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D8.5 Training and Consulting report II

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Document description	This deliverable reports on the training events organised by WP6 and WP7 groups to present the updates on the implementation of their

	respective pilots in the DARE platform; inferred evaluation results are also summarised. Moreover, it presents other external events organised by the DARE partners in the reference period.

Document Revision History

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v9	10/12/2020	Feedback from internal reviewer	I. Klampanos (NCSRD)
v10	11/12/2020	Final document	F. Magnoni (INGV)

Executive Summary

This report discusses the training events held by WP6 and WP7 groups to present the latest release of the DARE platform and the specific implementation of their respective pilots to the reference communities. Quantitative and qualitative evaluations of the training events are summarised by analysing user feedback through questionnaires and interviews. Recent events directly organised by DARE partners to promote the project are also summarised.

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List of Terms and Abbreviations

Abbreviation	Definition
ENES	European Network for Earth System modelling
EOSC	European Open Science Cloud
EPOS	European Plate Observing System
ESGF	Earth System Grid Federation
MT3D	Moment Tensor in 3D
RA	Rapid Assessment
SUS	System Usability Scale
VC	Volcanology test case

1 Introduction

1.1 Purpose and Scope

The purpose of this report is to describe recent events organised by DARE partners to promote the platform including the training events held by WP6 and WP7 whilst presenting the respective pilots to the EPOS and IS-ENES reference communities.

1.2 Approach and Relationship to other Workpackages and Deliverables

This deliverable is closely linked to WP6 and WP7, responsible for the seismic and climate use cases respectively, and other work packages that participated in the organised events, both trainings and external events (WP2, WP3, WP4 and WP5). Related Deliverables are D6.4, D7.4 and D8.3 which contain additional details on the trainings and other outreach events.

1.3 Methodology and Structure of the Deliverable

The structure of this deliverable is as follows: first, the report exposes the main training events organised by WP6 and WP7; in the last part, it summarises very briefly a few disseminating events organised by DARE partners.

2   WP6 – EPOS trainings

This section describes the organisation of the second WP6 training event for seismological applications. Moreover, following the decision of introducing the DARE platform to the new EPOS volcanology community (Deliverables D6.2 and D6.4), we present the volcanological school organised in the framework of WP6. Evaluation results of the two training events are then summarised.

2.1   Volcanological school

2.1.1   Motivations

The volcanological school was part of the module "Hazard and Risk Assessment of Mediterranean Volcanoes" which is an elective course at the Geophysical Institute of KIT. Participating students learned about tectonics and geodynamics in the region which led to the development of the current volcanism in the Mediterranean Sea. An important aspect in the course were the concepts of geohazard and risk, related to regional volcanic activity. In this context, the students gained knowledge in modelling volcanic ash dispersal and volcanic ballistic objects and could apply it to selected target sites.

The DARE volcanological test case VC was presented during the school since it combines the general preprocessing steps needed for such hazard analysis in its workflow and allows the students to focus on the interpretation task instead of spending too much time on preliminary coding tasks. Furthermore, the computational part of the course was used by the DARE partners to study the reliability and stability of the test case for applications with a large group of young domain experts with inexperience in software development.

2.1.2   Structure of the school

The volcanology school comprised three parts: Part A was conducted at KIT and dedicated to the preparation of the field class in Italy (part B). Part C included data analysis after the field class, and a poster presentation.

Part A:
- July/August 2020:
    - Lectures and video lectures, topics: Geodynamics of the Mediterranean, Volcanic Hazard and Risk in the Mediterranean, Seismic Arrays on Stromboli and Etna, Numerically modelling seismic signals, Ash Dispersal Modelling, Modelling volcanic ash: relevant parameters and their sensitivity
    - Ash modelling exercise at KIT: Scenarios for Vesuvius, Stromboli, Vulcano and Etna executing the VC test case in the DARE platform
    - Preparation of presentations which include ash modelling results for Vesuvius, Stromboli, Vulcano and Etna

Part B:
- August/September 2020:
    - 12 days in situ lecture in Italy with visits and measurements at Vesuvius, Stromboli, Vulcano and Etna, presentations by students (see above)

Part C:
- October 2020: Data analysis, exercises at KIT
- November 2020: Poster presentation including joint analysis: seismic data and ash modelling

The evaluation analysis to assess the platform usability was based on anonymous questionnaires filled in by the school participants and was conducted by Aurora Constantin (UEDIN – WP2).

2.1.3   Participants

The volcanological school was offered as an Elective in summer semester 2020 at the Geophysical Institute at KIT. As a prerequisite, students had to have compulsory passed a beginner's course in physical volcanology in preceding semesters. A total of ten students, the majority of them female, from the Master's degree program in Geophysics, participated in the elective course. Only four students had received their Bachelor's degree from KIT while the rest of the students had received their Bachelor's degree in Geophysics from other European and Non-European universities. Thus, the prior knowledge in computing training was rather heterogeneous.

2.1.4   Evaluation results

After analysing the data, we excluded the data from one participant as we found that their scores in System Usability Scale (SUS) questionnaire [Sauro 2011] - the first 10 five-point Likert scale questions - were in contradiction with their answers in the following three open-ended questions. Particularly, the student was very positive in appreciating the platform in the last open-ended questions, but scored the platform extremely low in the SUS questionnaire according to [Bangor *et al.* 2009]. Therefore, we only considered the results from nine participants in this study.

The overall outcome indicates a reasonably high-level of usability on the SUS, according to [Bangor *et al.* 2009]. The feedback in the open-ended questions were in line with the SUS score, allowing us to conclude that the students perceived the DARE platform quite positively. Thus, the students considered that the platform is easy to use and liked various aspects, such as the structure and remote access. The challenges and suggestions helped us identify opportunities for improvement that should be attempted if resources permit. A full description of the evaluation strategy and results is included in Deliverable D6.4. Further detail and analysis may be found in [Constantin 2020].

2.2   Seismological training webinar

2.2.1   Motivations

The objective of the second seismological training was to present to the reference EPOS community the implementation in DARE of the MT3D test case which deals with a typical seismology issue, the study of the earthquake source parameters. This workflow involves complex tools for producing and analysing the results and requires access to external research infrastructure services. These aspects may often distract the users from their final goals and prevent successful results (details in Deliverable D6.4). The training had thus the scope of using the test case to advertise and exemplify the advantages of exploiting the DARE platform to ease implementation and execution of scientific workflows developed by the community users.

The training was also motivated by the need to provide basic guidelines for future users of the platform in seismology, and for research developers and engineers who will work on the DARE platform deployment in institutional and local resources. We finally aimed to gather feedback from the participants in order to assess the usability and utility of the platform.

2.2.2   Structure of the training webinar

The seismological training was organised on Wednesday November 11th, 2020, as a webinar due to COVID-19 emergency. The agenda was the following:

When	What	Who
10:00-10:05	Welcome and introduction to the DARE project	Iraklis Klampanos, NCSRD
10:05-10:25	The DARE platform: Tools and API	Iraklis Klampanos, NCSRD
10:25-10:40	The implementation of the MT3D (Moment Tensor in 3D) use-case	Federica Magnoni, INGV
10:40-10:45	Evaluation overview	Aurora Constantin, UEDIN
10:45-10:50	Q&A	
End of 1st part		
10:50-11:10	DARE platform components and deployment	Iraklis Klampanos, NCSRD
11:10-11:30	Hands on for registered users	
End of webinar		

The webinar was structured in two parts. The first one was more general to introduce the DARE project and platform with its main components, together with the scientific basics of the MT3D seismological test case and its execution through the platform API. At the end of the first part, Aurora Constantin presented the evaluation strategy that is based on Google anonymous questionnaires[1] and detailed interviews (for users who gave the consensus). The second part included more detailed presentations of the use of the DARE platform components and functionalities, and instructions for the DARE platform deployment. A live demo of the execution of the MT3D workflow through a Jupyter Notebook was also presented. Participants were strongly encouraged to ask questions, participate in the evaluation and test the platform and workflow in the week after using training accounts purposely created. Additional details are in Deliverable D6.4.

2.2.3   Participants

The participation in the seismological webinar was largely advertised through invitation emails and DARE social media channels in order to involve EPOS, INGV, KIT and DARE communities. Registered users were 55 (including 9 DARE members) and their expertise was quite various including domain specific researchers, research developers and engineers, and software engineers (see Figure 1 and Deliverable D6.4). As for the first seismological training (Deliverable D8.4), the heterogeneity of participants was one of the targets of the training organisation and represents an added value for the evaluation phase. It allows a thorough appraisal of the DARE platform functionalities, their applicability

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[1] https://forms.gle/AmUtJKrbcKBmsrXz6

and perfectible aspects taking into account multiple points of view in order to evaluate the platform utility for the whole reference community.

Figure 1: *Expertise of the WP6 training participants.* This includes all registered participants (9 of which are DARE members).

2.2.4   Evaluation results

The impossibility of organising a face-to-face meeting partly limited the gathering of evaluations. In particular, all the interviews were conducted on present or previous members of the DARE project, so their results should be considered with caution.

In general, the evaluation results from both questionnaires and interviews were quite positive. The attendees appreciated the organisation of the training, recognised the main benefits of using the platform and provided positive feedback on the opportunity of using the platform for their daily work. These results are very important to orientate future dissemination actions and to support the sustainability of the DARE platform. A full description of the evaluation strategy and results is included in Deliverable D6.4.

3   WP7 – IS-ENES training webinar

This section describes the organisation of the second WP7 training event and summarises the evaluation results.

3.1   Motivations

In Climate Science research and applications, there is often a need to use more complex analysis tools. In Deliverable D8.4 the integration of climate indices and simple statistics calculations using the DARE platform was presented. Even if some of these tools are already available in other platforms, such as in the Copernicus C3S, the goal was to be able to easily use that kind of simple tools to process any climate datasets, either inside or outside the Research Infrastructure ESGF context.

The second objective was to leverage more complex analysis tools so that it is possible for end users to use them. Those tools can be complex to install, to configure, to run, and also to process the output. Users often lack technical and/or specific scientific knowledge as well as climate domain jargon. Also, it may not be possible for the users to download all required input data that is needed. In Deliverable D7.1 the reader will find a detailed description of the motivations and requirements, so it will not be reproduced here.

The evaluation training was designed to get feedback about the DARE platform in the context of the Climate domain, using the complex analysis tool integration as an example on how those tools can be

easily leveraged for end users. One of the other objectives of the training was to train future users of the platform, as well as those who will deploy instances of the DARE platform within the community. Another important objective is to disseminate and advertise the platform for future use in the community.

3.2   Structure of the training webinar

The training was done in virtual, as a webinar (due to COVID-19 emergency), on Friday October 16th 2020. The agenda was the following:

When	What	Who
10:00-10:05	Welcome and introduction to the DARE project	Iraklis Klampanos, NCSRD
10:05-10:25	The DARE platform: Tools and API	Iraklis Klampanos, NCSRD
10:25-10:40	The implementation of the cyclone tracking use-case	Christian Pagé, CERFACS
10:40-10:45	Evaluation overview	Aurora Constantin, UEDIN
10:45-10:50	Q&A	
End of 1st part		
10:50-11:10	DARE platform components and deployment	Iraklis Klampanos, NCSRD
11:10-11:30	Hands on for registered users	
End of webinar		

The training was using a standard structure, with introductory presentations followed by more detailed ones, and then ending with the evaluation itself, for the 1st part. The 2nd part was devoted to those who could be involved in the deployment of instances of the DARE platform within the community. Attendees were strongly encouraged to ask questions during presentations. The introductory presentations were to allow participants to have an overview of the whole project and objectives, to have more detailed information about the platform tools and API, as well as a description and a live demonstration of the cyclone tracking use case implementation. The evaluation was organised and led by Aurora Constantin.

3.3   Participants

Participants were from the climate science domain. 24 participants registered, and about 50% of them were Researchers and Research Engineers (see Figure 2). The participants were quite active and had many questions, especially on the use case, both after the presentation as well as during the Q&A period. Relevant discussions were triggered.

Figure 2: *Expertise of the WP7 training participants.* This includes all registered participants.

3.4 Evaluation results

As anticipated in §2.2.4, the evaluations' gathering was partially limited and the interviews involved present or previous members of the DARE project, so their results should be considered with caution. The overall evaluation from questionnaires and interviews was quite positive, and the participants were satisfied in how it was organised, and especially what they could learn by attending the training. This feedback is quite important to consider in order to prepare and finalise the last dissemination actions, as well as for the sustainability and adoption of the DARE platform within the ENES climate community. This point is also crucial for future adoption of the platform by other scientific communities. A full description of the evaluation strategy and results is included in Deliverable D7.4.

4   Other events organised by DARE

In order to be consistent with previous Deliverable D8.4, in the following section we briefly summarise other dissemination and outreach events in the reference period which the DARE partners have directly organised. An extensive report on the events and activities to which DARE partners participated or co-organised can be found in Deliverable D8.3 Dissemination and Outreach Report II.

4.1   American Geophysical Union (AGU) 2019

The project DARE was granted a session at the AGU Fall Meeting, held in San Francisco from December 9th to 13th, 2019. The session "IN021: Data-Oriented and Self-Optimizing Architectures and Workflows for Earth, Space and Climate Science Applications"[2] had the goal of discussing innovative approaches and new ideas on data distribution platforms, architectures, and workflows themselves to support research in Earth and Space Sciences.

The session was co-organised by the team members Christian Pagé (CERFACS), Iraklis Klampanos (NCSRD), Rosa Filgueira (UEDIN) and Alessandro Spinuso (KNMI).

4.2   American Geophysical Union (AGU) 2020

In the path of the success of the AGU 2019 participation, a session was also organised for the AGU 2020, from December 1st to 17th, in collaboration with the H2020-IS-ENES3 Project. This year, because of the

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[2] https://lnkd.in/gVUNvJp

COVID-19 pandemic, it was organised as a virtual-only conference. The session was: "IN032. Advancing Tools and Services for Climate Models and Analytics"[3] that took place on December 14th.

The session was organised by Christian Pagé (CERFACS), along with external international collaborators.

5 Conclusions

In the second phase of the project, DARE partners participated in numerous workshops and meetings, and directly organised sessions and training events to promote the project. Unfortunately, due to the COVID-19 pandemic, some of them couldn't take place as face-to-face meetings but very productive online events were organised which allowed us to properly advertise and disseminate the DARE platform.

Useful feedback came from the presentations and discussions during workshops and meetings which were important to complete the planned work of the project. Moreover, the training events held by WP6 and WP7 to present the platform to their respective reference communities showed positive outcomes. This demonstrates that the work done in the second phase of the project addressed most of the suggestions from previous trainings and satisfied the initial promising expectations. The powerful functionalities of the platform were recognised to speed up the scientific applications handling the time-consuming complexities and favouring the harmonisation of multiple components including external Research Infrastructure services.

In general, the organised training events demonstrated that the platform is of interest for multidisciplinary communities and can be productively utilised both by domain specific scientists and more technical users. Moreover, the involvement of a new scientific community, volcanology, allowed to prove the interest and possibility of the users to interact with the platform components and functionalities to get benefits for their work.

6 References

[Bangor *et al.* 2009] Bangor A., Kortum P., Miller J., 2009. *Determining what individual SUS scores mean: Adding an adjective rating scale*. Journal of usability studies, 4(3): 114-123.

[Constantin 2020] Constantin A., *Report on the first usability evaluation of DARE platform (24th July 2020)*, DARE technical report, https://doi.org/10.5281/zenodo.430971

[Sauro 2011] Sauro J., 2011. *A practical guide to the system usability scale*. Denver: Create Space.

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[3] https://agu.confex.com/agu/fm20/prelim.cgi/Session/109183 (Preliminary Program, URL may change)