LIQUIDICE

Deliverable 5.1 Dissemination, Communication and Exploitation plan

eu-liquidice.eu

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

LIQUIDICE: LinkIng and QUantifying the Impacts of climate change on inlanD ICE, snow cover, and permafrost on water resources and society in vulnerable regions.

Funding programme: Horizon Europe
Project Start Date: 01.02.2025
Grant Agreement No.: 101184962
Duration: 48 months

Document information	
Work Package	5 – Dissemination, Communication and Exploitation
Deliverable No.	5.1
Deliverable title	Dissemination, Communication and Exploitation plan
Dissemination level	☒ PU - Public ☐ SEN - Sensitive
Lead Beneficiary	IG PAS
Lead Author	Agata Goździk
Contributors	CNR, CMCC, GEUS, NORCE, DMI, UCPH
Contributing authors	Andreas Ahlstrøm, Warren R.L. Cairns, Bartłomiej Luks, Eirik Malnes, Lill Rastad Bjørst, Christian Rodehacke, Selvaggia Santin, Andrea Spolaor
Due date	31.07.2025

Document history		
Version	1.3	
Version Date	18.07.2025	
Status	☒ Draft	20.06.2025
	☒ WP leader approved	20.06.2025
	☒ Coordinator approved	01.07.2025
	☒Executive Board / SST approved	08.07.2025

Table of contents

Executive summary

This report pertains to the Deliverable D5.1: Dissemination, Communication and Exploitation plan, as described in ANNEX 1, part A (p. 32) of the EC/REA Grant Agreement for project number 101184962, “LIQUIDICE”. Work Package 5 of the LIQUIDICE project is led by coordinator IG PAS with the support of CNR, FONDAZIONE CMCC, UCPH and GEUS. Other beneficiaries are also asked to contribute to the DCE strategy by reaching out to key people and organisations in each of their own countries.

This document outlines the comprehensive strategy for dissemination, communication, and exploitation activities within the LIQUIDICE project. It provides a framework for effectively sharing project results with both the scientific community and policymakers, as well as engaging broader audiences through science communication. Key objectives, target audiences, tools, and key performance indicators (KPIs) are defined for each area.

Dissemination activities focus on promoting scientific outputs and policy-relevant findings through targeted channels. The document details how the project will foster collaboration via clustering and networking, ensuring strong integration with related initiatives.

Communication efforts aim to make science accessible to citizens, highlighting the societal relevance of the project. The strategy outlines various communication tools and indicators to measure outreach impact.

The exploitation strategy identifies potential exploitable outcomes and describes how these will be assessed and leveraged through appropriate exploitation mechanisms.

A dedicated section addresses the project’s visual identity, including logo design, templates, and promotional materials such as roll-ups, info sheet, videos, and press releases, ensuring a consistent and professional public image. Finally, the document presents the project's online presence, including the website and social media channels, as well as internal reporting mechanisms to track progress and ensure accountability throughout the project's lifecycle.

1. Introduction

LIQUIDICE stands for *LinkIng and QUantifying the Impacts of climate change on inlanD ICE, snow cover, and permafrost on water resources and society in vulnerable regions.*

Rising temperatures are causing rapid changes to snow, ice and permafrost. These elements play a vital role in regulating the Earth's climate. These changes threaten ecosystems and water resources in many regions, including Arctic, the Alps and High Mountain Asia. Melting glaciers and ice sheets contribute to rising sea levels, impacting communities worldwide. Understanding these changes is crucial for managing their effects.

The LIQUIDICE project is strategically focused on 5 specific super sites covering regions with diverse climatic characteristics and vulnerability to global warming. In these sites, local societies and communities heavily rely on the water supply sourced from cryosphere for agriculture, hydroelectric power production, industry and public water supply.

Recognising the central role played by snow, ice and permafrost in the global climate system, the LIQUIDICE project joins expert cryospheric observers and modellers to:

1. comprehensively re-assess the past and future century-plus of climate-induced high impact changes to the Greenland ice sheet and climate vulnerable locations across the Alps, Norway, High Mountain Asia (HMA) and Svalbard, including permafrost areas and their ecosystems;
2. develop new, expanded and harmonised data from satellite Earth Observation (EO) and ground stations;
3. use these data to improve and test a hierarchy of ice sheet and glacier models with Earth System Models (ESMs);
4. through these steps, yield new process understanding, and ultimately
5. inform water resource, hydropower, and socio-economic strategies through clear and transparent communication of results and uncertainties.

The project's strengths lie in new multidisciplinary collaborations across 18 research institutions, from eight European countries (Poland, Italy, Denmark, Germany, Spain, Sweden, Norway, United Kingdom) and India, encompassing expertise in field observations, satellite EO techniques, ESM development and application, and socio-economic analysis.

LIQUIDICE will place a strong emphasis on dissemination, communication, and exploitation in order to reach the widest possible audience and to maximise the impact of the project outcomes and results. Therefore, an organisation experienced in communication and dissemination, IG PAS, will lead this work, supported by CNR-ISP, FONDAZIONE CMCC, UCPH and GEUS in collaboration with communication units from all partners.

The dissemination, communication, and exploitation activities have the common objectives to ensure wide and efficient communication, raise awareness of the project, its outcomes and importance in advancing climate change adaptation strategies for local communities, effectively implement two-way communication and engage societies affected by the observed changes, disseminate the high quality content of the project, and strengthen impact on stakeholder groups maximising synergies between dissemination and exploitation.

2. Dissemination: sharing results with scientific audience and policymakers

2.1 Goals and target audience

The LIQUIDICE project places strong emphasis on effective dissemination to ensure that its findings reach and benefit a wide range of audiences. The primary goals of our dissemination efforts are to increase awareness of the impacts of climate change on inland ice, snow cover, and permafrost, and to share the project's scientific progress, methodologies, and results with stakeholders across various sectors.

Our target audiences include:

- **Scientists and research institutions** – to foster collaboration, share data and methodologies, and contribute to the global body of climate and cryosphere research.
- **Policymakers and local politicians** – to support evidence-based decision-making at local, regional, and national levels, especially in vulnerable regions.
- **Other projects and networks** – to build synergies, avoid duplication of efforts, and encourage knowledge exchange across related EU and international initiatives.

By tailoring content and formats to each group, LIQUIDICE ensures that its insights contribute meaningfully to both science and society. In this version of the DCE plan general key content is described, while we intend to specify the more precise messages in the update of the DCE plan foreseen in month 18.

Table 1. Key LIQUIDICE content and dissemination means and channels tailored for specific target audiences

Target audience	Key content	Dissemination means and channels
Scientists and research institutions	- Advanced knowledge on the impacts of climate change and different natural and socio-economic drivers on inland ice and permafrost,	- scientific publications - conference presentations

	and its global repercussions, including climate-ecosystem interactions; - Further developed and improved climate and Earth System Models; - Advanced provision and use of observations, including in-situ, of complex processes with focus on dynamic and vulnerable regions that may lead to high impact changes.	- website - networking activities - online training - scientific workshops - final conference
Policymakers and local politicians	- Supported climate change adaptation strategies; - Advanced provision and use of observations of complex processes with focus on dynamic and vulnerable regions that may face high impact changes; - Importance of inland ice in water cycle, water resources and global climate system.	-policy brief (deliverable D4.4) - website - social media - press releases - project video - final conference
Other projects and networks	- Further developed and improved climate and Earth System Models - Advanced provision and use of observations, including in-situ, of complex processes with focus on dynamic and vulnerable regions that may lead to high impact changes.	- website - networking and clustering activities - conf. presentations - final conference

2.2 Dissemination means and key performance indicators (KPIs)

To effectively reach its diverse target audiences and maximize impact, the LIQUIDICE project employs a variety of dissemination tools and channels. These include both digital and traditional formats, tailored to the needs of scientists, policymakers, and networking projects and initiatives.

The following table outlines the main dissemination means used in the project, along with their corresponding key performance indicators (KPIs) to monitor the effectiveness of undertaken actions.

Table 2. Dissemination tools and KPIs

Dissemination tool	Description with examples	KPIs
Scientific publications	High impact international journals (e.g. Nature, Journal of Glaciology, The Cryosphere, Journal of Hydrology, HESS)	15 high-impact papers
Presentations at scientific conferences and events	Oral or poster presentations, open sessions and workshops at various conferences: e.g. ICARP IV events, European Geophysical Union General Assembly, IEEE's International Geoscience and Remote Sensing Symposium, SIOS Polar Night Week, Arctic Science	20 presentations

	Summit Week, European Polar Science Week, EC-Earth General Assembly	
Academic webinars	A series of webinars - an online training for the research community devoted to methods and scientific outcomes of the project.	8 trainings
Clustering and networking events	Meetings with existing networks and similar projects (e.g. European Polar Board, IASC, CAFF, AMAP; APECS, SCOR, ESA Polar Science Cluster, the EU Arctic/Polar Cluster through EU PolarNet, Arctic GEOSS, OCEAN.ICE, PolarRES, ArcticPASSION)	8 events
Final conference	The final conference to present outputs, results, and impacts achieved is foreseen in collaboration with SIOS Polar Night Week (Jan 2029).	60 participants
Early and open data sharing	Open access repositories of SIOS member institutes, open access publications	7 datasets
Policy brief	Policy recommendations focusing on the impacts of change in water resources. The Policy Brief will be targeting EU-policymakers and Arctic Parliamentarians.	1 document

At the proposal stage the Consortium identified some relevant scientific conferences, such as European Geophysical Union General Assembly, IEEE's International Geoscience and Remote Sensing Symposium, SIOS Polar Night Week, Arctic Science Summit Week, Greenland Science Week, European Polar Science Week and others. In the process of preparation for the 5th International Polar Year 2032-33, which will focus on closing knowledge gaps in understanding the consequences of rapid changes in the polar regions for the global ecosystem, there will be many opportunities to share project outcomes to academia and policymakers. The project will be presented whenever possible during the Fourth International Conference on Arctic Research Planning (ICARP IV) events.

During the first months of the project implementation more precise plan for the dissemination of the scientific results for the upcoming months was prepared and include:

- Cryospheric Ecosystems Conference, Poznań, Poland, 1-4 September 2025 (keynote talk "Shall We Care About the Arctic Snowpack?). The conference covers a broad spectrum of disciplines related to the functioning of cryospheric ecosystems: biology, chemistry, physics, and Earth sciences. Official website: https://cryo-ecosystems-conference.web.amu.edu.pl/
- SISC2025: Innovation in climate research for societal transformation – 13th Annual Conference of the Italian Society for Climate Sciences, Salerno, Italy, 22-24 October 2025. The Conference aims at connecting leading scientists, researchers, economists, practitioners, business leaders, and policy makers, whose activities are focused on different aspects of climate change, its impacts and related policies. Official website: https://www.sisclima.it/hp-rewrite/e626b1b6a00a32211f049025cddb3e2e

- Svalbard Science Conference, Oslo, Norway, 28-29 October 2025 (presentation & poster). The conference will bring together researchers at all career stages, research managers, policymakers and other stakeholders of Svalbard research to build and strengthen multi-generational, interdisciplinary and international collaboration. Over the two days, there will be sessions covering important aspects of Svalbard research. More information and a tentative program for the conference can be found on the official website: https://www.forskningsradet.no/en/svalbard-science-forum/conference/
- AGU25, New Orleans, USA, 15-19 December 2025. The conference highlights the essential role of connection in advancing Earth and space sciences. It brings together global researchers, policymakers, and emerging leaders to share cutting-edge science and foster collaboration. With interactive sessions, workshops, and panel discussions, AGU25 offers opportunities to engage with the latest research and explore cross-disciplinary solutions. From labs to policy, the event emphasizes the power and promise of scientific connection in driving innovation and progress. Official website: https://www.agu.org/annual-meeting
- SnowHydrology 2026, Jaca, Spain, 2-6 February 2026, (presentation – if accepted). 5th International Conference on Snow Hydrology seeks to provide an stimulating atmosphere to discuss our recent research about snow hydrology and different aspects of snow research. Official website: https://snowhydro.unirioja.es/
- 11th EARSeL Workshop on Land Ice and Snow 2026, Helsinki, Finland, 9–11 February 2026, (presentation). The workshop will be organised by the European Association of Remote Sensing Laboratories. Official website: https://si.earsel.org/workshop/11ws-is/?page_id=127
- Arctic Circle Rome Forum – Polar Dialogue, Rome, Italy, 3-4 March 2026. The conference will be held in coordination with the Ministry of University and Research in Italy and CNR. More details to follow.
- EGU GA 2026, Vienna, Austria, 3-8 May 2026, joint sister projects session at the European Geosciences Union General Assembly 2026, (no details yet, as we will apply for the session on the later stage). The EGU General Assembly 2026 will bring together over 20,000 scientists. EGU26 will foster interdisciplinary collaboration, showcase cutting-edge geoscience research, and promote diversity and global engagement in the Earth, planetary, and space sciences.

Additional opportunities for dissemination of the LIQUIDICE results to scientific audiences will be identified and described in the deliverable D5.2 due in month 18.

The summary of dissemination KPIs:

- scientific publications: **15 papers**
- presentations at scientific conferences and events, incl. scientific workshops: **20 presentations**
- academic webinars: **8 trainings**

- clustering and networking events: **8 events**
- final conference: **1 event for 60 pax**

2.3 Clustering and networking activities

LIQUIDICE fosters collaboration with stakeholders through established networks and organisations, selecting initiatives based on the needs and challenges identified in other WPs. This collaborative approach is essential for ensuring that efforts are targeted, impactful, and grounded in real-world priorities. The project maximises its reach and effectiveness by engaging existing networks without overextending resources.

Active two-way communication with local communities in key glacial basins further strengthens local relevance and participation.

Close coordination with the Year of Polar Prediction (YOPP), The Fifth International Polar Year (IPY-5), ICARP IV, and networks such as the European Polar Board, IASC, SCOR, ESA Polar Science Cluster, EU PolarNet, and Arctic GEOSS underscores the importance of collective action in advancing polar research and achieving meaningful outcomes. In addition, LIQUIDICE has initiated collaboration with CryoSCOPE (EC Grant Agreement No. 101184736) and ICELINK (EC Grant Agreement No. 101184621), so called "sister projects", further expanding its network and reinforcing the shared commitment to addressing critical challenges in polar and glacial regions. The coordinators of the sister projects meet online on regular basis to discuss potential future joint actions.

As part of the ongoing efforts to enhance collaboration and visibility across sister projects, a range of networking activities have been suggested to foster stronger synergies between LIQUIDICE, CryoSCOPE, and ICELINK. These include featuring blog posts, multimedia content, and insights from the projects on the LIQUIDICE website. Joint social media campaigns could be coordinated via LinkedIn to amplify the reach of project updates, thematic initiatives (e.g., YOPP, IPY-5), and event invitations. A series of joint webinars and online workshops is also proposed, offering thematic discussions, interactive Q&A sessions, and training opportunities for early-career researchers and students. To increase visibility at external events, coordinated booths and co-presentations at key conferences will be organized. Finally, a jointly curated newsletter is being considered to consolidate major updates, milestones, and dissemination highlights, aligning with the communication goals of each project and reinforcing cross-project promotion to key audiences.

3. Communication: science for citizens

3.1 Goals and target audience

The communication strategy of the LIQUIDICE project is designed to raise awareness and foster understanding of how climate change affects inland ice, snow cover, permafrost, and water resources in vulnerable regions. Our aim is to make complex scientific concepts accessible and relevant to the broader public, while promoting active engagement with the project's mission and activities.

The main aims of the communication activities are:

- to ensure visibility of the project and its effectiveness,
- to attract stakeholders to use project outcomes,
- to foster literacy on water resources challenges in the context of climate change,
- to inspire behavioural change towards more sustainable patterns and adaptation solutions.

We identified five major Stakeholders Groups (SGs), which will be reached within the communication activities, and we plan to build a venue for implementing two-way communications to foster closing the knowledge gap on climate change impacts in specific regions and to support informed decision-making for the communities relying on water resources.
Key target groups include:

- **Local societies and communities** – to inform and involve those directly impacted by environmental changes and to highlight local perspectives and knowledge. Dedicated workshops will be organised (more details in the next section).
- **Ski resort operators and local companies** – especially those dependent on water resources, infrastructure, or tourism, who may benefit from better understanding climate-related risks and adaptations. CNR-ISP is in contact with companies that manage the cable car facilities and ski slope preparation in the heart of the Dolomites and in the Monte Rosa area: Ski area San Pellegrino, Lagazuoi, and Monte Rosa. These three resorts are very interested in water availability for artificial snowmaking, particularly in the context of the ongoing drought and the reduced snowfall and summer precipitation that have been occurring in recent years. Dedicated workshops will be organised for them.
- **Environmental associations and Non-governmental organizations (NGOs)** – as partners in awareness campaigns, amplifiers of key messages and supporters of advocacy efforts related to climate resilience and sustainable water resource management. The environmental associations: Protect our Winters and Mountain Wilderness expressed their interest in participation in LIQUIDICE outreach workshops and exhibition events. Tourist guide associations in Longyearbyen (Svalbard) expressed their interest in hosting an outreach seminar for guides and tour operators on Svalbard

in order to spread the word on the project's findings dedicated to this part of the Arctic.

- **General public** – to cultivate broader awareness of climate impacts and encourage responsible environmental behaviour. General public will be reached by means of presentations of the project at various open-science events (science festivals, Researchers Nights, Greenland Science Week 2025 in Nuuk, Science Picnic etc.), social media presence, project website and highly innovative 360-degree videos dedicated to some of the project super sites, which will be prepared and used on VR goggles during open events.
- **School children** – to inspire the next generation through educational outreach, visual storytelling, and interactive resources. Schools will be reached via a series of online lessons, school competitions organised in Poland and Italy with an international awarding ceremony and special performances combining science with art. More details are provided in the next section).

By using clear language, engaging formats, and locally relevant messages, LIQUIDICE seeks to connect science with society and empower communities to take part in climate solutions. In this version of the DCE plan general key content is described, while we intend to specify the more precise messages in the update of the DCE plan foreseen in month 18.

Table 3. Key LIQUIDICE content and communication means and channels tailored for specific target audiences

Target audience	Key content	Communication means and channels
Local societies, local companies	- Advanced knowledge on the impacts of climate change and different natural and socio-economic drivers on inland ice and permafrost, and its global repercussions, including climate-ecosystem interactions; - Further developed and improved climate and Earth System Models; - Advanced provision and use of observations, including in-situ, of complex processes with focus on dynamic and vulnerable regions that may lead to high impact changes.	- conference presentations - website & social media - project video & 360 video - networking activities - online training - workshops - final conference
Environmental associations and NGOs	- Supported climate change adaptation strategies; - Advanced provision and use of observations of complex processes with focus on dynamic and vulnerable regions that may face high impact changes; - Importance of inland ice in water cycle, water resources and global climate system.	- open events - website & social media - press releases - project video & 360 videos - final conference

General public	- Importance of inland ice in water cycle, water resources and global climate system; - Vulnerability and sensitivity of inland ice to the ongoing climate change; - Knowledge on the impacts of climate change.	- open events - website & social media - art performances - project video & 360° videos
School children	- Importance of inland ice in water cycle, water resources and global climate system; - Vulnerability and sensitivity of inland ice to the ongoing climate change; - Knowledge on the impacts of climate change.	- website & social media - art performances - project video & 360° videos - school competitions - online lessons

3.2 Communication means and KPIs

To ensure broad visibility and engagement with the general public, local communities, and non-scientific stakeholders, the LIQUIDICE project employs a range of communication tools. These include online platforms, public-facing materials, and interactive events designed to raise awareness of climate-related challenges and project outcomes. The table below summarizes the key communication tools and associated key performance indicators (KPIs) used to evaluate their reach and effectiveness.

Table 4. Communication tools and means and KPIs

Communication tools	Description with examples	KPIs
Project website	The website will be the project's institutional communication and dissemination hub, as an access point for all the target audiences. More details are provided in the chapter "LIQUIDICE online presence" below.	>3000 visits
Project video	The project video (to be published on the project website and YouTube) will be a promotional tool presenting the main objectives and super sites.	>1000 views
Social media presence	Social media channels were chosen after a discussion at the kick-off meeting to suit the identified target audiences. At the current state we run: LinkedIn and Bluesky accounts for academic and policy audience and Facebook and Instagram profiles for a general audience. More details are provided in the chapter "LIQUIDICE online presence" below.	2-3 posts per week
Popular scientific publications	Press releases dedicated to some of the project's milestones and any relevant peer-reviewed papers, prepared by the project office, translated into partners' national languages and published in national media.	3-4 articles
Workshops and seminars for local	Outreach workshops, exhibition events and seminars for local societies, ski resorts operators, tourist guides associations and environmental organisations.	6 events

societies and SG		
School competitions	National competitions for schools in Poland and Italy with an international awarding ceremony.	>100 attendees
Art & science events	Special performances combining science with art (in collaboration with the educational departments of the Fenice Theatre Venice, the Theatre of Como and the Opéra Grand Avignon	>3000 attendees
360-degree videos	Highly innovative 360-degree videos dedicated to some of the project super sites will be prepared and used on VR goggles during open events	4 videos >500 views
Online lessons for schools	Online lessons for secondary schools in Europe by polar experts in collaboration with the EDU-ARCTIC network of 2500+ teachers	>30 lessons >1500 attendees

The online presence of LIQUIDICE is described in one of the sections below. Here one may find description of the activities specific for LIQUIDICE.

3.2.1 Local workshops

As part of LIQUIDICE commitment to public engagement and collaboration with local and Indigenous communities, several key outreach and co-creation activities are planned and underway. On 14 June 2025, Lill Rastad Bjørst (WP4) participated in a high-profile panel debate at Folkemødet 2025 (Democracy Festival) in Bornholm, Denmark, alongside the head of the National Center for Climate Research (NCKF), a Greenlandic entrepreneur, and a historian, with support from the Queen Mary's Centre at the University of Copenhagen. A presentation titled *"Advancing Greenland's Energy Sovereignty"* has been submitted for Greenland Science Week 2025. Looking ahead, LIQUIDICE will host a workshop during the Arctic Science Summit Week (ASSW) 2026 in Aarhus, Denmark, facilitating dialogue with Indigenous scholars and local stakeholders on co-designing inclusive research and community events, with participation from all WPs encouraged. A locally focused workshop will also be held in summer 2026 in Ilulissat, Greenland, in collaboration with Avannaata Kommunia and the ILLU science and art hub, organised by the University of Copenhagen. Finally, in early 2027, a webinar series and in-person event in Nuuk will be launched in cooperation with Nukissiorfiit, focusing on green transition potentials to support sustainable development in Greenland. In planning these activities, we will draw on UCPH's experience with stakeholder dialogue, workshop planning, and interaction with arctic policy makers.

3.2.2 School competitions

School competitions will be organised for students from secondary schools in Poland and Italy (on national levels). The aim of the competitions will be to increase interest of students in climate change and Arctic regions, raise their awareness about specific environmental challenges which these regions face and what impacts may the climate change have on their lives. This initiative encourages young individuals with an interest in science, technology,

engineering, and mathematics (STEM) to design and develop either a research project or an innovation project specifically tailored to Arctic conditions. Each participant will have a unique opportunity to explore scientific inquiry and creativity in a real-world context. At the current stage of the project implementation the specific rules and prices are not yet decided.

3.2.3 Art & science event

The integration of art and science offers a powerful means to engage young audiences with pressing environmental issues through emotionally resonant storytelling. *Piccolo Orso e la Montagna di Ghiaccio* (Little bear and the Ice Mountain) is a lyrical opera for elementary and middle school students that unites scientific expertise and artistic creativity to portray the impact of human activity on a fragile mountain ecosystem. The Opera is being prepared by the Associazione Lirica Como of the Como Theatre (https://aslico.org/) and their Opera Education Department (https://www.operaeducation.org/?lang=en) together with the Fenice Education department (https://education.teatrolafenice.it/), under the scientific direction of CNR ISP who will guide the writer Giancarlo De Cataldo in preparation of the libretto (lyrics). The CNR ISP unit will be the scientific consultants together with WP5 team. The idea behind the opera is of a mountain under anthropogenic pressure (a tourist park will represent overtourism) and it will darken slowly during the opera due to black carbon contamination. The final aria will have the children singing and the magic will cause the mountain to return to how it was. The first performance will be at the end of January 2026 at the Teatro Malibran in Venice, with other performances scheduled in March at Como and to be announced in the rest of Italy, and abroad in the partner theatres in Barcelona and Provence. The music is being composed by Giovanni Sollima inspired by sounds provided by CNR ISP from the underwater sound pollution unit. The students that will participate in the opera will have followed music lessons and a series of science lessons based on materials that are being prepared. The teachers will come to training events with LIQUIDICE personnel to help them instruct the children.

3.2.4 Online lessons

Online lessons for secondary schools in Europe by polar experts are foreseen. Online lessons are a tool, which helps to establish strong links between the research and education communities by connecting – even in real time – schools to scientists working in various places in the world. Online lessons conducted by researchers allow to inspire students to engage in the learning process and to better understand the role of scientific research in the modern world, scientific messages and scientific language. They may help to increase their knowledge about nature, geography, natural resources, and social sciences and to raise awareness about environmental issues and climate change. They may also encourage young people to choose STEM careers, so crucial for the development of knowledge-based societies.

The range of research topics of online lessons planned within LIQUIDICE is wide and covers geography, climatology, climate change, atmospheric physics and hydrology. Lessons may be delivered in English and in the national languages of the Consortium. In total we plan to organise a minimum 30 lessons for at least 1500 attendees.

The LIQUIDICE online lessons will be offered a.o. to STEM teachers and educators registered in the EDU-ARCTIC project (in total 2490 teachers from 60+ countries). EDU-ARCTIC was a European project funded by the EC within Horizon 2020 Programme and implemented in 2016-2019. Thanks to the possibility of promoting the LIQUIDICE online lessons among teachers registered in the EDU-ARCTIC programme, we may easily reach schools in Europe and even beyond.

The summary of communication KPIs:

- website & social media: 2-3 posts/week
- open events: 12 events
- seminars, outreach & community workshops: 6 events
- press releases: 4 articles
- art performances: 3000 participants
- project video, KPI: 1000+ views
- 360° videos: 4 videos, >500 views
- school competitions: 100 participants
- online lessons: 30 lessons with 1500 participants in total

4. Exploitation strategy

In the current document a preliminary plan for prolonged exploitation of model codes, research data and disseminated results is presented. It focuses on identifying and describing the potential exploitable results, while the selection of activities and effective means for their dissemination, transfer and future exploitation will be carried out in the next step and described in the deliverables D5.2. *Dissemination, Communication and Exploitation plan – 1st update* (M18) and D5.3 *Dissemination, Communication and Exploitation plan – 2nd update* (M36), whereas the D5.8 *LIQUIDICE Roadmap* (M46) will include guidance material and inform how to use project results to ensure their legacy. The final strategy will ensure that the exploitable results are made available, documented and disseminated to the research community.

4.1. Exploitable outputs

The key exploitable results include:

1) comprehensive standardised open-access datasets concerning glacier dynamics, Snow Water Equivalent (SWE), glacier mass balance, frontal ablation rates and permafrost through data compilation, field measurements and remote sensing observations with high spatial and temporal resolution necessary to study specific cryosphere related processes,
2) high-resolution (~20–40 km) global Earth System Model (ESM) simulations with enhanced representation of the Greenland and Antarctica ice sheets,

3) new Earth System Model simulations downscaled to a few km resolution over project super sites,
4) assessment of the future glacio-hydrological changes in selected river basins and their societal and environmental implications on water resources availability.

LIQUIDICE WP5 leader applied for the Booster EC services and the application was accepted on 18th June 2025, whereas the first introductory meeting took place on 1st July 2025. We expect that within the coming months, thanks to the Booster experts' support we will be able to properly identify and describe the key exploitable outputs and identify Unique Value Propositions and plan the most effective activities for each output. The results of the collaboration with the Booster service will be presented in the updated version of the DCE plan (D5.2). Currently, 12 exploitable outputs were identified by WP Leaders and their descriptions accompanied by the information on potential stakeholders are provided below.

4.1.1. Data catalogue of in-situ observations

Description: A new catalogue of in-situ observations related to the Earth System Science with particular attention to the climate-induced high-impact change regions (Greenland, Alps, Norway, High Mountain Asia, and Svalbard) and data crucial for Earth System Models. The catalogue will describe the repositories/databases, their content, and the implementation level of the FAIR (Findability, Accessibility, Interoperability, and Reuse) principles. Additionally, newly acquired datasets for snow water equivalent (SWE), firn-depth, snow accumulation, ice ablation, snow density, temperature, liquid water content and active layer thickness in the study sites will be released in M24.

Potential stakeholders:

- Glaciologists and cryosphere researchers
- Climate scientists and modellers
- Environmental monitoring agencies
- Developers of Earth system models

Due date: M12 (first version of the collection of the existing data, with updates in M36 & M42), M24 (release of the new acquired datasets).

Additional information: The deliverable D1.1 Data Catalogue (and updates D1.4 & D1.5) will provide a uniform and well-documented entry to a broad range of datasets, previously relatively scattered and often difficult to locate and use. This will make datasets from the selected high-impact regions easy to access, in particular to scientists not working or familiar with the data collection in the field. The Data Catalogue will be promoted at conferences and through the project website and information channels.

The deliverable D1.2 New field observations will consist of data collected by project partners during the project, some of which are new experimental datasets. Results will be disseminated through scientific publications and conference presentations.

4.1.2. New data processing methodology

Description: Documentation and code for new data processing chains and interpretation methods to retrieve subsurface snow and ice temperature, and to identify the cold-to-temperate transition surface in glaciers. This includes algorithm development, validation with field data, and integration into existing glaciological modeling frameworks.

Potential stakeholders:

- Glaciologists and cryosphere researchers
- Climate scientists and modellers
- Environmental monitoring agencies
- Developers of Earth system models

Due date: M24

Additional information: Results associated with D1.3 – New Data Processing Methods. Includes open-source code, technical documentation, and user guidelines. Results will be disseminated through scientific publications and conference presentations.

4.1.3. Snow cover and snow water equivalent datasets based on remote sensing

Description: High resolution snow cover datasets will be provided over the focus sites based on historical low-resolution satellite data improved to high-resolution using AI methods to reconstruct the time-series in as high resolution as possible based on training in periods when both high- and low-resolution data is available. Upcoming radar-satellite missions like NISAR (NASA) and ROSE-L (Copernicus) will open a possibility to measure the snow water equivalent frequently with satellites with a relevant resolution. These innovative satellite products could bridge a long-standing gap in the observations of snow.

Potential stakeholders:

- Hydrology, glaciology and cryosphere researchers
- Climate scientists and modellers
- Environmental monitoring agencies
- Hydropower companies, power traders

Due date: M12, M24, M36, M42
Additional information: Results as FAIR data and processing methods will be published in open science publications. They will be available as deliverables D2.1 Snow cover data set and updates (D2.5 & D2.9) and D2.2 Snow water equivalent data set and updates (D2.6 & D2.10).

4.1.4. Albedo climate data records

Description: Long term albedo products (1982-present) will be provided for all extended study areas (Greenland). Data sources: AVHRR 1982 to present, NASA MODIS 1999 to present, and EU Copernicus Sentinel-3 2017 to present

Potential stakeholders:

- Hydrology, glaciology and cryosphere researchers
- Climate scientists and modellers

- Environmental monitoring agencies

Due date: M12, M24, M36, M42

Additional information: Results as FAIR data and processing methods will be published in open science publications. They will be available as deliverables D2.3 Albedo climate data record and updates (D2.7 & D2.11).

4.1.5. Glacier mass balance data set

Description: LIQUIDICE will provide a consistent glacier and ice sheet mass balance time series for the period 1950-present building on contributions from EU and ESA projects.

Due date: M12, M24, M36, M42
Results as FAIR data and processing methods will be published in open science publications.

Potential stakeholders:

- Hydrology, glaciology and cryosphere researchers
- Climate scientists and modelers
- Environmental monitoring agencies

Additional information: Results will be available as deliverables D2.4 Glacier mass balance data set and updates (D2.8 & D2.12).

4.1.6. Three new fully coupled Earth system-ice sheet models

Description: Several WP3 deliverables enhance multiple aspects of the ISMIP within the CMIP framework, thereby contributing to the subsequent IPCC report. Ultimately, they will also deepen our understanding of the projected sea level contribution from disintegrating ice sheets and the fate of the evolving cryosphere across various climate zones. Developing three new fully coupled Earth system-ice sheet models (AWI-ESM, EC-Earth, CMCC-ESM) in LIQUIDICE will significantly contribute to the corresponding ISMIP (Ice Sheet Model Intercomparison Project) group. It will undoubtedly lead to recommendations regarding ice sheet implementations in global ESMs. Beyond coupled simulations, standalone ice sheet models require realistic ice surface conditions. These will be computed for the period covered by the CARRA reanalysis and presented in the deliverable D3.7 – IMBIE Surface Mass Balance simulations.

Potential stakeholders:

- ISMIP community and its focus group about coupled ice sheet-earth system models
- CMIP (Climate Model Intercomparison Project) and the next IPCC report
- Cryosphere, Sea-level, and Paleoclimate researchers
- Environmental monitoring groups and agencies
- Climate attribution research

Additional information: Results will be available as deliverables: D3.1 – FESOM-ice shelf cavity adjustment, D3.3 – CISSEMBEL code: Debris cover, coupling to OpenIFS, D3.4 – Report on high versus low resolution simulations, D3.9 – Coupling between CISM ice sheet and CMCC-ESM.

4.1.7. More accurate projection of glacier evolution in the Arctic, the European Alps and beyond

Description: Glaciers respond to the changing conditions affecting their role as water towers, which coincide with alterations in numerous environmental factors, such as hydropower generation, the biological landscape, land use, and tourism in their immediate vicinity. Remote consequences, such as navigable stream networks, downstream power generation, and irrigated agriculture, also accompany these.

Potential stakeholders:

- Hydrology, glaciology and cryosphere researchers
- Climate scientists and modellers
- Environmental monitoring agencies
- Biology of the alpine zone researchers
- Hydropower companies, power traders
- Tourism industry planning its future

Additional information: To enable a more accurate projection of these changes and consequences, various deliverables contribute and will support follow-up studies in different directions: Deliverable D3.2 – Downscaled CORDEX climate scenarios, D3.5 – Report about thermodynamics affecting glaciers, D3.6 – CryoGrid simulations

4.1.8. Software to enhance our understanding of the cryosphere and beyond

Description: LIQUIDICE developed open-source software enables commercial use, such as CISSEMBEL under the European Union Public Licence 1.2 (EUPL 1.2), and promotes its application in commercial environments. The detailed simulations of glacier surface melting, including the effects of debris cover, present significant business opportunities for hydropower companies and serve as a resource for environmental monitoring agencies globally. Machine learning techniques could augment these capabilities.

Potential stakeholders:

- Hydrology, glaciology and cryosphere researchers
- Climate scientists and modellers
- Environmental monitoring agencies
- Hydropower companies, power traders

Additional information: In WP3, various software products will be developed and shared as open-source software with the interested community. This will expand the potential use cases of existing products. Deliverable D3.3 – CISSEMBEL code: Debris cover, coupling to OpenIFS will provide ice sheet integration of the snow/surface mass balance model as a versatile tool to integrate ice sheets in Earth System Models and potential integration of glaciers in global simulations at sufficient resolution. A pilot is also planned with Indian partners. An enhanced CryoGrid model with glacier evolution capabilities will be presented in the deliverable D3.6 – CryoGrid simulations, whereas Deliverable D3.5 will be a report about thermodynamics affecting glaciers.

4.1.9. Satellite product supporting tools

Description: Knowledge of the ice's surface mass balance is crucial to fully exploit the strength of satellite-based monitoring programs for ice sheets and glaciers. Therefore, we will contribute to the Ice Sheet Mass Balance Intercomparison Exercise (IMBIE) for the Greenland ice sheet. This collaborative effort between the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) contributes to global sea level estimates in IPCC reports.

Potential stakeholders:

- ISMIP community with a focus on ice sheet simulations
- CMIP and the next IPCC report
- Cryosphere and Sea-level researchers
- Satellite groups evaluating the total mass balance of the Greenland ice sheet
- Environmental monitoring groups and agencies

Additional information: Deliverable D3.7 – IMBIE Surface Mass Balance simulations will provide Surface Mass Balance simulations across the Greenland Ice Sheet for the period 1991–present as contribution to Ice sheet Mass Balance Inter-comparison Exercise (IMBIE).

4.1.10. Framework for a Water Discharge Impact Assessment

Description: The impact modelling in WP4 will use modelled estimates (from WP3) of liquid water input (meltwater runoff from hydro-glaciological models, and rainfall on areas free of snow and ice) for future scenarios as input to catchment models which produce time series of river flow at the point of economic/societal interest. The river flow time series will be converted into impacts by using site specific information. Selection of metrics will be done by consultation with relevant stakeholders.

Potential stakeholders:

- Government and municipalities
- Environmental monitoring groups and agencies
- Hydrology, glaciology, and cryosphere researchers
- Hydropower schemes and private companies
- Policymakers

Additional information: Deliverable D4.1 Develop a Framework for a Water Discharge Impact Assessment will focus on Assessment of the future glacio-hydrological changes in selected river basins and their impacts on Hydropower Projects.

4.1.11. Policy recommendations focusing on impacts of change in water resources

Description: With the aim of delivering a holistic understanding of society's response and behavioural changes, the research will allow for a tangibly estimation of the impacts of climate change informed by Water Discharge Impact Assessments.

Potential stakeholders:

- Government and municipalities
- Environmental monitoring groups and agencies
- Policymakers (mainly EU-policymakers and Arctic Parliamentarians)

4.1.12. Guidelines for citizen engagement

Description: Recommendations will be developed ensuring consistency with regional, national, and alpine-specific plans. The framework and results generated through this research will be disseminated into guidelines, facilitating its application in analogous sectors. The guidelines will include also recommendations for sustainable tourism. Lessons learned, including both the best and worst practices, will be integral to refining and enhancing the proposed guidelines.

Potential stakeholders:

- Government and municipalities
- NGOs
- Civil society
- Policymakers
- Destination Management Organizations (DMOs)
- Tourism operators
- Tourism studies (Academia)
- Rights-holders (ICC)
- Indigenous peoples
- Renewable energy companies
- Nordic Council of Ministers
- Journalists and Press

Additional information: This output will be based on the following deliverables: D4.2 Identification of climate change adaptation strategies with local stakeholders and policy-makers - A report identifying climate change adaptation strategies pertaining to inland ice snow cover and permafrost impact on water resources and the hydropower potential with local stakeholders (Greenland, Norway); D4.3 Guidelines and Recommendations for Sustainable Tourism - framework and recommendations for Sustainable Tourism: Applying Insights from the Monte Rosa Area in the Italian Alps, and D4.5 New guidelines for citizen engagement and democratic participation related development in hydropower.

4.2. Exploitation means and KPIs

There are several activities foreseen to strengthen the exploitation of the LIQUIDICE outcomes. Within the project we plan to conduct at least 8 online trainings dedicated to various project outcomes. During the trainings participants will get familiar with LIQUIDICE methodology and developed model codes, which could be implemented for other regions. They will be informed, how to use collected data and downscaled simulations. The trainings will be recorded and made available for any other potential users.

Additionally, the project will provide guidance material describing how project results can be interpreted and appropriately applied within their limitations.

The summary of exploitation KPIs:

- online trainings on developed methods and project results: 8 webinars
- sharing of model codes, research data and project results with guidance material: 7 datasets
- LIQUIDICE Roadmap: 1 document
- Policy brief: 1 document

5. Project visual identity

5.1. Logo and templates

The LIQUIDICE logo serves as a visual identity for the initiative. The design reflects the project's core themes, incorporating elements that evoke the cryosphere, water, and environmental change. With a clean and modern aesthetic, the logo symbolizes the scientific and collaborative nature of LIQUIDICE, aiming to capture the project's focus on inland ice, snow cover, and permafrost in a rapidly changing climate. As a consistent branding element across digital platforms and project materials, the logo reinforces recognition and cohesion in all communication and dissemination efforts.

The LIQUIDICE logo was prepared in 3 graphic variants to serve in various graphic and multimedia formats:

Fig. 1. Three versions of the LIQUIDICE logo

The logo features the project name in a clean, bold typeface, using the **Kiro** font—a geometric sans-serif that conveys clarity, stability, and professionalism. The primary color of the logo is a deep, cool-toned blue with the RGB value **(49, 39, 130)** and hex code **#312782**, symbolizing water central to the project's research. Combined, the typography and color scheme establish

a strong and cohesive visual identity that is both recognizable and aligned with the project's scientific and environmental mission.

Based on the visual identity and style of the LIQUIDICE logo, we have developed a cohesive set of branded materials. These include a Word document template, a deliverable & milestone templates, and three versions of PowerPoint templates — light, dark and plain — to accommodate different presentation contexts. All materials are aligned with the brand's aesthetic to ensure a consistent and professional look across communications. They also include the obligatory disclaimer: "*Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.*"

They are available in the project' Teams folder "General LIQUIDICE channel" -> "Visual identity".

5.2. Promotional materials

5.2.1. EU Acknowledgement

The promotional materials should include the EU logo and disclaimer: "Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environmental Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them. "

All scientific publications funded by the project need to include the funding statement: "This work was funded by the European Union's Horizon Europe research and innovation programme through the project LIQUIDICE (grant number: 101184962). "

5.2.2. Roll-up

The LIQUIDICE roll-up banner visually communicates the core mission and structure of the project. Featuring a clean, modern design aligned with the project's branding, it highlights the acronym meaning — *Linking and QUantifying the Impacts of climate change on inlanD ICE, snow cover, and permafrost* — and emphasizes its relevance to water resources and vulnerable societies. Central to the layout is a circular diagram of the six work packages, illustrating the project's interdisciplinary workflow across field observations, remote sensing, modelling, impact assessment, dissemination, and coordination. The lower section showcases the coordinator and partners from across Europe and beyond, while a QR code and website link ensure easy access to more information. The banner is available in both dark and light versions, designed for flexibility in different presentation settings.

Fig. 2. Light and dark versions of the LIQUIDICE roll-up banner

5.2.3. Project infosheet

The LIQUIDICE infosheet (A4, two pages) serves as a concise, visually engaging overview of the project, intended for stakeholders, policymakers, researchers, and the general public. It is presented as an annex 1 to this document. It includes the following key components:

1. **Project Title and Logo**: Prominently displayed at the top, including the project's acronym (LIQUIDICE) and full title for clarity and branding.
2. **Global context:** A paragraph providing information about the geographic regions affected by cryospheric changes and the types of transformations occurring, such as glacier retreat, snowpack loss, and permafrost thaw. It also highlights the broader environmental and societal impacts of these changes, including altered hydrology, increased climate extremes, and risks to infrastructure, ecosystems, and communities.
3. **Facts:** This section outlines major impacts of ice loss on water, energy, and infrastructure, emphasizing the global role of the Greenland Ice Sheet and the Himalayas. It also notes gaps in climate models and risks from permafrost instability.
4. **Keywords:** selection of important terms connected to the project's content.
5. **Project overview (About)**: Two paragraphs with information about the geographic focus, scientific components, and research methods of the LIQUIDICE project, describing also the collaborative structure, types of data and models generated, and the intended applications for stakeholders in water management, hydropower, and climate adaptation.
6. **Geographic Focus**: A map presenting the project super-sites.
7. **Work Packages (WPs)**: A diagram showing the six main work packages, highlighting the project's multidisciplinary approach (field observations, modelling, remote sensing, etc.).
8. **Consortium & Partners**: Logos of the coordinating institution (Institute of Geophysics PAS) and partners, showing the wide European and international collaboration.
9. **Project in numbers**: Project budget, duration (Feb 2025 – Jan 2029), number of countries and partners involved.
10. **Social media & Website**: Web address (www.eu-liquidice.eu), and social media links.
11. **EU Acknowledgment**: Funding statement with the EU flag and disclaimer about the European Union's role, as required.

5.2.4. Project video

The first draft version of the LIQUIDICE project video is now available on YouTube https://youtu.be/1qT36_JhWJ4?si=d3VShRkBJk_UYHAC and provides an introductory overview of the project's aims, methodology, and expected impacts. It presents the scientific motivation behind the project and highlights its focus on understanding climate change effects on inland ice, snow cover, and permafrost. The current version serves as a conceptual teaser and communication tool, designed to support early outreach and stakeholder engagement. The final version of the video, currently in development, will feature enriched content

including footage from LIQUIDICE super-sites, fieldwork activities, and in-situ measurements. It will showcase the use of advanced monitoring equipment and the real-world environments in which the project's data is collected, offering a more dynamic and visually compelling narrative of the project's interdisciplinary work and geographical scope.

5.2.5. Press releases

To support visibility and stakeholder engagement, LIQUIDICE plans to prepare press releases and distribute them with the help of press officers and communication offices in partners institutions. The project has released two official press releases to date. The first, published on February 28, 2025 announced the successful Kick-Off Meeting of the project, highlighting its ambitious goals, international consortium, and focus on climate-related cryospheric changes. The second release, distributed on March 21, 2025 focused on LIQUIDICE's active contribution to World Meteorological Day, World Water Day, and International Day of Glaciers — three global observances united by the project's core mission. These communications play a key role in raising awareness about the project's relevance to climate science, water security, and international cooperation and help to increase the project general visibility.

6. LIQUIDICE online presence

As part of its comprehensive Dissemination, Communication, and Exploitation Plan, the LIQUIDICE project places strong emphasis on maintaining a dynamic and accessible online presence. This is achieved through its official website and a range of social media platforms, which together serve as vital tools for engaging stakeholders, sharing research outcomes, and raising awareness about the impacts of climate change on inland ice and water resources. The following sections provide an overview of the project website and its structure, as well as the social media channels leveraged to reach diverse audiences and foster public and scientific dialogue.

6.1. Project website

The LIQUIDICE project maintains a comprehensive online presence through its official website: eu-liquidice.eu. The website was launched in April 2025. This platform serves as a central hub for disseminating information, updates, and resources related to the project's objectives and activities. The website is organized into several key sections, each providing detailed insights into various aspects of the project:

- **About**: This section outlines the project's mission to assess and quantify the impacts of climate change on inland ice, snow cover, and permafrost, particularly focusing on water resources and societal implications in vulnerable regions. It emphasizes the importance of understanding these changes to manage their effects effectively. It contains 5 sub-sections: Impact, Methodology, Objectives, Work Packages and Networking, where further details about the project and its structure are provided.

- **News**: Regular updates and announcements are posted here, detailing recent fieldwork, research findings, and other significant developments within the project. For instance, updates on spring fieldwork in Svalbard and data collection efforts in Greenland were shared to keep stakeholders informed.
- **Super-sites**: This section provides in-depth information on the five study areas, known as super-sites, which are critical for the project's research:
    - **Italian Alps**: Monte Rosa glacier system and the Lys and Évançon glacier catchments.
    - **Norway**: Jostedalsbreen glacier system and Nigardsbreen glacier catchment.
    - **Greenland**: Ilulissat and Kangerlussuaq ice sheet catchments.
    - **Svalbard**: Austre Brøggerbreen and Werenskioldbreen glacier catchments, along with the Fuglebekken catchment.
    - **Indian Himalayan Region**: Ladakh Region, including the Stok glacier and the Chenab, Alaknanda, and Teesta Basins.

  Each super-site page offers descriptions of the specific research activities, climatic characteristics, and the significance of these regions in the context of global climate change.

- **Partners**: This section lists the 18 research institutions from eight European countries and India that collaborate on the project. It highlights the multidisciplinary nature of the consortium, encompassing expertise in field observations, satellite Earth Observation techniques, Earth System Model development, and socio-economic analysis. Additionally, in order to enable direct contact with researchers involved in particular project tasks contact and scientific details were provided for the staff members from each Beneficiary.
- **Library**: A repository of publicly available deliverables, reports, and scientific publications produced by the project. This section will ensure transparency and facilitates knowledge sharing among stakeholders and the broader scientific community.
- **Multimedia**: This area hosts visual content such as videos from fieldwork and other project-related activities, providing a visual narrative of the project's progress and findings.
- **Contact Us**: Provides contact information for inquiries, fostering communication between the project team and interested parties.

Additionally, the website features links to the project's social media profiles on platforms like LinkedIn, Bluesky, Facebook, Instagram, and YouTube, further extending its outreach and engagement with the public.

Overall, the LIQUIDICE website serves as a central tool for communication, offering comprehensive information and resources to stakeholders, researchers, and the general

public interested in the impacts of climate change on cryospheric elements and associated water resources. The website will be updated with news as the project progresses.

6.2. Social media

The LIQUIDICE project maintains an active and multifaceted social media presence to enhance its dissemination, communication, and exploitation efforts. The project engages with diverse audiences through the following social media platforms, which are fully operative since 04/2025:

6.2.1. LinkedIn

On LinkedIn, LIQUIDICE connects with professionals, researchers, and stakeholders in the fields of climate science, glaciology, and environmental policy. The platform is utilized to share updates on project milestones, publications, and events, fostering professional engagement and collaboration. The LIQUIDICE profile is available at: https://www.linkedin.com/company/liquidice/

6.2.2. Bluesky

LIQUIDICE maintains a presence on Bluesky, a decentralized social network. This platform allows the project to reach audiences interested in open-source and decentralized technologies, sharing insights and developments related to climate change impacts on cryospheric elements. The LIQUIDICE profile is available at: https://bsky.app/profile/eu-liquidice.bsky.social

6.2.3. Facebook

Through its Facebook page, LIQUIDICE engages with a broader public audience. The platform is used to disseminate news, educational content, and multimedia materials, aiming to raise awareness about the project's objectives and findings among the general public. The LIQUIDICE profile is available at: https://www.facebook.com/profile.php?id=61572282227883

6.2.4. Instagram

LIQUIDICE's Instagram account showcases visual content, including photographs and short videos from fieldwork and research activities. This platform serves to visually communicate the project's work, highlighting the beauty and significance of the studied regions and the impacts of climate change. The LIQUIDICE profile is available at: https://www.instagram.com/eu_liquidice/

6.2.5. YouTube

The project's YouTube channel hosts video content such as interviews with researchers, documentaries, and recordings of events or presentations. These videos provide in-depth insights into the project's research and findings, catering to audiences seeking comprehensive

information. The LIQUIDICE sub-channel is available at: https://www.youtube.com/playlist?list=PLiWRn6uRXqilzrvRy2MJunpxaZMud-xho

7. Internal reporting

As part of the internal monitoring and reporting of science communication and dissemination activities within the LIQUIDICE project, a structured approach has been implemented to track publications, communication, and dissemination outputs, along with associated Key Performance Indicators (KPIs). For scientific publications, detailed metadata is collected, including author affiliations, publication identifiers (DOI, repository links), journal information, open access status, and whether article processing costs were covered by the project. Communication activities are systematically recorded with details on partners, timing, contributors, delivery methods, and observed outcomes. Dissemination efforts, such as conference presentations and collaborative events, are similarly tracked by partner, co-authors, audience, and purpose, allowing for comprehensive mapping of outreach impacts. This Internal monitoring is conducted in the shared excel file, available in Teams folder -> General LIQUIDICE folder -> Reporting on DCE. All partners are requested to fill in information on regular bases. Reminders will be sent out quarterly.

Additionally, progress toward project objectives is assessed through KPIs that link activities to specific work packages and deliverables, with clearly defined fulfilment and evaluation strategies. KPIs reporting is proceeded within a monthly monitoring spreadsheet for the progress indicated by the WP5 leader.

This coordinated internal reporting framework ensures transparency, accountability, and data-driven evaluation of the project's sci-comm effectiveness.

Annex 1. Project's infosheet

LIQUIDICE

LinkIng and QUantifying the Impacts of climate change on inlanD ICE, snow cover, and permafrost on water resources and society in vulnerable regions

GLOBAL CONTEXT

The accelerating retreat of glaciers, permafrost thaw, and snowpack loss in high-altitude and polar regions — including Greenland, the Himalayas, the Arctic, and the European Alps — is transforming the cryosphere's role in regulating freshwater availability and sea level rise. These changes disrupt regional hydrology, intensify climate extremes, and impact infrastructure, ecosystems, and livelihoods - from Arctic permafrost towns to Alpine and Himalayan communities.

In regions like Greenland and High Mountain Asia, altered snow and ice dynamics reshape water supplies for billions. In Svalbard, the local community relies on melting snow and glaciers for its water supply, whereas fresh water from glacial melt significantly changes the fjord ecosystems. In Norway, shifting permafrost and ice conditions threaten infrastructure and hydropower. In the Alps, snow and glacier-fed tourism and hydroelectricity are increasingly at risk. Yet current models often fail to capture the complex interactions between snow cover, glaciers, ice sheets, and permafrost across spatial and temporal scales.

The LIQUIDICE addresses this gap by integrating Earth observations, advanced climate and cryosphere modelling, and social vulnerability assessments to develop actionable climate services that connect inland ice dynamics to societal impacts across Europe and Asia's most fragile cold regions.

FACTS

- Ice loss threatens mountain and Arctic water supplies, tourism, and energy.
- The Greenland Ice Sheet is the single largest contributor to global sea level rise.
- Himalayas provide water for over 1.65 billion people downstream.
- Most climate models under-represent ice–hydrology–socioeconomic linkages.
- Permafrost instability endangers housing, roads, and heritage sites.

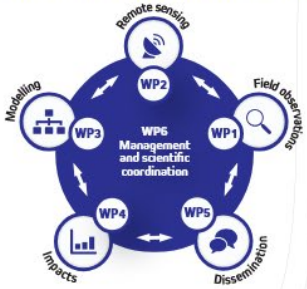
KEYWORDS

- Ground-based and Earth Observations
- Cryosphere–Hydrosphere Interactions
- Glaciers, Snow, Ice Sheets
- Permafrost Thaw
- Coupled Climate Modelling
- Freshwater Availability
- Hydropower Resilience
- Socioeconomic Adaptation
- Global to Local Downscaling
- Climate Services

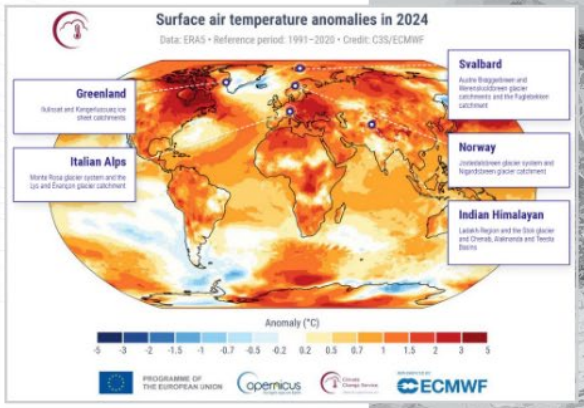
PROJECT OVERVIEW

ABOUT

LIQUIDICE explores the coupled glacier–snow–permafrost–hydrology–climate system across five climate-vulnerable cryosphere "super-sites": the Greenland Ice Sheet, Norwegian glaciers (Jostedalsbreen), the Italian Alps (Monte Rosa), Svalbard, and the Indian Himalayas. By integrating cutting-edge ground observations, remote sensing products, and high-resolution models, LIQUIDICE links ice evolution to freshwater availability, hydropower potential, and societal risks under climate change.



With 18 partners across 9 countries, LIQUIDICE develops advanced cryosphere–hydrology models, harmonized datasets (including 44-year SWE and albedo time series), and coupled Earth system simulations. These are used to co-design tailored decision-support tools and climate services for local stakeholders—hydropower managers, Arctic communities, tourism operators, and water authorities—aimed at improving resilience and informing adaptation.



PARTNERS

Coordinated by:
Institute of Geophysics, Polish Academy of Sciences (IG PAS), Poland

Consortium includes:

- CNR, CMCC & UNESCO-ICTP (Italy)
- NORCE, UiO & SIOS (Norway)
- GEUS, DMI & UCPH (Denmark)
- AWI (Germany)
- UGOT (Sweden)
- UPM (Spain)
- UoB (UK)
- UoS (Poland)
- IISER Bhopal, IITB, IISc (India)

IN NUMBERS

- EU Budget Contribution: **€7,499,965.25**
- Duration: **48 Months** (Feb 2025 – Jan 2029)
- Countries: **9**
- Partners: **18**

STAY CONNECTED

LIQUIDICE
eu-liquidice.bsky.social
LIQUIDICE
eu_liquidice
www.eu-liquidice.eu

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.