



WebCritech

Fifteen years of service for the scientific community

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UNESCO, Paris, 27-29/11/2024

Joint
Research
Centre

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A new era in JRC: new priorities, team, working mode and partnerships

A new era

- A **new agenda** for the European Commission and **work programme for JRC**, aka **new research priorities (2019-2024; 2025-2027)** – *WebCritech identified as a potential negative priority*
- **Changes in the JRC team** at work with the tsunami hazard, **different skill-set**
- On tsunami and coastal hazards, our focus gradually moved from sea-level science to **research on anticipatory analyses and multi hazard impact estimations**
- The **JRC relationship with this community** needs to be re defined according to the new landscape.

Joint Research Centre

The JRC provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.



Anticipate

Looking ahead and seeing more clearly what's coming to us to be better prepared and react more efficiently to new challenges.



Integrate

Connecting the dots and disentangling cross-overs thanks to multi-disciplinary and analytical capability.

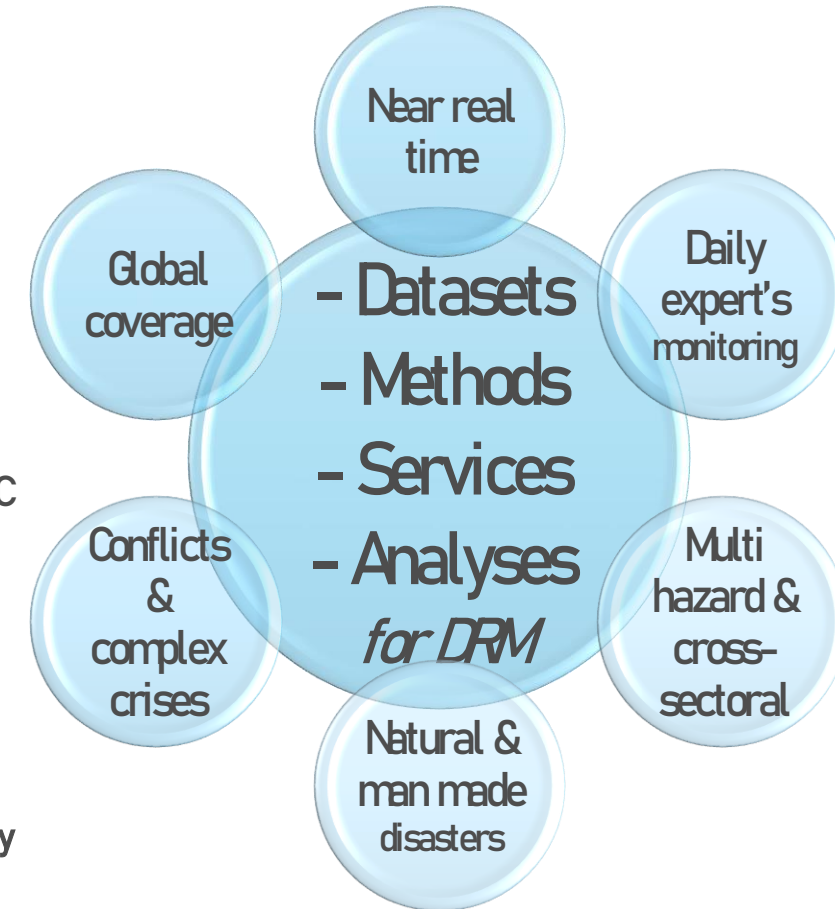


Impact

Measuring the impact of EU policies, supporting the design and monitoring of policies and performance indicators.

The European Crisis Management Laboratory - ECML

- Preparedness & response - **situational awareness & anticipation**
- **Global daily expert monitoring**, boosted with AI
- **Multi hazard & multi crises** - natural, man-made intentional/unintentional
- **Cross-sectoral, cross-boundaries** impact analyses
- **Testing of innovative technology**, including AI
- **Portfolio approach**: full collaboration with all relevant research groups in JRC
- We currently mainly work on **3 policies**:
 - **Union Civil Protection Mechanism** with DG ECHO (European Civil Protection and Humanitarian Aid Operations)
 - **Peace and Stability** with EEAS/FPI (European External Action Service - Foreign Policy Instruments)
 - **European Health Union** with DG HERA (Health Emergency Preparedness and Response)

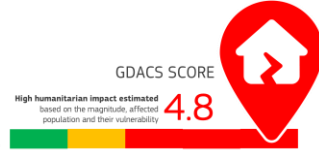


We work for all phases of the DRM cycle & we inform all phases of the POLICY cycle

The European Crisis Management Laboratory - ECML

M 7.8 Earthquake on 6 February 2023 07:17 UTC

20th anniversary
GDACS Global Disaster Alert and Coordination System



6 February

- JRC Emergency Report
- JRC Technical Report – Scientific Analysis: Update #1
- Daily Map for DG ECHO
- Copernicus EMS – Rapid Mapping activation

7 February

- JRC Technical Report – Scientific Analysis: Update #2
- Daily Map for DG ECHO

10 February

- JRC Technical Report – Scientific Analysis: Update #3
- JRC Global Drought Observatory Analytical Report
- Daily Map for DG ECHO

13 February

- Daily Map for DG ECHO

17 February

- JRC Technical Report – Scientific Analysis: Update #4

20 February

- Syria Earthquake Impact Map

28 February

- JRC Technical Report – Scientific Analysis: Update #5
- Daily Map for DG ECHO

17 March

- Daily Map for DG ECHO

JRC.E.1

- **Seismotectonic** analysis and assessment, incl. historical seismicity and tsunami warnings
- **Impact on human life, built environment** (inc. analysis of the Turkish building code and building census; cultural heritage)
- **Pre-existing humanitarian crisis in Syria** due to ongoing conflict (e.g. monitoring of Persons of Concern)
- **Conflict related damage** in Syria

JRC.E.2

- **Health system capacity and health related issues** using EIOS (Epidemic Intelligence from Open Sources)

JRC.E.3

- **Drought** situation and its mid-term consequences
- **Cascading effects**: most significant critical infrastructure accidents arising from the earthquake
- **Modelling of the affected dams**, including modelling of potential flooding due to dam breach in 2 cases

JRC.E.5

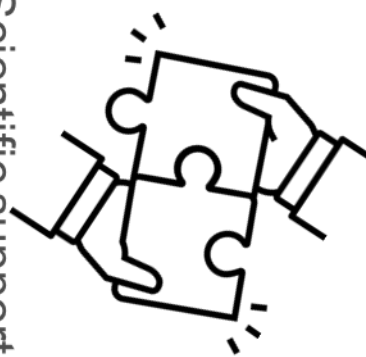
- **Social media** analysis (inc. input to S&R teams for messages and calls for help)
- **International assistance** situation
- **EO mapping mechanisms**

VOST PT/EU

- **Misinformation narratives**
- **Volume of debris** estimation
- **Geopolitical brainstorming** on long term, large scale potential impact of this crisis

JRC.T.5

Scientific support



Operational support

Türkiye Earthquake - Timeline

6 February, two earthquakes of 7.8M and 7.5M shook southeastern Türkiye and northwest Syria

6 February, Copernicus Mapping was activated (EMSS-55). 64 maps were produced

6 February, first in-kind assistance offers were received in total: **22 EU MS** and **1 UCPM PS** offered in-kind assistance

6 February, ERCC mobilised RHUs from the **rescEU reserve** hosted by **SE**, as well as tents and beds hosted by **RO**

7 February, first USAR teams arrived in Türkiye. In total, **32 USAR teams** via the UCPM

7 February, Türkiye activated the UCPM 1.5 hours after the first EQ with a request for **USAR teams** and **EMTs**

7 February, EUCPT Alpha deployed to Türkiye: **15 experts**, **12 TAST** and **2 ERCC LOs**

Later, Türkiye also requested shelter items, medical items, transportation means for cargo and medevac

8 February, the first **EMTs** arrived in Türkiye. In total **7 medical teams** deployed: **Four EMT 2**

8 February, ERCC mobilised medical equipment and PPE from the **rescEU medical stockpiles** hosted by **DE, EL, NL, SI** and **SE**

8 February, Türkiye indicated that PPE were not needed for the time being, thus the contribution from SI was withdrawn

8 March, EUCPT Charlie with **2 experts** deployed until 26 March as well as a **Team Leader** and **1 ERCC LO**

8 March, A **Health Expert** from ECDC joined the team on 10 March

17 February, all USAR teams **demobilised** in total, **1 647 personnel** with **11 dogs** were deployed via the UCPM and at least **101 people** were **rescued**

21-22 February, EUCPT Bravo consisting of **7 experts** deployed to replace team Alpha

22 March, all medical teams **demobilised**. In total, **386 personnel** were deployed via the UCPM and over **17 500 people** were **treated**

Over **EUR 33.5 million** in EU humanitarian funding was allocated to the earthquake response

European Commission

Union Civil Protection Mechanism and humanitarian international community

EU/UN/GO/NGO field teams Rapid Humanitarian Needs Assessment

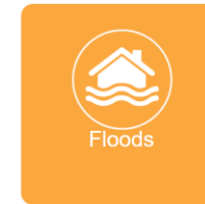
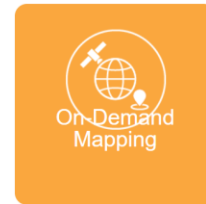
Joint EU-UNDP (long term) Post-Disaster Needs Assessment process (inc. donors' conference in March)

The EU delivers! **€400 MILLION** mobilised through the European Solidarity Fund for emergency and recovery operations in Türkiye following the devastating earthquake in 2023

Video:
Stronger Together: EU Rescue and Aid Efforts in Türkiye's Earthquake-hit Area



The European Crisis Management Laboratory - ECML



Multi Hazard Rapid Impact Estimations for Humanitarian Aid community
Resp. EC JRC/ECHO

VIRTUAL OSOCC - On Site Operations Coordination Centre for Humanitarian Aid community
Resp. UN OCHA

Satellite Mapping Coordination System (SMCS) component Humanitarian Aid community
Resp. UNITAR UNOSAT

Earthquakes GDACS Red Alert Magnitude > 5.5 M GDACS Orange Alert Magnitude 5.0 M - 5.5 M	Volcanoes All GDACS Alert Volcanic eruption	Tsunamis All GDACS Alert > 1.0m observed/calculated wave height Earthquake that generated tsunami	Tropical cyclones GDACS Red Alert GDACS Orange Alert Wind speed > 118 km/h GDACS Green Alert Wind speed > 118 km/h	Floods GDACS Red Alert GDACS Orange Alert Affected administrative division	Droughts GDACS Red Alert GDACS Orange Alert Affected area Arid/hyper-arid areas (Aridity Index < 0.2) Drought risk areas (see map)	Forest fires All GDACS Alert Affected area
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Quick overview of 15 years of contribution to
tsunami risk management

JRC contribution to tsunami risk management until 2022

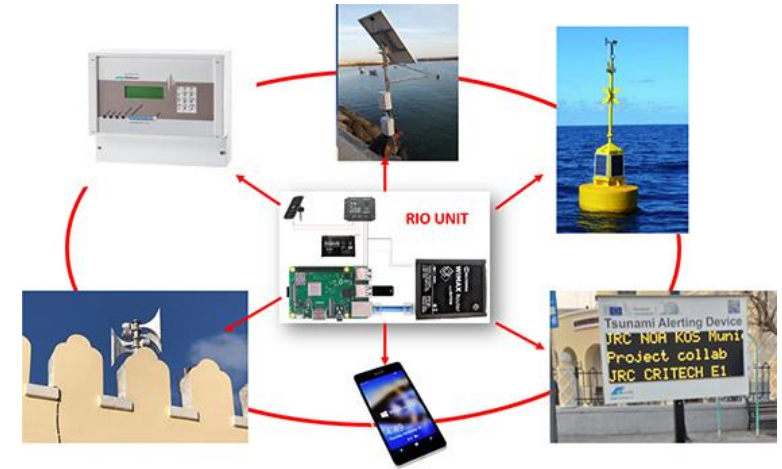
JRC directly or indirectly contributed to better tsunami risk management globally until 2022: <https://drmkc.jrc.ec.europa.eu/events-news/newsletter/newsletter-21>

- **Analyses of real life events** for ERCC and the international humanitarian community building on GDACS and WebCritech
- **Contributions to the TEWS** of Euro Mediterranean region and Indonesia with IDSL network
- **Testing differential GPS technique for offshore sea level measurements**, in collaboration with Ispra (Istituto Superiore per la Protezione e la Ricerca Ambientale)
- **Implementing community preparedness programmes** under the umbrella of the Tsunami Last Mile projects
- **Designing and testing a remote interoperability platform** to manage different devices (e.g. seismic sensors, sea-level stations, digital warning panels)
- **Supporting the participation to the NEAMWAVE exercises** of the European Commission
- **Designing and supporting the implementation of the (first) COASTWAVE project** together with UNESCO/IOC and DG ECHO
- **Attending and contributing to the ICG/NEAMTWS meetings** as observer



Tsunami Last Mile projects

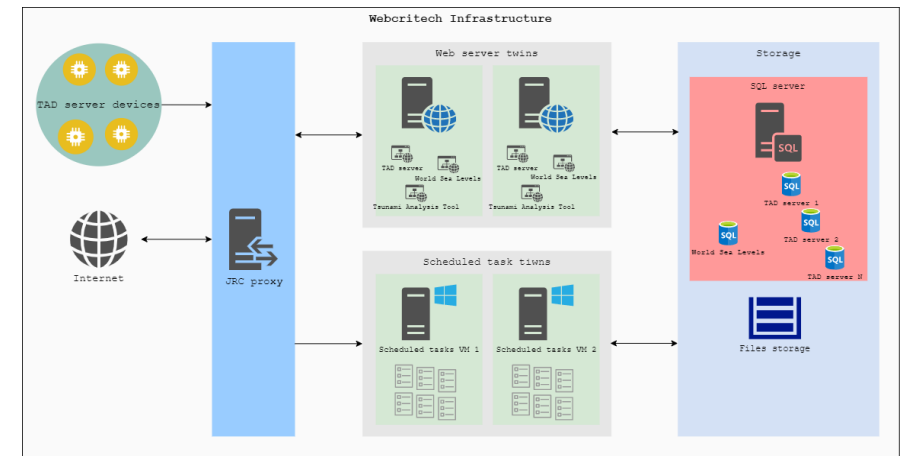
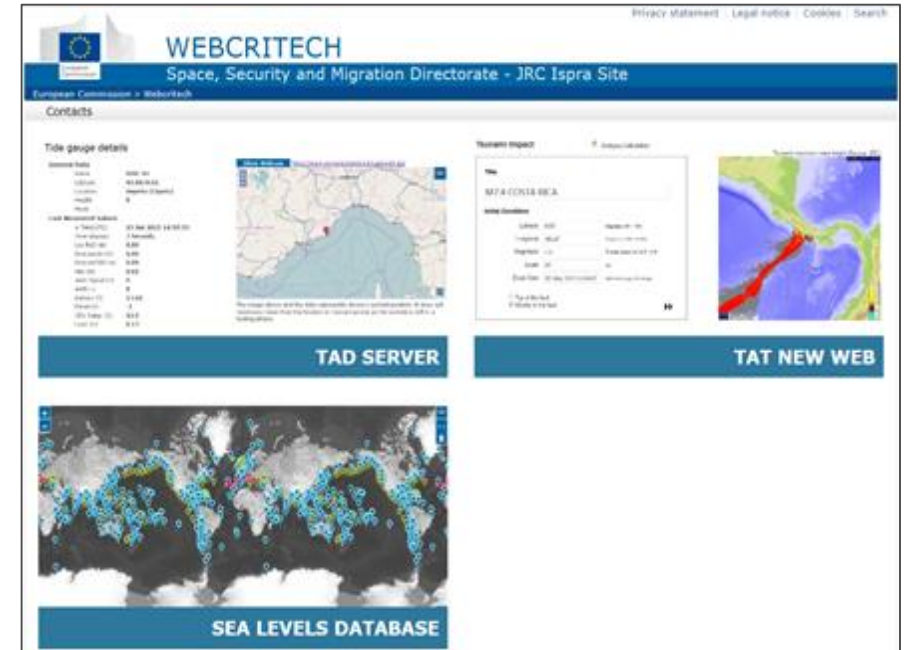
- **DG ECHO funds; JRC coordination**
- **2 implementations: 2018-2019; 2020-2021**
- **Countries involved: Greece (Kos), Turkey (Bodrum), Malta (Marsaxlokk), Indonesia (Pangandaran)**
- **Tsunami Ready-like approach, i.e. community preparedness programme**
- **Outcomes: local tsunami scenarios, maximum expected strong motion acceleration (PGA), inundation areas and evacuation routes, tsunami signage, suite of technologies for public warning, engagement of the local community and final exercise to test all the above**



Webcritech portal

Started in 2005, 3 applications in the same website:

- **TAD Server:** conceived as a portal for managing the Inexpensive Device for Sea Level monitoring (IDSL) network
- **World Sea Level Database:** a sea levels measurement data collector and analysis tool
- **Tsunami Analysis Tool:** for quick calculation the tsunami propagation + a global pre-calculated scenario DB with 136 000 calculations based on historical tsunami events

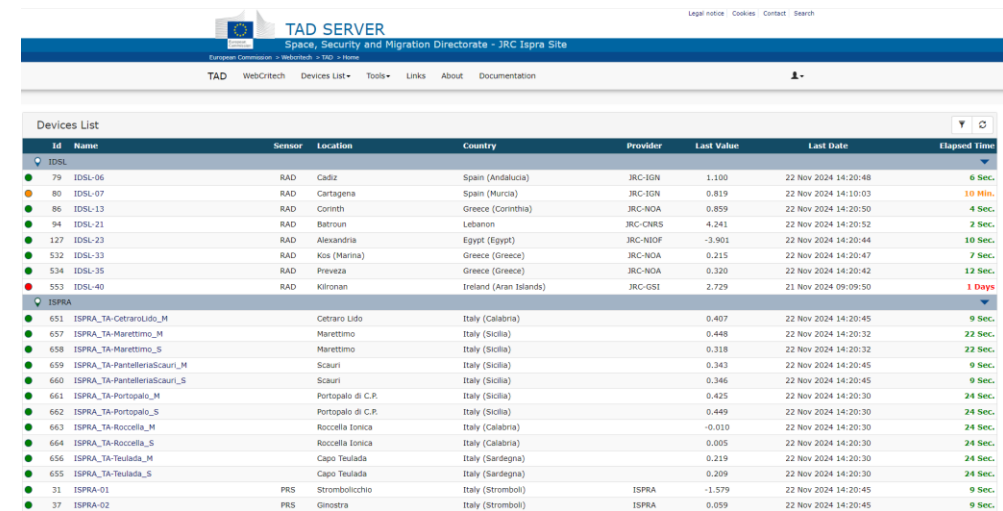


WebCritech portal – TAD server

TAD Server, web-based application designed for the visualization and monitoring of data acquired from various types of devices, including sea level measurement stations, seismometers, and buoys.

The following functionalities are available:

- **Device details** (description, picture, documents and operational timeline) and monitoring in near real time
- **Forecasting and alerting** root mean square regression used to compare the forecasts and estimate the alert conditions; customizable thresholds and alert messages. For sea level devices, levels harmonics constants are calculated on a daily basis
- **Data Analysis:** all acquired data can be displayed in customizable charts
- **Device Statistics:** devices can have a dedicated section with uptime and data quality statistics
- **Data Dissemination:** Sea levels data in TAD server can be downloaded in various formats (JSON, CSV, TXT) or consumed via a REST web API.



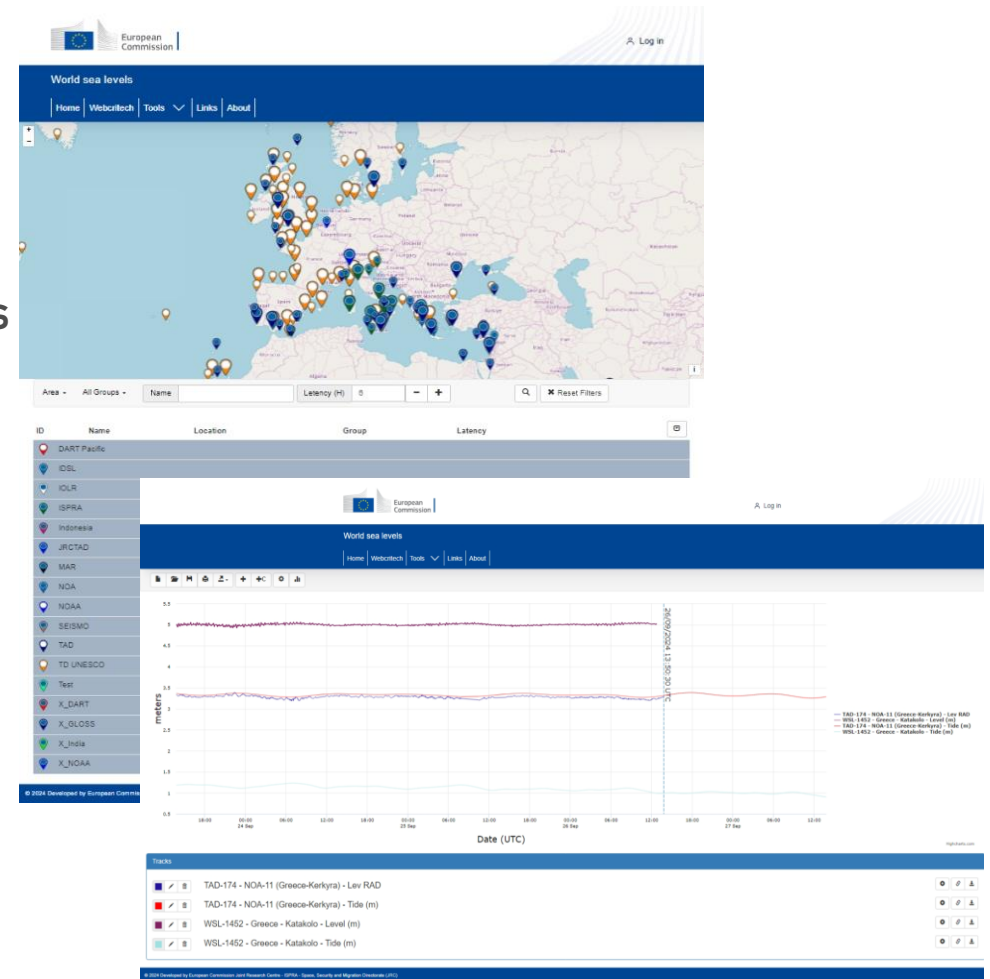
The screenshot displays the TAD SERVER web application interface. The page title is 'TAD SERVER' and the subtitle is 'Space, Security and Migration Directorate - JRC Ispra Site'. The navigation menu includes 'TAD', 'WebCritech', 'Devices List', 'Tools', 'Links', 'About', and 'Documentation'. The main content area shows a 'Devices List' table with columns: Id, Name, Sensor, Location, Country, Provider, Last Value, Last Date, and Elapsed Time. The table is divided into two sections: 'IDSL' and 'ISFRA'.

Id	Name	Sensor	Location	Country	Provider	Last Value	Last Date	Elapsed Time
IDSL								
79	IDSL-06	RAD	Cadiz	Spain (Andalucia)	JRC-IGN	1.100	22 Nov 2024 14:20:48	6 Sec.
80	IDSL-07	RAD	Cartagena	Spain (Murcia)	JRC-IGN	0.819	22 Nov 2024 14:10:03	10 Min.
86	IDSL-13	RAD	Corinth	Greece (Corinthia)	JRC-NOA	0.859	22 Nov 2024 14:20:50	4 Sec.
94	IDSL-21	RAD	Batroun	Lebanon	JRC-CNRS	4.241	22 Nov 2024 14:20:52	2 Sec.
127	IDSL-23	RAD	Alexandria	Egypt (Egypt)	JRC-NOF	-3.901	22 Nov 2024 14:20:44	10 Sec.
532	IDSL-33	RAD	Kos (Marina)	Greece (Greece)	JRC-NOA	0.215	22 Nov 2024 14:20:47	7 Sec.
534	IDSL-35	RAD	Preveza	Greece (Greece)	JRC-NOA	0.320	22 Nov 2024 14:20:42	12 Sec.
553	IDSL-40	RAD	Kilronan	Ireland (Aran Islands)	JRC-GSI	2.729	21 Nov 2024 09:09:50	1 Days
ISFRA								
651	ISFRA_TA-CetraroLido_M		Cetraro Lido	Italy (Calabria)		0.407	22 Nov 2024 14:20:45	9 Sec.
657	ISFRA_TA-Marettimo_M		Marettimo	Italy (Sicilia)		0.448	22 Nov 2024 14:20:32	22 Sec.
658	ISFRA_TA-Marettimo_S		Marettimo	Italy (Sicilia)		0.318	22 Nov 2024 14:20:32	22 Sec.
659	ISFRA_TA-ParitelleriaScauri_M		Scauri	Italy (Sicilia)		0.343	22 Nov 2024 14:20:45	9 Sec.
660	ISFRA_TA-ParitelleriaScauri_S		Scauri	Italy (Sicilia)		0.346	22 Nov 2024 14:20:45	9 Sec.
661	ISFRA_TA-Portopalo_M		Portopalo di C.P.	Italy (Sicilia)		0.425	22 Nov 2024 14:20:30	24 Sec.
662	ISFRA_TA-Portopalo_S		Portopalo di C.P.	Italy (Sicilia)		0.449	22 Nov 2024 14:20:30	24 Sec.
663	ISFRA_TA-Roccella_M		Roccella Ionica	Italy (Calabria)		-0.010	22 Nov 2024 14:20:30	24 Sec.
664	ISFRA_TA-Roccella_S		Roccella Ionica	Italy (Calabria)		0.005	22 Nov 2024 14:20:30	24 Sec.
656	ISFRA_TA-Teulada_M		Capo Teulada	Italy (Sardegna)		0.219	22 Nov 2024 14:20:30	24 Sec.
655	ISFRA_TA-Teulada_S		Capo Teulada	Italy (Sardegna)		0.209	22 Nov 2024 14:20:30	24 Sec.
31	ISFRA-01	PRS	Stromboli	Italy (Stromboli)	ISFRA	-1.579	22 Nov 2024 14:20:45	9 Sec.
37	ISFRA-02	PRS	Ginostra	Italy (Stromboli)	ISFRA	0.059	22 Nov 2024 14:20:45	9 Sec.

WebCritech portal – World Sea Level DB

WSL, a web-based application designed to provide a centralized platform for the visualization and analysis of sea level data acquired from multiple providers.

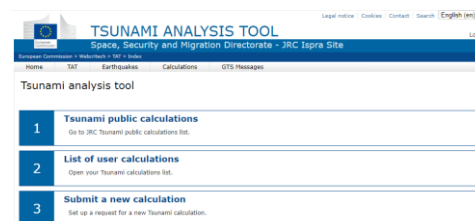
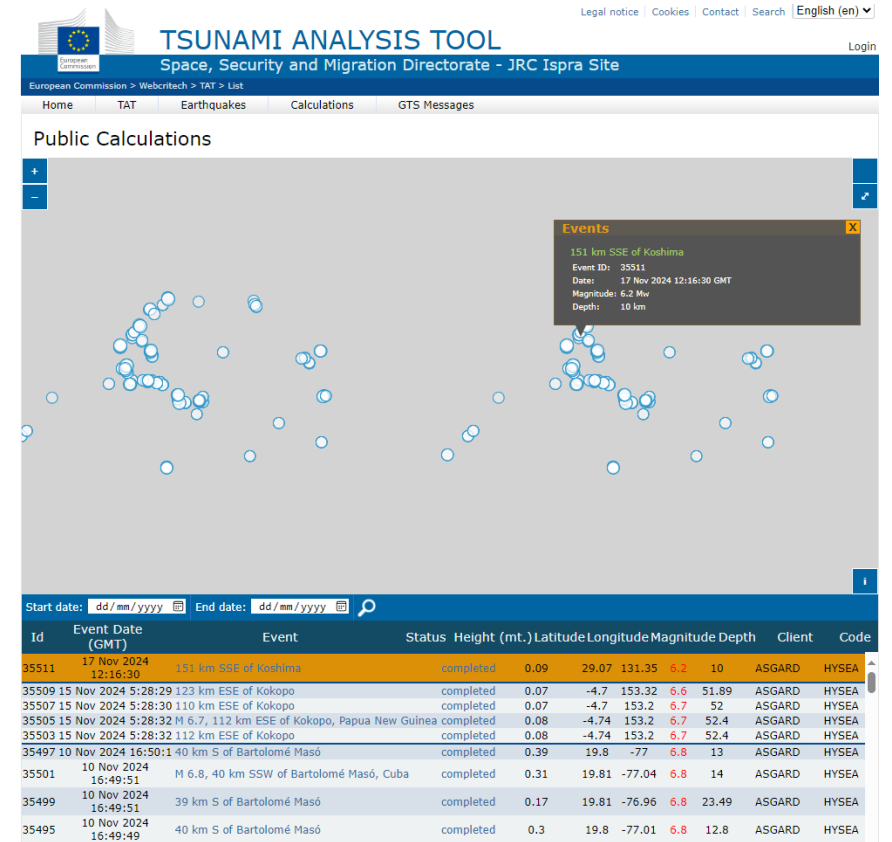
- Data collection and normalization from multiple providers
- Device overview and grouping by provider
- Map view of devices
- Access to sea level harmonics variables
- Customizable chart tool for data visualization and comparison
- Data download in various formats (e.g. JSON, CSV, and TXT)
- Web API for data access
- Integration with the TAD Server and GDACS tsunami reports



WebCritech portal – Tsunami Analysis Tool

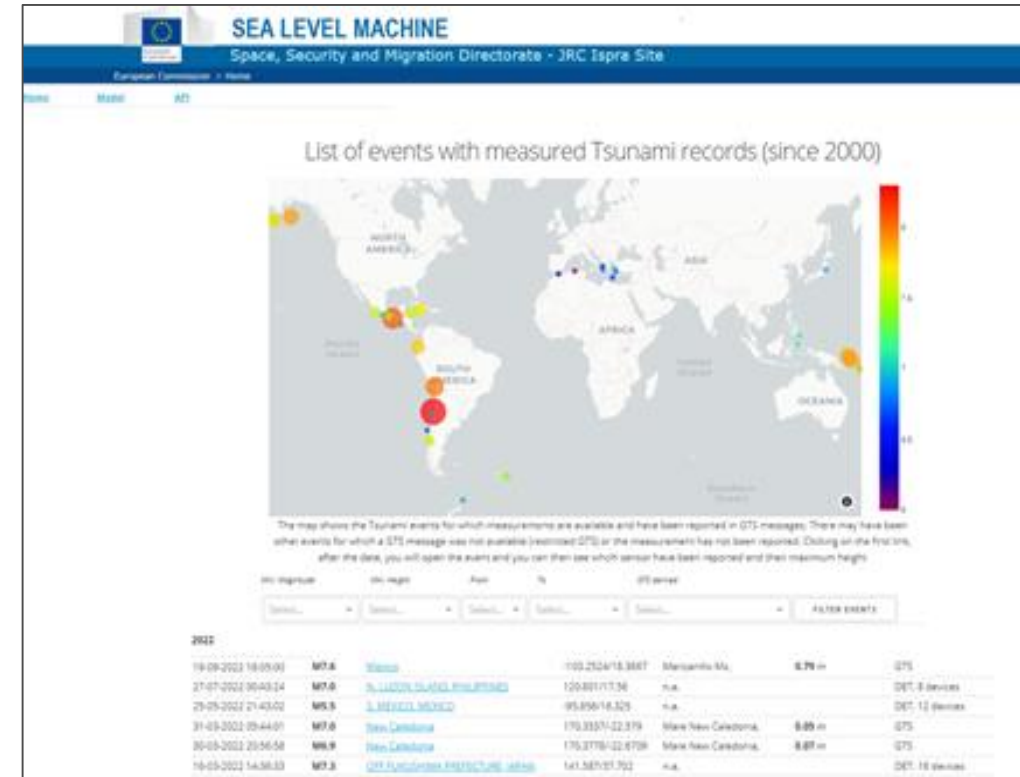
TAT, a web-based platform designed to provide users with a tool for consulting and requesting tsunami calculations.

- HYSEA used to simulate tsunami wave propagation and impact based on earthquake parameters
- Integration with the Sea Levels Database and TAD Server to access near real-time sea level data and device information
- Generation of sea level charts for requested locations
- Comparison of calculation results with measured water levels from sea level measurement stations
- The *“Tsunami public calculations”* are available, while the *“List of user calculations”* and *“Submit new calculation”* are not available functionalities for the time being



Sea Level Machine

- **A standalone web site, not included in the WebCritech portal,** which provides visualization and basic analysis functionalities (wave amplitude and period reading) for all the sea-level recordings from tsunami events occurred since year 2000 globally (data from the NOAA NGDC database)
- For each event, the **corresponding report in GDACS is identified and connected.** This allows to extract the **GTS messages** that were produced by the Tsunami Service Providers for that event, which are stored in the GDACS database.
- Within GDACS, JRC developed routines to extract from each GTS message the reported tsunami height, period and arrival time. **This allows to visualize for each event which tide gauge was used by the Tsunami Service Providers during their analysis and if possible, download and process these data.**



Activities of the last 2 years (2023-2024)

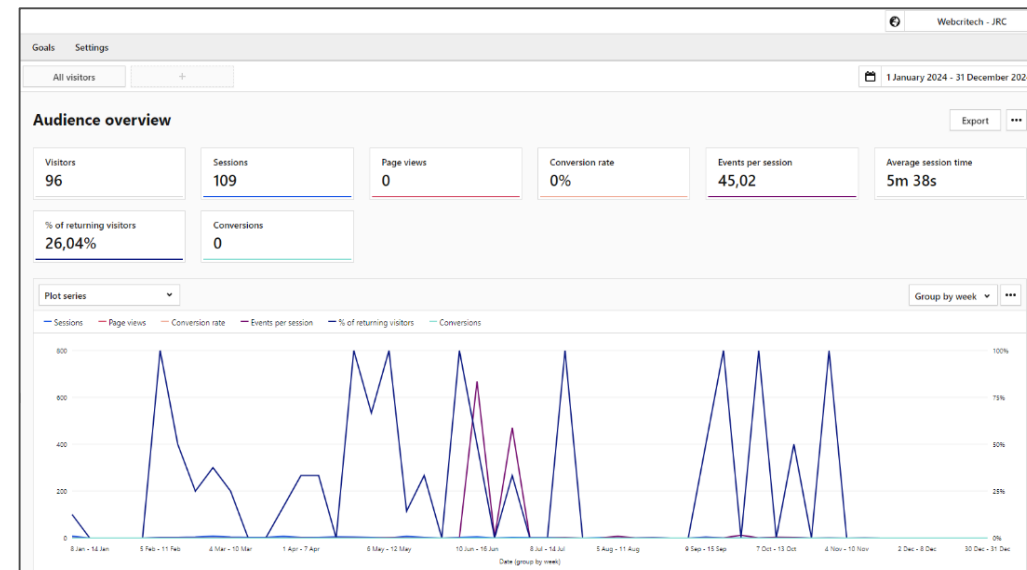
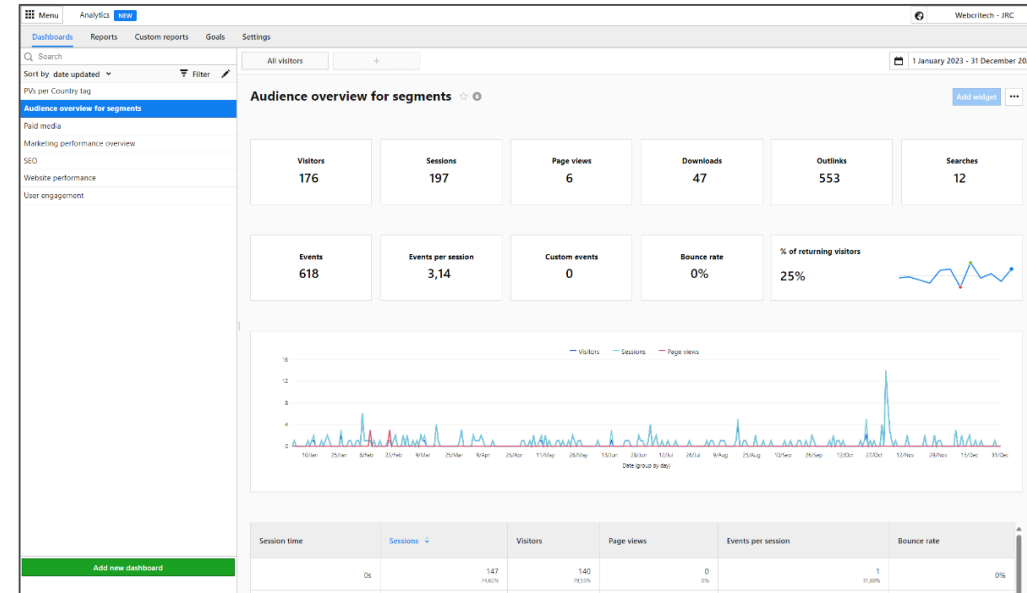
Wrapping up

- Since 2020, JRC can check the data from the **IDSL network** only once they are received in its servers. JRC do not maintain the IDSL network on site anymore (only support from remote was offered to requesting Member States)
- **COASTWave projects** were conceived by JRC with ECHO and UNESCO/IOC to implement the handover of the IDSL sea level measurement network to the Countries with stations on their coastlines, among the other main objectives. In the second COASTWAVE project JRC was not involved formally, but remains available to collaborate if useful.
- Currently, for the **Web Critech portal**, JRC is limiting its efforts to **ensure a minimum level of maintenance, with no further developments**. In particular, JRC:
 - keeps updated the **Sea Level Database system and all related documentation** and moved it from the previous infrastructure (dismissed for obsolescence) to the JRC virtualization infrastructure;
 - created a [webpage](#) to share with Member States participating to the **COASTWave project** all needed **documentation and images** for their training and full empowerment of the respective IDSL stations;
 - contributed to the “**Installation guide**” and the “**Initialization manual**” requested by UNESCO for the full transfer of responsibility of the “Tsunami Last Miles suite of technologies” to the concerned Member States.

Continued support

In 2023–2024, JRC continued to provide support for WebCritech users, examples of specific cases being:

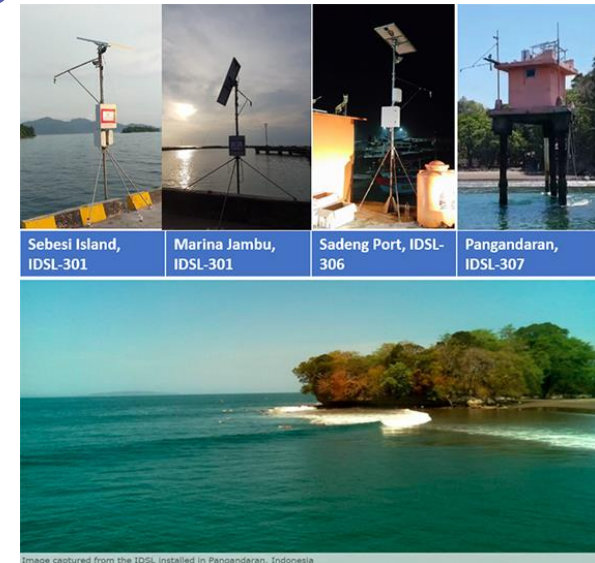
- **Greece:** uses the same technology, JRC helped the transition of their sea level monitoring system to the cloud
- **Spain:** support for the deployed IDSL devices and additional research on GNSS
- **Indonesia:** handover of IDSL network and advise on developing the new network
- **Ireland:** support for the deployed IDSL devices
- **Italy:** uses the same technology of their sea level monitoring system, JRC helped updating it
- **Portugal:** IPMA expressed interest for the continuation of the system and its features in informal meetings



WebCritech accesses in 2023 and 2024
(WebAPI downloads not captured)

Contribution to the Tsunami Early Warning system of Indonesia

- In 2019 JRC provided Indonesia with 8 IDSL devices to quickly implement a new Tsunami Warning System in the aftermath of the Anak Krakatau volcano explosion on 22 Dec 2018^(*)
- Since then the collaboration between the Commission and Indonesia never stopped and in 2023 BMKG requested to JRC a training for its staff on the development of a non-seismic tsunami detection system.
- The training took place in August 2023, with 11 participants from BMKG (among which the head of the earthquake and tsunami center) and Prof. Maurizio Ripepe and Eng. Alessandro Annunziato as invited speakers.



^(*) <https://publications.jrc.ec.europa.eu/repository/handle/JRC116540>; <http://www.tsunamisociety.org/382AnnunziatoEtAl.pdf>;
<https://www.gdacs.org/Public/download.aspx?type=DC&id=228>

Proposal scenarios for the next steps

Next steps

For the WebCritech portal and its sub applications -TAD server, TAT new Web, Sea Level Database- a way forward needs to be decided.

JRC is preparing a technical report for summarizing the WebCritech activities until now and for outlining its possible next steps, options under consideration are:

1. **JRC to close the activity line of WebCritech**, as it is no longer research-related, with offer to collaborate with Vliz university for the handover of all useful data/analytical and UI features, for their inclusion in IOC sea level DB
2. **JRC to continue only with the current minimum maintenance activity** to continue to provide support to the operational functions of the Tsunami Service Providers.
3. **JRC to re-focus toward research the purpose of the WebCritech** suite of applications, gradually transitioning away from supporting operations, with global sea level DB + analytical functionalities available as a hub for research and education^(*)
4. **JRC to continue advancing the developments of WebCritech for supporting operations**, under the condition that interested Member States are available to deploy Seconded National Experts to JRC for this purpose

KEY MESSAGE: *an explicit, written feedback is needed from this community (UNESCO/IOC, NEAMTWS Steering Group, TSPs, Member States) on their interest and on the potential impact of each of the 4 scenarios listed above as JRC doesn't want to proceed in a direction not agreed with the community itself. To this aim, we remain available also for a dedicated meeting at your earliest convenience (no later than mid-January 2025) with the key contact points, for which we count on the IOC Secretariat advice.*

(*) e.g. researchers can upload data -even digitized from analogic records- and perform some data analysis

Conclusions

- **There is the interest in continuing to be part of this community**, with or without the WebCritech platform
- **We are still interested in the Coastwave projects, the Tsunami Ready initiative** and in collaborating further in the community preparedness area
- **We will need a feedback from the NEAMTWS community** on the future scenarios for WebCritech

Thank you

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