



Strategy for the Intellectual Property Exploitation Deliverable D7.6



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1 Abstract / publishable summary

This deliverable summarises the beneficiaries' strategy and concrete actions related to the protection and the exploitation of the project results after the end of the project.

2 Conclusion & Results

The strategy for exploitation, dissemination and protection of the results of the ESiWACE2 project has been defined in a number of previous documents: The formal consortium agreement and two deliverables, D7.5 and D7.8, which covered plans for the exploitation and sustainability of project results and activities. This document gives a short recap and overview, taking into account also recent developments, in particular newly funded projects, which will take over responsibility for some of the results and activities.

3 Project objectives

This deliverable contributes directly and indirectly to the achievement of all the macro-objectives and specific goals indicated in section 1.1 of the Description of the Action:

Macro-objectives	Contribution of this deliverable
(1) Enable leading European weather and climate models to leverage the available performance of pre-exascale systems with regard to both compute and data capacity in 2021.	yes
(2) Prepare the weather and climate community to be able to make use of exascale systems when they become available.	yes
Specific goals in the workplan	Contribution of this deliverable
Boost European climate and weather models to operate in world-leading quality on existing supercomputing and future pre-exascale platforms	yes
Establish new technologies for weather and climate modelling	yes
Enhance HPC capacity of the weather and climate community	yes
Improve the toolchain to manage data from climate and weather simulations at scale	yes
Strengthen the interaction with the European HPC ecosystem	yes
Foster co-design between model developers, HPC manufacturers and HPC centres	yes

4 Detailed report on the deliverable

The general strategy for the protection and exploitation of the project results has been defined in the consortium agreement signed by the partners and in Deliverable D7.5 "Exploitation Plan" (D75, 2019) at the beginning of the project. The terminology following the Horizon 2020 Rules for Participation has been adopted by our project:

- **Exploitation** means the use of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities.
- **Results** generated under the project could be any tangible or intangible output, more particularly data, knowledge

4.1 Overall Strategy

A detailed analysis of ongoing requirements that need to be addressed after the end of both ESiWACE2 and the complementary project IS-ENES3 was submitted in the section "The future of ESiWACE" as annex to Deliverable D7.8 "Sustainability Plan" (D78, 2022) in February 2022. The considerations and recommendations given in that document are still valid today. Since then three of the identified key activities of the strategy for sustaining and exploiting ESiWACE2 results have significantly progressed: i) The third phase of ESiWACE (ESiWACE3) has been granted and was kicked off in February 2023, ii) two digital twins relevant for our field - a Climate Twin¹ and an Extremes Twin² - have been selected within Destination Earth³, and their implementation has started, and iii) the discussions on implementing the ENES research infrastructure (ENES-RI) are converging.

The primary objective of ESiWACE was and is not the generation of commercial projects but to enable cutting-edge science using extreme performance computing capabilities. For most of the tools, models and services of the ESiWACE2 project, this implies the need for continued maintenance and improvement. Driven by the scientific interest of the partners and the societal importance of the topics addressed, the work carried out in ESiWACE2 will be continued using a number of channels and instruments.

4.1.1 ESiWACE3

The ESiWACE3 project started in January 2023⁴ and will continue selected ESiWACE2 activities, a prominent example being the HPCW benchmark. Furthermore, ESiWACE3 will maintain established communication channels such as the ESiWACE newsletter, the Zenodo community⁵ and the ESiWACE YouTube channel⁶. A smooth continuation of these activities is secured via the continued involvement of ESiWACE2 key partners in ESiWACE3.

4.1.2 Other funded projects

The overarching objective of ESiWACE2 was to advance the capability of existing climate models by enabling them to make efficient use of pre-exascale and exascale hardware. Due to the enormous complexity and longevity of weather and climate models this is only possible with the institutional involvement of the model owners and through collaboration with other projects. The ESiWACE2 flagship model configurations have reached high readiness levels and are already taken up by large EU research and infrastructure projects that are exploiting them for scientific studies (for example in nextGEMS⁷ and EERIE⁸) and future operational simulations of weather and climate, in particular Destination Earth.

The ESiWACE2 work is also being taken up and continued in large non-EU funded projects like the

¹<https://stories.ecmwf.int/provider-page-climate-adaptation-digital-twin/index.html>

²<https://stories.ecmwf.int/providers-page-on-demand-extremes-digital-twins/index.html>

³<https://stories.ecmwf.int/destination-earth/index.html>

⁴ESiWACE3 has received funding from the EuroHPC JU under grant agreement No 101093054. Co-funded by the European Union.

⁵<https://zenodo.org/communities/esiwace/>

⁶<https://www.youtube.com/@esiwace880>

⁷Next Generation Earth Modelling Systems (nextGEMS): <https://nextgems-h2020.eu/>

⁸European Eddy-Rich Earth system models (EERIE): <https://cordis.europa.eu/project/id/101081383>

German WarmWorld⁹, which is centered around the ICON model, the Swiss EXCLAIM¹⁰ project, which in particular is advancing one of the domain-specific languages (DSLs) supported by ESiWACE2, or the UK project ExCALIBUR¹¹, which among many other things builds on the work on data handling carried out in ESiWACE2.

4.1.3 ENES-RI

ESiWACE3 will support an interim office for the ENES research infrastructure (ENES-RI)¹². On the longer term, ENES-RI is conceived as an overarching coordination and support activity driven by institutions that are involved in Earth system modelling and/or the usage of its produced data. ENES-RI will continue the support of community tools such as OASIS, XIOS or NEMO, which have been part of the ESiWACE2 activities, and also take over the coordination of the ENES HPC Task Force, which is currently supported via ESiWACE2 to foster collaboration in the weather and climate community with respect to High Performance Computing-related issues.

4.1.4 Collaboration

All activities mentioned above are collaborative efforts by design. However, it is also very important to continue the interaction and collaborations established by ESiWACE2 outside of existing funding schemes. For example, there is currently no funding opportunity to support the international collaboration on DSLs for the Climate and Weather domain, an effort furthered very much through Swiss and UK involvement. All parties are highly interested in continuing the collaboration and exchange. Instruments like the HPC Task Force or domain-specific conferences such as the series of ENES HPC workshops, which will be continued in ESiWACE3, are extremely helpful to sustain this interaction.

4.1.5 Dissemination via external platforms

All ESiWACE partners are strongly encouraged to keep using the established dissemination channels: the Zenodo community, the ESiWACE newsletter, the ESiWACE Twitter channel and the ESiWACE YouTube channel.

4.2 Ownership and Access

The ESiWACE2 Consortium Agreement (CA) was set up in 2019 for regulating the ownership and access to key knowledge and scientific results. The CA defines the following:

- Access rights;
- Results ownership;
- Joint Ownership;
- Transfer of results;
- Protection of results.

After the conclusion of the project, these IPR provisions remain in force, such as the obligations regarding confidentiality, exploitation and dissemination. Consequently, partners are required to properly manage the post-contract phase by complying with the following:

⁹WarmWorld: <https://warmworld.de/>

¹⁰EXCLAIM: <https://exclaim.ethz.ch/>

¹¹Exascale Computing ALgorithms & Infrastructures Benefiting UK Research (ExCALIBUR): <https://excalibur.ac.uk/>

¹²ENES-RI: European Network for Earth System Modelling - Research Infrastructure

- During implementation of the action and for four years after the project, in accordance with the general model grant agreement, partners must keep confidential any data, documents or other material (in any form) that is identified as confidential.
- Measures to ensure the exploitation of results must be performed up to four years after the project, requiring partners to be truly engaged in the use of their results.
- When disseminating the results without protecting them first, deciding to stop protection or not to seek extension, partners that have received EU funding must up to four years after the project formally notify the Commission in advance according to the requirements established in the grant agreement.
- The obligation to protect results remains, including the need to include the statement of financial support in any application for protection of results, whenever possible.
- Dissemination obligations also stay in force, including the need to mention the EU funding and to include a disclaimer.
- Partners are entitled to request access rights up to one year (or any other time limit agreed) after the conclusion of the project and therefore exclusive licences require during this period a prior written waiver of rights from the other consortium partners concerned.

Obligations regarding the transfer of results also remain in force.

4.3 Dissemination and Publication

Partners should use their best efforts to take measures aiming at ensuring the exploitation of their results up to four years after the project and take steps to make sure that the results they owned are used:

- in further research activities other than those covered by the project concerned, or in developing, creating and marketing a products or processes, or
- in creating and providing a services, or
- in standardisation activities.

A number of these channels has already been defined and is in use as listed in subsection 4.1.

For publication of results, ESiWACE2 privileges open access journals. If this is not possible, we opt for golden open access or green open access.

5 References

ESiWACE2 Exploitation Plan (D7.5), July 2019. URL <https://doi.org/10.5281/zenodo.3922017>.

Sustainability Plan - Deliverable D7.8, February 2022. URL <https://doi.org/10.5281/zenodo.6302901>.

Scalability on pre-exascale EuroHPC systems - Deliverable D1.3, March 2023. URL <https://doi.org/10.5281/zenodo.7701514>.

6 Changes made and/or difficulties encountered, if any

N/A

7 How this deliverable contributes to the European strategies for HPC

The project ESiWACE2 contributes to the European strategies for HPC as is outlined in many other deliverables of the project. Exploitation of the project results thus inherently contributes to these strategies. In particular, as reported in Deliverable D1.3, the project has developed large HPC applications, which can leverage the power of European pre-exascale and exascale machines when they become available.

8 Sustainability

This deliverable describes the available instrument to sustain the activities of the ESiWACE2 project. As elaborated in section 4, we expect and recommend that the relevant tasks of ESiWACE3 and the ENES-RI, and here in particular the HPC task force, serve to continue those efforts.

8.1 Target audience

As indicated in the Description of the Action, the audience for this deliverable is the general public. However, it addresses primarily the project partners.

yes		The general public (PU)
yes		The project partners, including the Commission services (PP)
		A group specified by the consortium, including the Commission services (RE)
		This reports is confidential, only for members of the consortium, including the Commission services (CO)

We ensure the uptake of the deliverable by the targeted audience through the following actions

We will publish this deliverable at Zenodo and distribute it by e-mail to all ESiWACE2 staff members.