
# WebCritech

## Fifteen years of service for the scientific community

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UNESCO, Paris, 27-29/11/2024

# Table of contents

# 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.**




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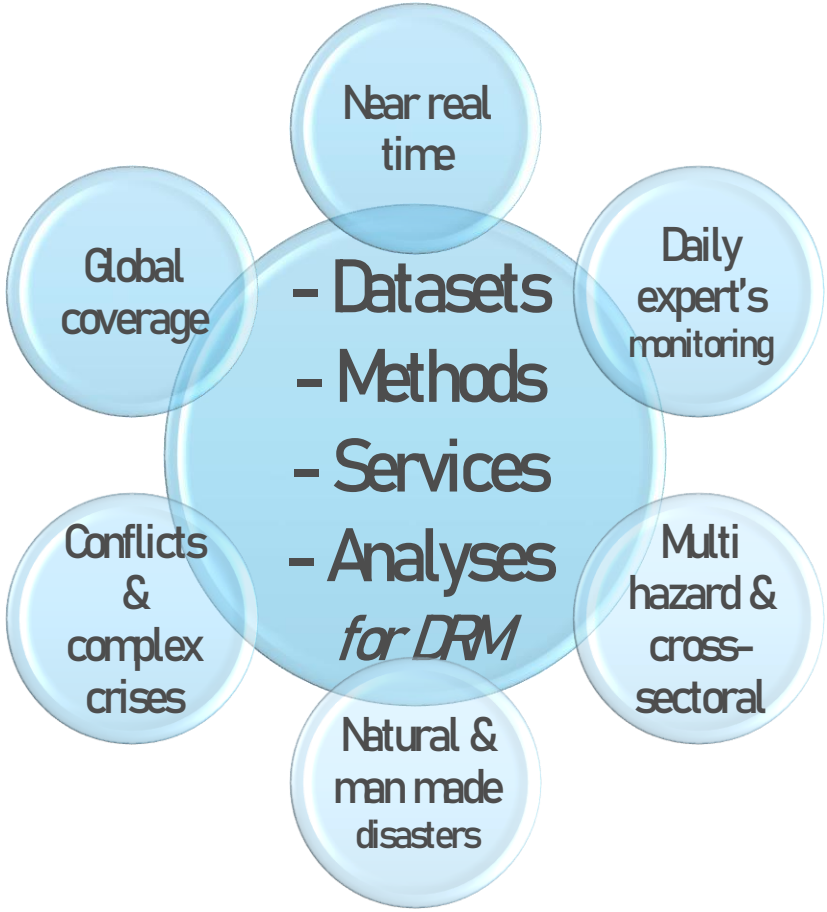
- **Preparedness & response – situational awareness & anticipation**
- **Global daily *expert* monitoring**, boosted with AI
- **Multi hazard & multi crises** – natural, man-made intentional/unintentional
- **Cross-sectoral, cross-boundaries** impact analyses
- **Testing of innovative technology,** including 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*



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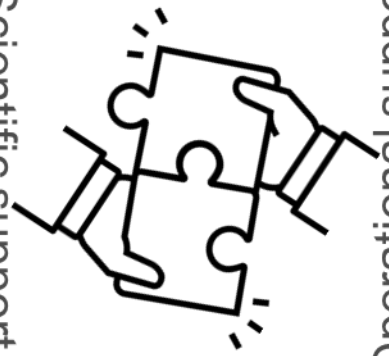
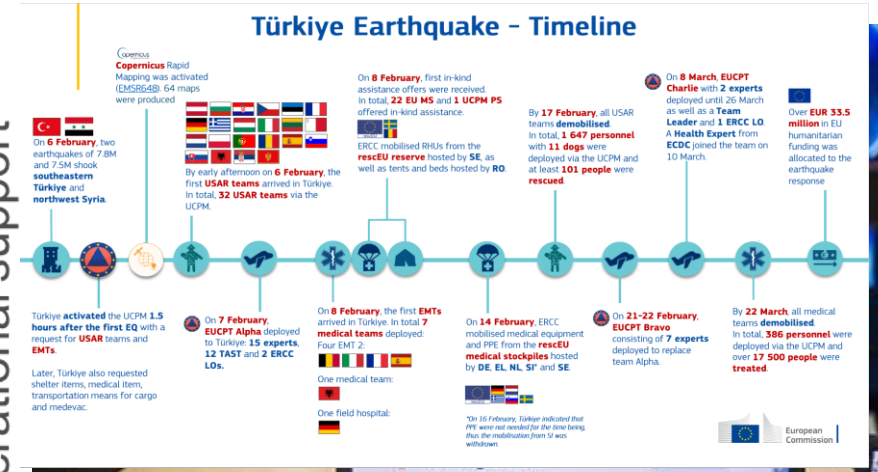
Scientific support



Operational support




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



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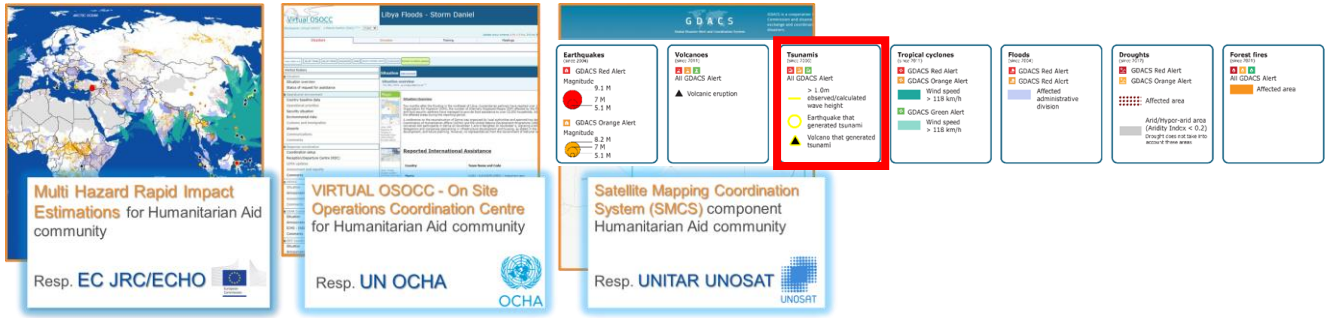
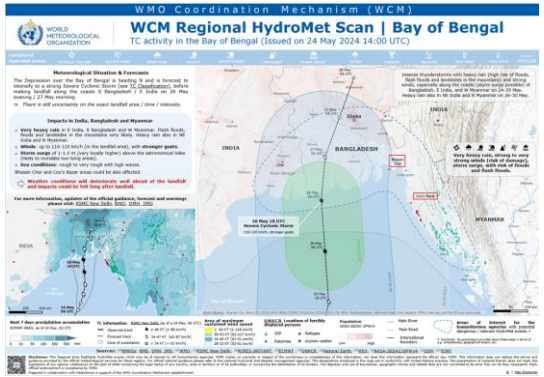
- Copernicus Europe's eyes on Earth
- Emergency Management


- 20 anniversary GDACS Global Disaster Alert and Coordination System




- WORLD METEOROLOGICAL ORGANIZATION
  Weather Climate Water

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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




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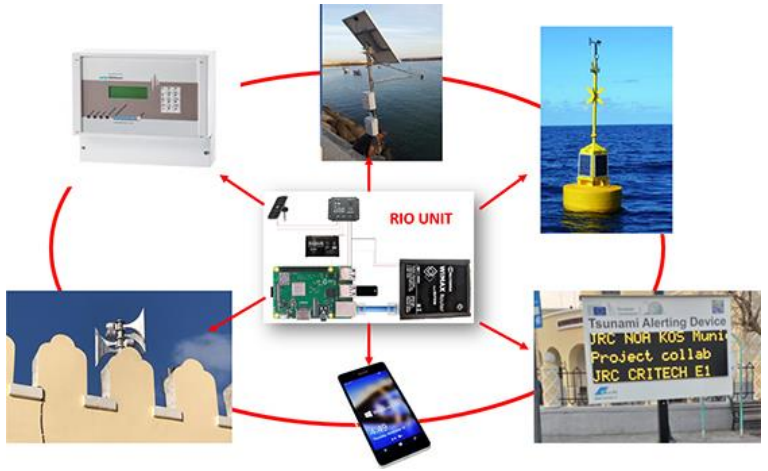
# Tsunami Last Mile projects

- **DG ECHO funds; JRC coordination**
- **2 implementations:** 2028-2019; 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







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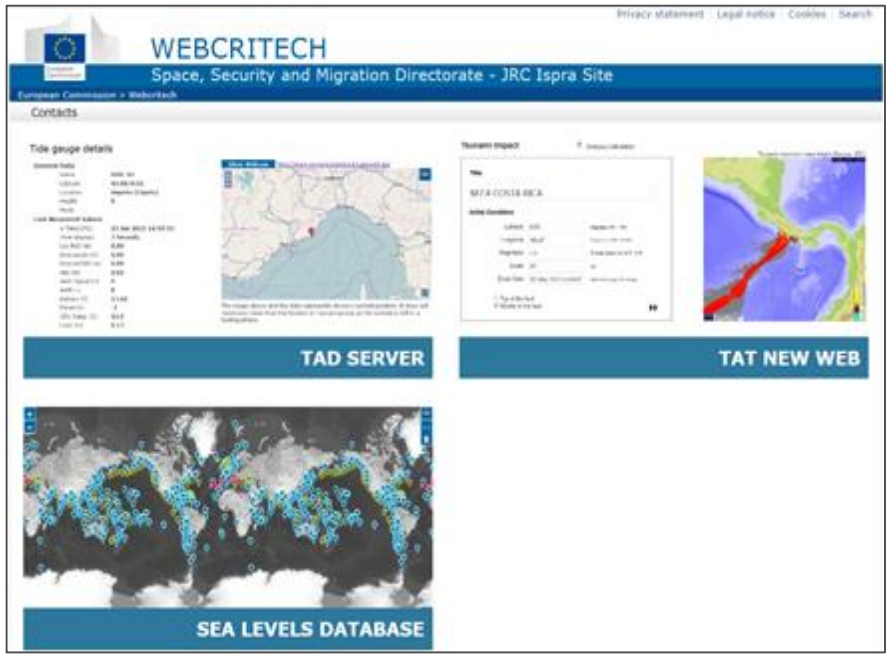
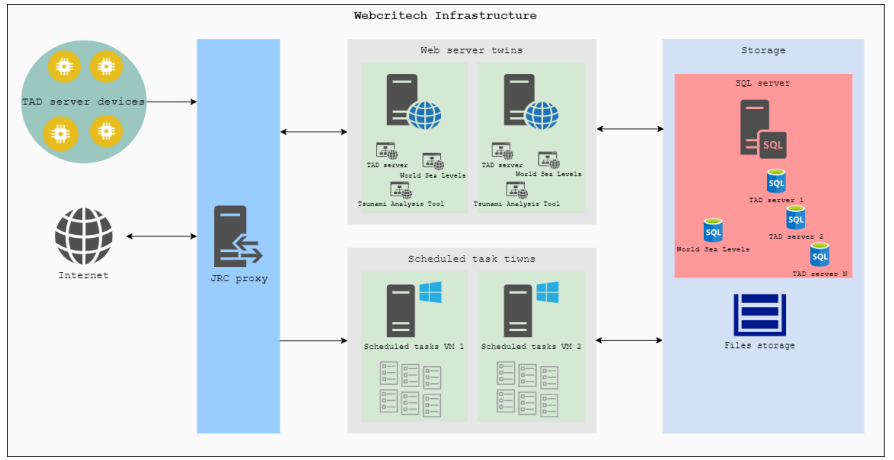
# Webcritech portal

**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



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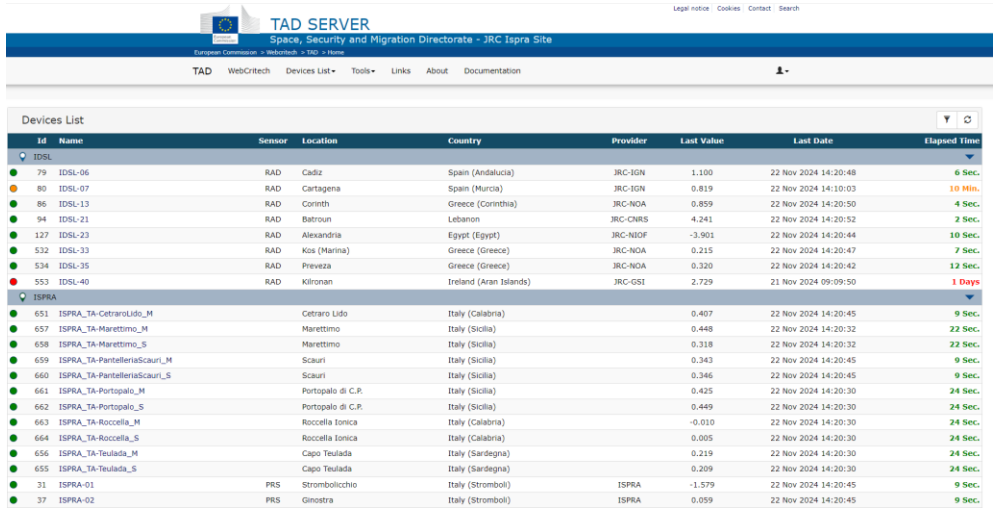
# WebCritech portal – TAD server

**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.




| 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-NIOF | -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 |
| ISPRA | | | | | | | | |
| 651 | ISPRA_TA-CetraroLido_M | | Cetraro Lido | Italy (Calabria) | | 0.407 | 22 Nov 2024 14:20:45 | 9 Sec. |
| 657 | ISPRA_TA-Marettimo_M | | Marettimo | Italy (Sicilia) | | 0.448 | 22 Nov 2024 14:20:32 | 22 Sec. |
| 658 | ISPRA_TA-Marettimo_S | | Marettimo | Italy (Sicilia) | | 0.318 | 22 Nov 2024 14:20:32 | 22 Sec. |
| 659 | ISPRA_TA-PantelleriaScauri_M | | Scauri | Italy (Sicilia) | | 0.343 | 22 Nov 2024 14:20:45 | 9 Sec. |
| 660 | ISPRA_TA-PantelleriaScauri_S | | Scauri | Italy (Sicilia) | | 0.346 | 22 Nov 2024 14:20:45 | 9 Sec. |
| 661 | ISPRA_TA-Portopalo_M | | Portopalo di C.P. | Italy (Sicilia) | | 0.425 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 662 | ISPRA_TA-Portopalo_S | | Portopalo di C.P. | Italy (Sicilia) | | 0.449 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 663 | ISPRA_TA-Roccella_M | | Roccella Ionica | Italy (Calabria) | | -0.010 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 664 | ISPRA_TA-Roccella_S | | Roccella Ionica | Italy (Calabria) | | 0.005 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 656 | ISPRA_TA-Teulada_M | | Capo Teulada | Italy (Sardegna) | | 0.219 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 655 | ISPRA_TA-Teulada_S | | Capo Teulada | Italy (Sardegna) | | 0.209 | 22 Nov 2024 14:20:30 | 24 Sec. |
| 31 | ISPRA-01 | PRS | Stromboli | Italy (Stromboli) | ISPRA | -1.579 | 22 Nov 2024 14:20:45 | 9 Sec. |
| 37 | ISPRA-02 | PRS | Ginostra | Italy (Stromboli) | ISPRA | 0.059 | 22 Nov 2024 14:20:45 | 9 Sec. |



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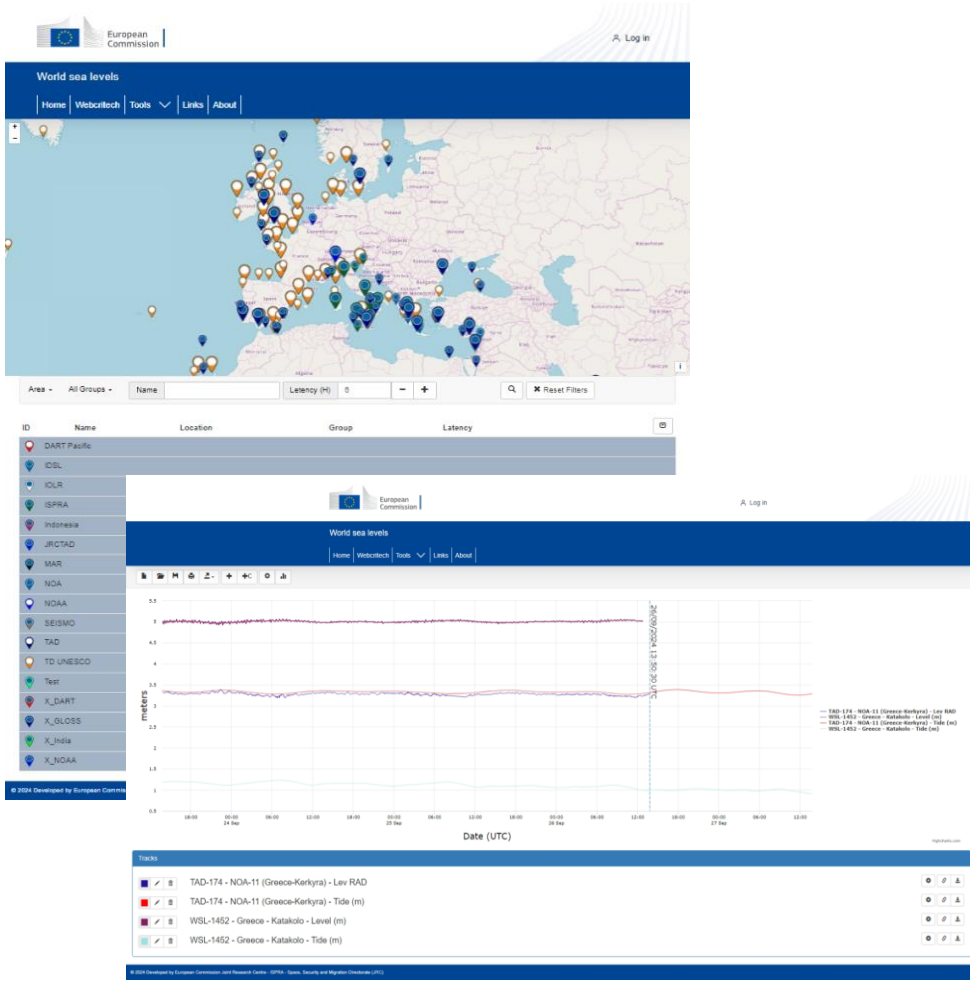
# WebCritech portal – World Sea Level DB

**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**



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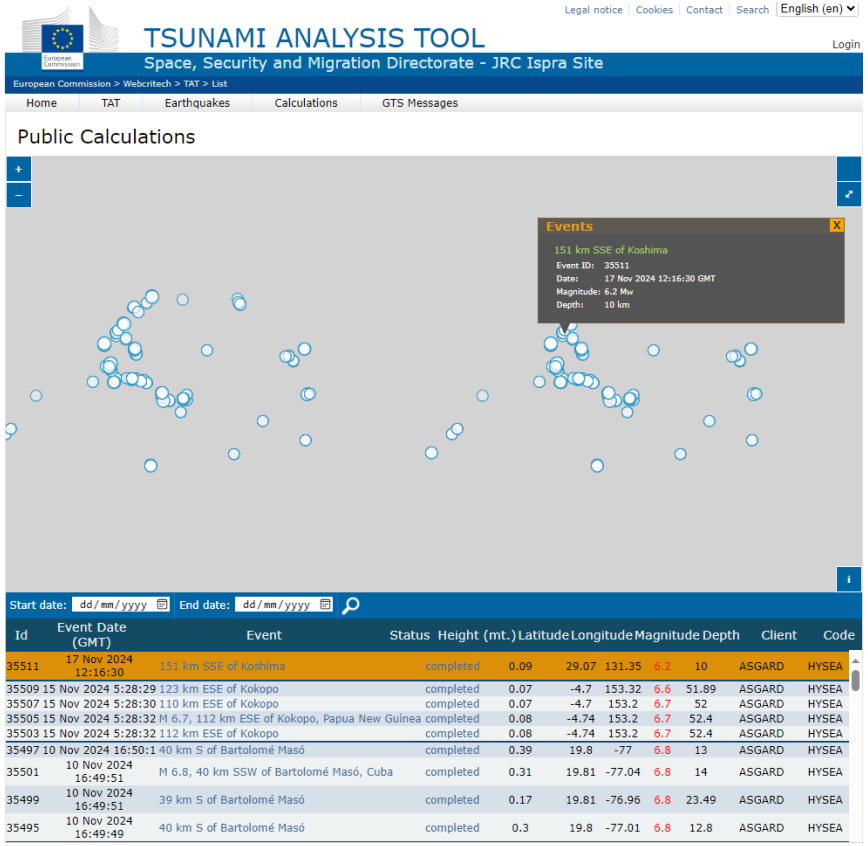
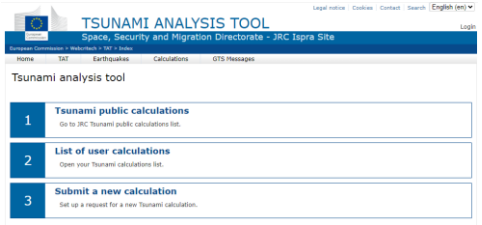
# WebCritech portal – Tsunami Analysis Tool

**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



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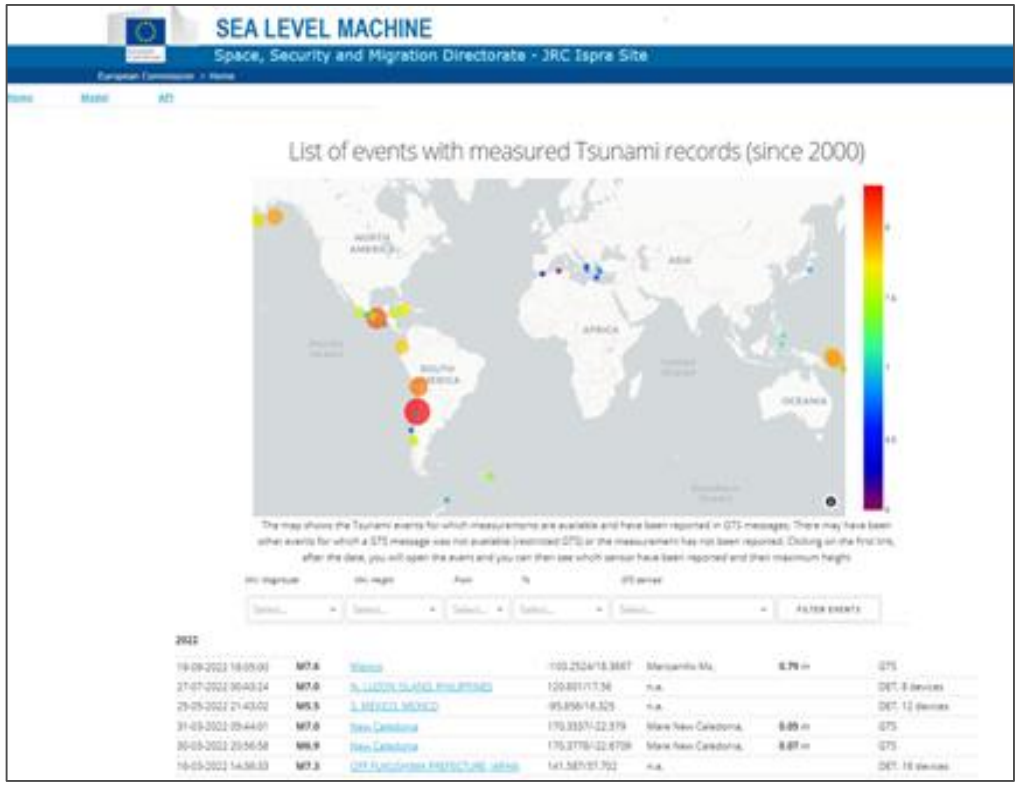
# Sea Level Machine

- **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.**



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# Activities of the last 2 years (2023-2024)

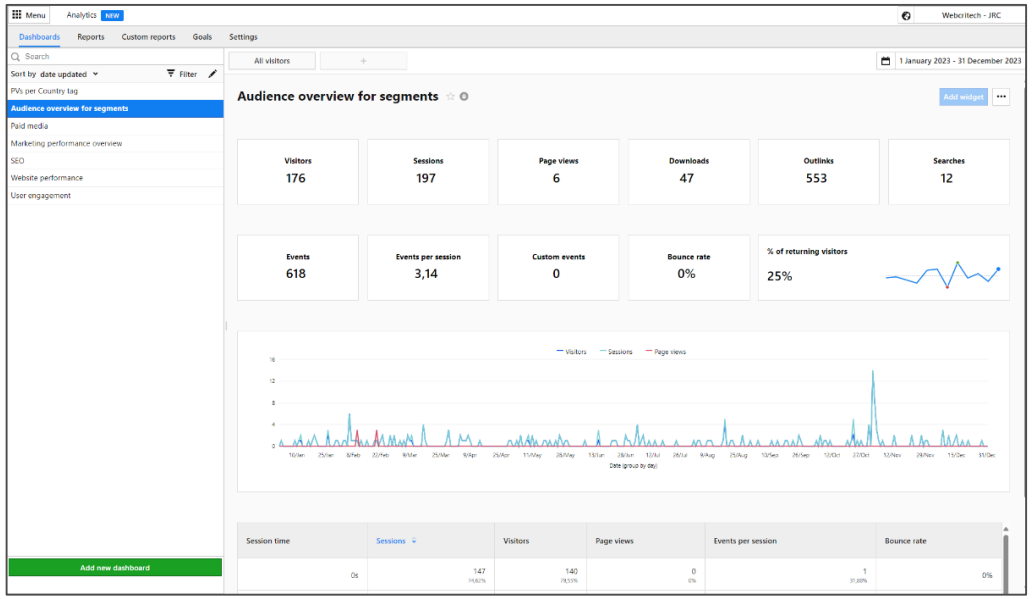
# Wrapping up

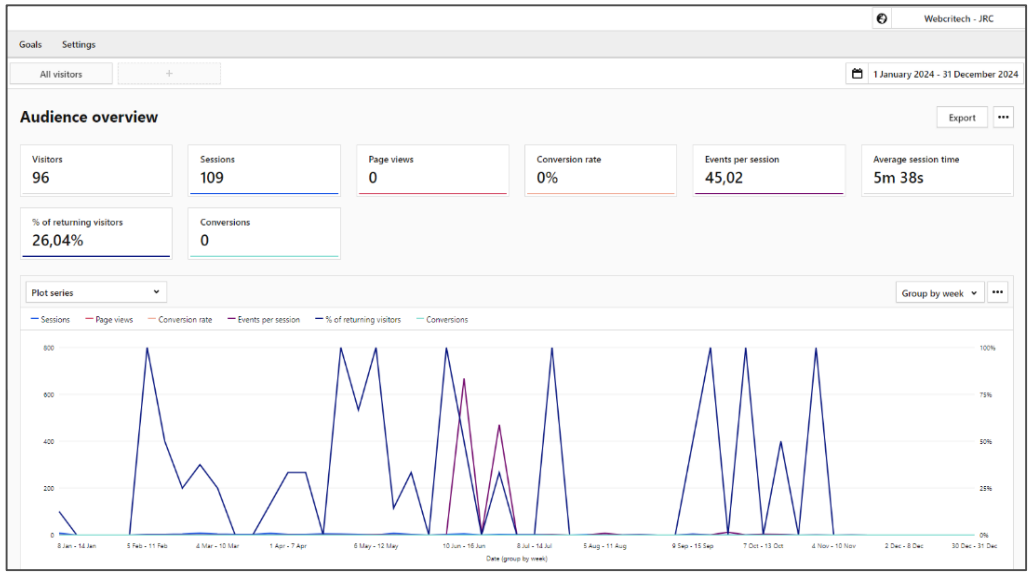
- **Since 2020, JRC can check the data from the IDSL network only once they are received in its servers**. JRC do not maintain the IDSL network on site anymore (only support from remote was offered to requesting Member States)
- **COASTWave projects were conceived** by JRC with ECHO and UNESCO/IOC **to 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)



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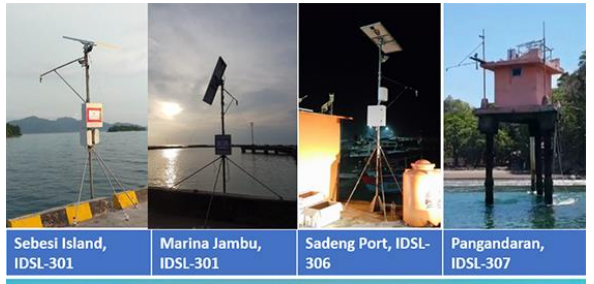
# Contribution to the Tsunami Early Warning system of Indonesia

- 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



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# 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 fpr 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 Stares 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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