, and other members conducted the field survey of Illapel Earthquake 2015 in Chile. The maximum inundation height was around 6 to 7 m (that was 3 to 4 m as inundation depth) in Coquimbo port. The ships were landed by tsunami and some que walls were damaged. In this area the inundation started in 30 to 40 minutes after the earthquake shock. On the other hand, in the near epicenter site, the inundation started just around 10 minutes after the shock. Although the tsunami warning alerted 8 minutes after, the most Chilean people began to evacuate in 10 minute. It indicated that the evacuation habitat was very important to save their own life. (by Taro Arikawa, Chuo University)

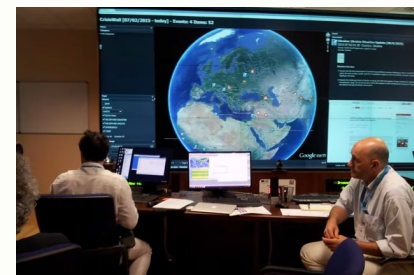


A scene showing the damage in Coquimbo Port.

WP 6 - Operational detection and communication infrastructure - Progress

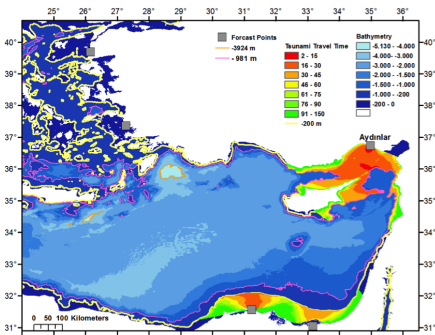
TsuComp-Tsunami Analysis and Message Dissemination Tool

TsuComp, developed by KOERI as a user-friendly interface to be used in the assessment of tsunamigenic potential and as a single-point entry for message dissemination within WP6, has been successfully demonstrated at the 6th JRC ECML Crisis Management Technology Workshop on Tsunami Decision Support Systems (TDSS-2015) held in the European Crisis Management Laboratory (ECML) of the Joint Research Centre in Ispra, Italy, from 2nd to 3rd July 2015. The purpose of the workshop was to show the status of the technology in this field, the specific requirements and the benefits in the use of one or another solution. The overall aim was to bring together stakeholders in the design, development and use of ICT tools for Decision Support in crisis room operation in order to provide hand-on experience on systems and collaboratively discuss status of the art, lessons learned, ideas for improvements and opportunities for collaboration. One of the key aspects of this event was the demonstration exercises carried out on the basis of given scenarios. The workshop evaluation pointed out the effectiveness of the tool.



Scene from the TDSS-2015 workshop where TsuComp developed by KOERI within ASTARTE-WP6 was demonstrated.

KOERI continued its work for improving TsuComp based on the further development needs identified at this event.



Identification of the capabilities and the limitations of HF Radar technology for the purpose of tsunami detection in the Eastern Mediterranean, Aegean and Black Seas

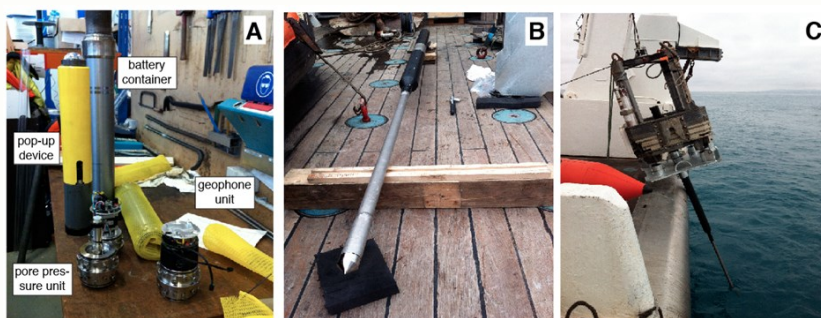
A technical review document providing an assessment of the HF Radar technology with special focus on its possible use within a Tsunami Warning System in the central and eastern Mediterranean, including the Aegean Sea and the Black Sea, have been provided internally to WP6 by KOERI. This document also aims to identify capabilities and the limitations of HF Radar technology for the purpose of tsunami detection and clarify the maturity and the applicability of these systems for the possible use under the Tsunami Warning Systems and includes analysis of possible appropriate locations of the measurement systems to be deployed/installed in the future.

Tsunami travel (warning) times at assumed HF Radar sites (grey square) at selected focal points inside 300 km radar range.

Deployment of the MeBo prototype observatory at the Ligurian site, France

The Nice Slope, situated in the French part of the Ligurian Margin, represents a landslide-prone area where mass wasting followed by a tsunami caused damage and casualties in 1979. For several years, ASTARTE partners IFREMER Brest and MARUM Bremen have installed a multi-instrument array including multi-level piezometers, tilt-meter and an osmotically driven fluid sampling-lance to distinguish between the potential drivers of the slope failure, such as groundwater charging, seismicity, sediment weakening, human impact, etc.

During the most recent cruise to maintain and refine the long-term observatory, MARUM has installed a prototype of a multi-parameter observatory with alert capability, which was developed in the framework of the ASTARTE project. The deployment and use of several such systems is envisaged for the ASTARTE cruise with German RV Merian, where the Me-Bo seafloor drill will be used in the NE Atlantic and western Mediterranean Sea in the near future.



The cylindrical MeBo observatory: (A) when being assembled prior to deployment, (B) on deck (covered in black shrink wrap) with a conical lance mounted to the front for test deployment, and (C) when attached to a weight stack to get the probe into the seafloor.

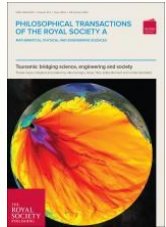
Announcements

ASTARTE is on social media! You can follow our Facebook page and join the LinkedIn group from the links <https://www.facebook.com/astartefp7> and <https://www.linkedin.com/groups/ASTARTE-8162283>, respectively.



A new thematic issue by *Phil. Trans. R. Soc. A*: "Tsunamis: Bridging science, engineering and society"

Philosophical Transactions of the Royal Society A: Mathematical, Physical & Engineering Sciences has recently published a new themed issue on tsunamis: "Tsunamis: Bridging Science, Engineering and Society". Edited by Utku Kânoğlu, Vasily Titov, Eddie Bernard and Costas Synolakis this theme issue brings together 14 key papers summarizing recent developments in the science of tsunamis. It describes the state of the art methodologies, standards for warnings while highlighting recent advances in basic understanding, and identifying cross-disciplinary challenges. The main objective behind publication of such a themed issue is to gain in wisdom and progress towards effective hazard mitigation, and to bridge science, engineering and society to help build up coastal resilience and reduce losses. More information can be found [here](#). The papers authored by ASTARTE researchers are listed in Publications section on the next page.



IOC-UNESCO-ISESCO Workshop on Improving Tsunami Warning and Emergency Response in the NEAM (Rabat, Morocco)

The Intergovernmental Oceanographic Commission (IOC) of UNESCO together with the Islamic Educational, Scientific and Cultural Organization (ISESCO), the UNESCO for the Maghreb based in Rabat, and the Centre National pour la Recherche Scientifique et Technique of Morocco, organized a in Rabat, Morocco, on 23 and 24 September 2014 a workshop entitled "Improving Tsunami Warning and Emergency Response in the North-Eastern Atlantic, Mediterranean and Connected Seas". The aim of this workshop is to present recent developments on Tsunami Early Warning and Mitigation Systems in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS) and prepare for the next tsunami exercise, NEAMWave 14, which took place in October 28 to 30, 2014.



The workshop was organized in three sessions: (i) Tsunami Early Warning Systems – design and operation; (ii) the exercise NEAMWave 14; and (iii) Communicating the tsunami risk in the Mediterranean and North-Eastern Atlantic. Several presentations that related the ASTARTE experience, were given in this workshop by ASTARTE figures who participated in animating this workshop. Such presentations are:

- The governance, the status and the architecture of the tsunami warning system in the NEAM (North-Eastern Atlantic, Mediterranean and connected seas) region: Ahmet Ahmet Yalciner, Chair of the ICG/NEAMTWS;
- Tsunami Risk Assessment: the approach of the ASTARTE project: Stefano Tinti, University of Bologna and co-chair of the ICG/NEAMTWS Working Group 4;
- Tsunami Watch Operations: Öcal Necmioğlu, Kandilli Observatory and Earthquake Research Institute;
- Set-up of a national tsunami warning system in Morocco: recent developments: Abdelouahed Birouk, CNRST, Rabat, Morocco;
- CNRST contribution for the tsunami hazard and vulnerability assessment in Morocco: Sabah Bencheckroune, CNRST, Rabat, Morocco

What is going on?

- June 21-26, 2015** 4th Tsunami and Safety Symposium at the 25th International Ocean and Polar Engineering Conference (ISOPE-2015) in Kona, Big Island, Hawaii (<http://www.isopec.org>)
- Oct 15-17, 2015** The 2nd ASTARTE General Assembly and 3rd SSC Meeting of ASTARTE in Gulluk Bay, Turkey
- Nov 1-4, 2015** 7th international symposium on Submarine Mass Movements and Their Consequences (ISSMMTC) 2015 in Wellington, New Zealand ([official website link](#))
- Nov 1-4, 2015** USA Geological Society of America annual meeting in Baltimore, Maryland, USA (<http://community.geosociety.org/gsa2015/home>)
- Dec 14-18, 2015** American Geophysical Union (AGU) Fall Meeting 2015 in San Francisco, California, USA (<http://fallmeeting.agu.org/2015/>)

Upcoming Events

- Feb 21-26, 2016** Ocean Sciences 2016: ASLO-AGU-TOS The 2016 Ocean Sciences Meeting, in New Orleans, Louisiana, USA (<http://osm.agu.org/2016/>)
- April 20-22, 2016** Seismological Society of America (SSA) Annual Meeting in Reno, Nevada, U.S.A. (<http://www.seismosoc.org/meetings/ssa2016/>)
- July 17-22, 2016** 35th International Conference on Coastal Engineering (ICCE 2016) in Istanbul, Turkey (<http://www.icce2016.com/en/>)
- July 31-August 5, 2016** Asia Oceania Geosciences Society (AOGS) 13th Annual Meeting in Beijing, China (<http://www.asiaoceania.org/aogs2016/>)
- Oct 17-21, 2016** 3rd European Conference on Flood Risk Management in Lyon, France (<http://floodrisk2016.net/>)

All ASTARTE presentations (or abstracts) can be found at: <http://www.astarte-project.eu>

Project deliverables

Deliverable No	Deliverable title	WP	Delivery date	Partner in charge
D2.15	Rates of activity of the seismogenic structures	2	Month 24 (Dec 2015)	IPMA
D3.16	GIS database of risk-driving offshore active faults, tsunamigenic landslides, eruptive volcanoes, and their parameters	3	Month 24 (Dec 2015)	CNRS
D3.17	Statistical analysis of the frequency and timing (relative to sea level and eruptions) of flank collapses in the Canary Islands and other locations	3	Month 24 (Dec 2015)	NERC
D4.18	Complex multi-scale ocean-to-shore tsunami model	4	Month 24 (Dec 2015)	CEA
D4.19	Reports and modelling strategies for complex tsunami processes	4	Month 24 (Dec 2015)	CNRS
D4.20	Suite of new simple to complex benchmark problems	4	Month 24 (Dec 2015)	METU
D5.21	Experimental benchmarks of tsunami and coastal structures from flume experiments	5	Month 24 (Dec 2015)	UC
D5.22	Recommendations on cost effective solutions and mitigation measures to reduce adverse effects and increase resilience in post tsunami harbor operations	5	Month 24 (Dec 2015)	METU
D6.23	Report on the integration of available oceanography/meteorology data into NEAMTWS	6	Month 24 (Dec 2015)	FFCUL
D6.24	Preparation of the Mediterranean source database and evaluation of tsunamigenic potential of individual sources in the Mediterranean and North-east Atlantic	6	Month 24 (Dec 2015)	GFZ
D7.25	Source evaluation capabilities in the NEAM region	7	Month 24 (Dec 2015)	CEA
D7.26	New products for TWS proposed by Civil Protection	7	Month 24 (Dec 2015)	BOUN
D7.28	Tsunami forecast capabilities in the NEAM region	7	Month 27 (March 2015)	BOUN
D9.27	Report on institutional plans, operative response capacities and needs for crisis management and capacity building	9	Month 24 (Dec 2015)	METU
D10.34	ASTARTE Newsletter	10	Every 6 months	METU

Publications

- Kânoğlu U, Titov V, Bernard E, Synolakis C. 2015 Tsunamis: bridging science, engineering and society. Phil. Trans. R. Soc. A 373: 20140369. <http://dx.doi.org/10.1098/rsta.2014.0369>
- Behrens J, Dias F. 2015 New computational methods in tsunami science. Phil. Trans. R. Soc. A 373: 20140382. <http://dx.doi.org/10.1098/rsta.2014.0382>
- Løvholt F, Pedersen G, Harbitz CB, Glimsdal S, Kim J. 2015 On the characteristics of landslide tsunamis. Phil. Trans. R. Soc. A 373: 20140376. <http://dx.doi.org/10.1098/rsta.2014.0376>
- Paris R. 2015 Source mechanisms of volcanic tsunamis. Phil. Trans. R. Soc. A 373: 20140380. <http://dx.doi.org/10.1098/rsta.2014.0380>
- England P, Howell A, Jackson J, Synolakis C. 2015 Palaeotsunamis and tsunami hazards in the Eastern Mediterranean. Phil. Trans. R. Soc. A 373: 20140374. <http://dx.doi.org/10.1098/rsta.2014.0374>
- Synolakis C, Kânoğlu U. 2015 The Fukushima accident was preventable. Phil. Trans. R. Soc. A 373: 20140379. <http://dx.doi.org/10.1098/rsta.2014.0379>

ASTARTE presence at the 26th IUGG General Assembly in Prague, Czech Republic

The 26th General Assembly of the International Union of Geodesy and Geophysics was held from June 22 to July 2, 2015 in Prague, the Czech Republic. ASTARTE researchers presented their work in the session "JP5 Tsunamis (IAPSO, IASPEI)". The links to the abstracts presented can be found [HERE](#).

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"We are happier when we go to the beach, not when the beach comes to us." — Volkan Mulcar (Governorship of Muğla, Turkey)