



Destination Earth

3rd DestinE User eXchange

15th – 16th October 2024
Darmstadt, Germany
Event report

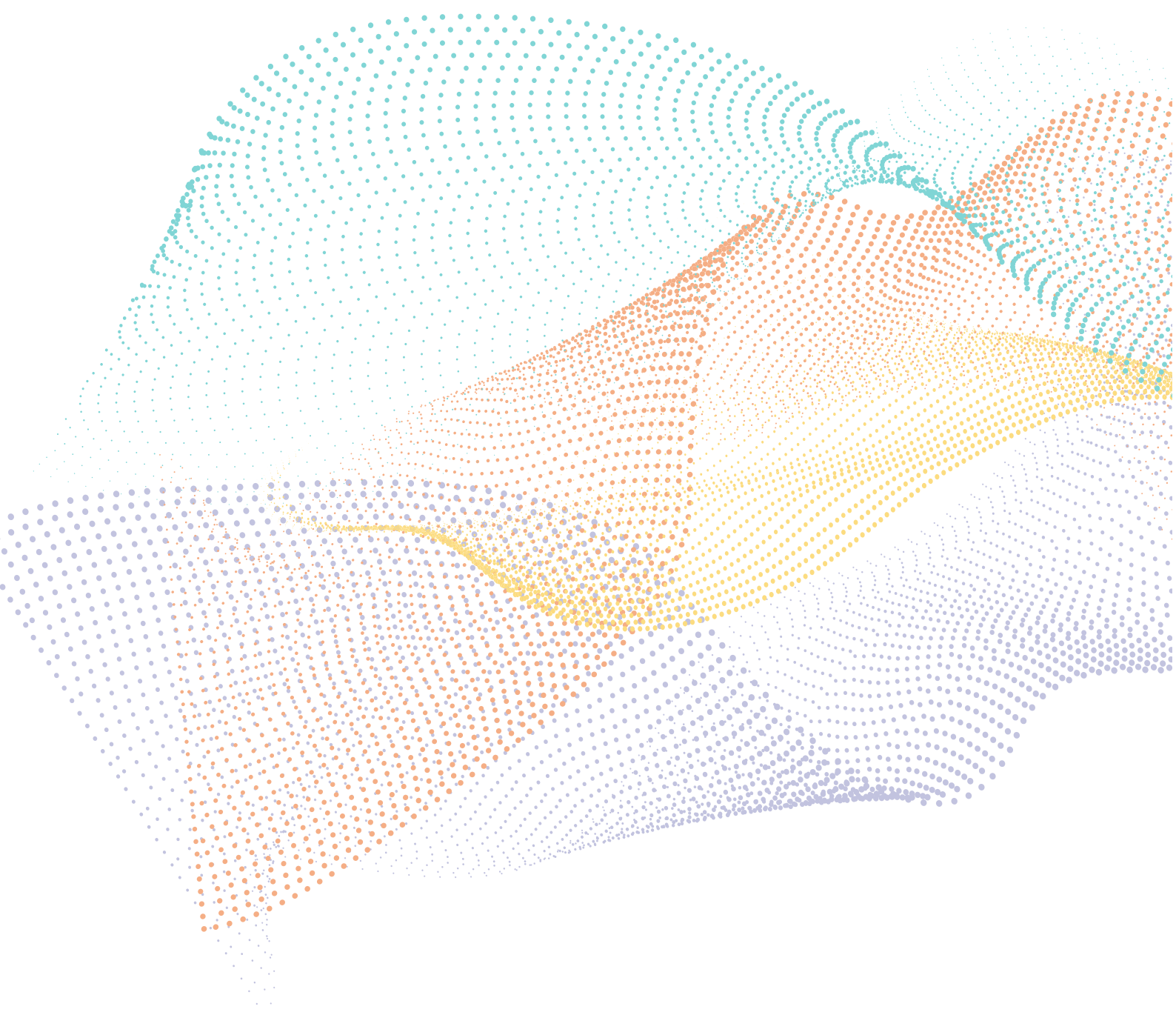
Destination Earth

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CONTENT INDEX

1 Summary	2
2 Introduction.....	3
3 Opening and Keynote.....	4
4 DestinE Progress and live Demonstration of the Service Platform.....	5
5 Climate Models and data	6
6 Extremes Digital Twin	7
7 Interacting with Digital Twins	8
8 Interacting with the DestinE Platform and Edge services	9
9 Interacting with DestinE Data Portfolio	10
10 Visualisation talks and demos	11
11 Artificial Intelligence and Machine Learning in DestinE.....	12
12 Flood Risk Management	14
13 Agriculture and biodiversity	15
14 Health at Risk.....	16
15 DestinE in the Energy sector.....	17
16 Transportation and Urban dynamics.....	18
17 DestinE Community Forum.....	20
18 The Broader Digital Twin Landscape.....	21
19 Co-design workshop	22
20 Training	23
21 Conclusion	24
APPENDIX A: Programme committee	25
APPENDIX B: Third DestinE User exchange programme	26

1 SUMMARY

The Destination Earth (DestinE) User eXchange has become the main user-facing event convening stakeholders of the initiative. The third User eXchange attracted over 500 participants on-site and online. The different sessions covered the breadth of developments on all of the DestinE System Components and highlighted the results of the early usage of the system in a variety of application domains. Presenters took stock of the substantial progress during the first implementation phase of the initiative.

Following the announcement by the European Commission during the opening that the DestinE Platform will now be available to all users, many discussions in the User eXchange revolved around early demonstrations of usage of the system for domains including renewable energy, hydrology, disaster risk management, agriculture, or urban management. There was a sense of excitement around the

potential and a lot of interest to exploring this potential further.

The user exchange aimed to bring together DestinE stakeholders to foster awareness of the development but in particular to encourage and drive co-design of the implementation. The following aspects have been identified across several sessions as drivers of the initiative: interoperability and collaboration across EU projects, reliability and high-quality of data as well as emergence of AI/ML development supporting DestinE objectives.

This third User eXchange showcased the growing DestinE community by its strong attendance as well as the expansion of the initiative with an increasing number of developments presented and discussed.

2 INTRODUCTION

Destination Earth (DestinE) is a flagship initiative by the European Commission to create a highly accurate digital twin of the Earth. It enables precise modelling, monitoring, and simulation of natural phenomena and human impacts, supporting effective adaptation and mitigation strategies. DestinE represents a breakthrough in accuracy, detail, and interactivity, advancing computing and science. It is a key component of the EU's Green Deal and Digital Strategy.

The Commission has entrusted the European Centre for Medium -range Weather Forecasts (ECMWF), the European Space Agency (ESA), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), with the implementation of DestinE.

The third User eXchange aimed to convene current and prospective users of DestinE and developers of the DestinE system. During various sessions the resources available to users were demonstrated, highlighting how they can benefit. Goals included sharing information about the system's status and use, showcasing user interaction examples, identifying expectations and needs for future adaptations, fostering dialogue between stakeholders and potential partners, attracting interested parties, and exploring ways to enhance interaction and engagement.

The event was hosted by EUMETSAT and offered both in-person attendance and remote participation via web stream and for interaction tools. Training sessions on how to use the newly launched DestinE platform were also provided and streamed to the attendees.

The event was jointly organised by the implementing entities of DestinE and the programme was established by a Programme Committee (available in Appendix A)).

Along both days, participants could attend application presentations, live demonstrations on DestinE services and features, as well as consult DestinE thematic posters. The full programme is available in Appendix B and posters can be consulted in event webpage¹.

STATISTICS

+234 people on-site

+266 people online

Registrations from participants in 61 countries in total, from 20 for on-site participants

16 sessions with +80 presentations

50 posters

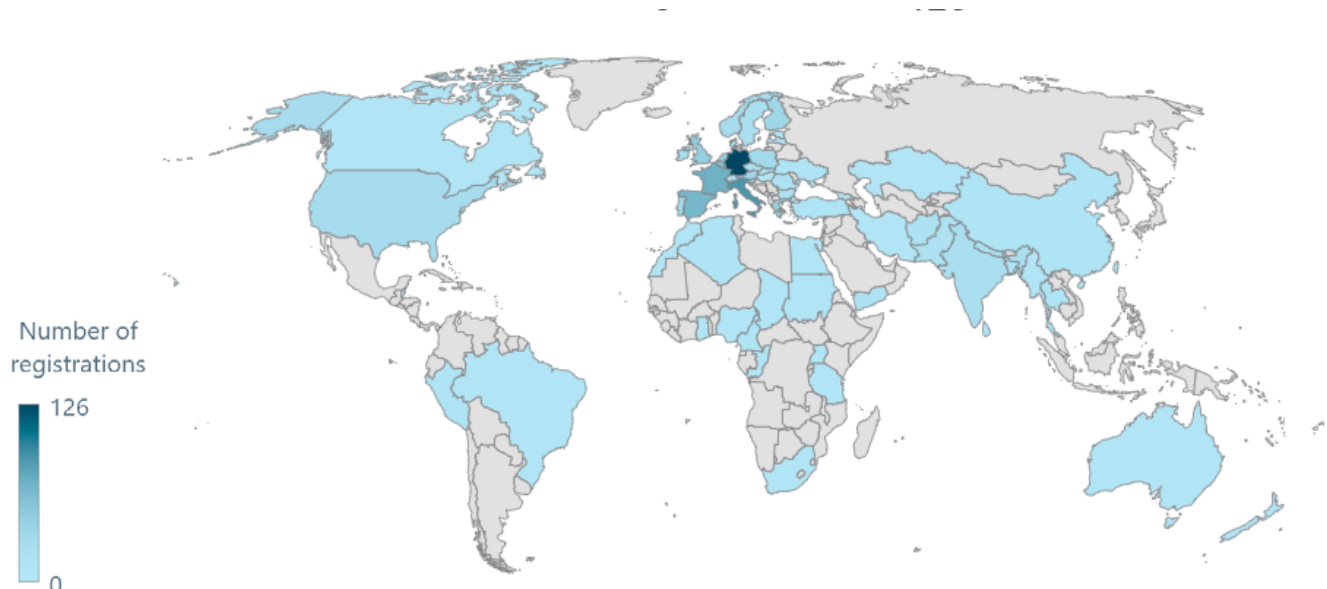


Figure 1 Number of registrations per country

1 <https://destination-earth.eu/event/3rd-destination-earth-user-exchange/>

3 OPENING AND KEYNOTE

The event was opened by **Lothar Wolf, DestinE Programme Manager at EUMETSAT**. Lothar Wolf welcomed participants and invited the audience to interact for an active co-design of DestinE with users, stakeholders, and policymakers.

Liina Munari, Deputy Head of Unit, DG CNECT.C1 High Performance Computing and Applications, European Commission, welcomed attendees, emphasising the European Commission's commitment to DestinE as a critical tool in climate adaptation. Liina Munari discussed the potential of DestinE's digital twins to foster high-

accuracy modelling, considered essential for informed decision-making across sectors. Finally, the opening of users registration to the DestinE platform was announced.

Roar Skålin, Director of Norwegian Meteorological Institute, provided a keynote focused on the challenges of climate extremes and their increasing frequency. Roar underscored the need for strategic adaptation, noting that while it is impossible to prepare for every scenario, DestinE's digital twins (e.g., DT Climate and DT Extremes) provide powerful tools for analysing sector-specific impacts of extreme events and planning cost-effective adaptations.

4



Credit: EUMETSAT/Axel Gaube

4 DESTINE PROGRESS AND LIVE DEMONSTRATION OF THE SERVICE PLATFORM

This session began by sharing updates on achievements in Phase I, including system infrastructure and development milestones for Phase II.

Kathrin Hintze (ESA) introduced DestinE's services and interfaces. She highlighted the platform's initial capabilities allowing users to discover DestinE data, exploit and visualise them. Future plans are to enhance DestinE features and services based on user feedback.

Irina Sandu (ECMWF) focused on the unique models and characteristics of DestinE's digital twins, explaining how these simulations will interact with real-world data and provide unprecedented resolution for climate and environmental predictions. Irina noted that the co-design approach with users and application of AI and machine learning are enabling groundbreaking integrations of climate and weather simulations.

Lothar Wolf (EUMETSAT) described the data lake services and its distributed infrastructure being developed to support DestinE's massive data requirements. Data Lake sites, co-

located with EuroHPC resources, will facilitate data storage, management, and access across Europe. He explained that the data lake's seamless connection to the EuroHPC ensures robust performance for complex simulations and real-time data processing.

The session was concluded by **Alexis Longuet (Serco)** providing high-level information about the opening of the public registration to the DestinE Platform and the implementation of the Destination Earth Access Policy. Alexis shared with the audience the journey of the DestinE Platform implementation, from the early beta testing phase, where user feedback has been collected to evolve the platform according to their needs. He explained how to join the platform, register and request upgraded access for specific user categories. Alexis demonstrated how to browse various sections of the platform, including: Services, Support, Onboarding, Updates, About.



5 CLIMATE MODELS AND DATA

Session co-chaired by **Nikolay Koldunov (Alfred-Wegener Institute)** and **Sebastian Milinski (ECMWF)**

The “Climate models and data” session had the objective to present the concept, current status, and next steps for the Climate Adaptation Digital Twin to users. The Climate DT is one of the DTs at the core of DestinE, therefore these sessions provided users with the essential knowledge to make use of the Climate DT output.

Four speakers presented different aspects of the Climate DT: **Tracy Kiszler (CSC – IT Center for Science)** provided an overview of the Climate DT, its role in DestinE, and the plans for moving to operations. **Pablo Ortega (Barcelona Supercomputing Centre)** introduced the multi-decadal climate projections and supporting simulations (historical for evaluation, control for qualifying model drift). **Paolo Davini (Politecnico di Torino)** summarised the evaluation of the existing simulations, pointing users to strengths and weaknesses in the different simulations. **Amal John (AWI)** introduced the storyline simulations that allow users to investigate how impacts of extreme events the world

experienced since 2017 would change in a colder and warmer world.

The presenters collectively summarised their results on two posters that were presented in the evening to give users the opportunity to ask their specific questions about the Climate DT in direct conversation with the experts.

An overview of the Climate DT is also available in the Factsheets (<https://destine.ecmwf.int/info-corner/>) and on the poster presented in this session (<https://destination-earth.eu/wp-content/uploads/2024/05/Climate-DT-Simulations.pdf>). Evaluation results are summarised on a poster that was presented at the user exchange².

The highlight of this session was the introduction of the Climate DT simulations that are now available via the Destination Earth Core Service Platform. This includes future projections at 5 km resolution for 2020–2040, historical simulations for model evaluation covering 1990–2020, as well as storyline simulations to answer ‘what-if’ questions about the changing impacts of recent observed extreme events in a warming climate.



Credit: EUMETSAT/Axel Gaube

2 <https://destination-earth.eu/wp-content/uploads/2024/05/Destination-Earth-Climate-DT-model-evaluation.pdf>

6 EXTREMES DIGITAL TWIN

Session co-chaired by **Benoît Vannière (ECMWF)** and **Roger Randriamampianina (Norwegian Meteorological Institute)**

The session “Extremes Digital Twin” aimed to introduce the Extremes Digital Twin workflow and its components, as well as to showcase a success story. Key components of the workflow, such as detection and triggering frameworks, global and on-demand regional weather forecasting, uncertainty quantification, and impact model capabilities were presented through illustrations and use cases.

After a short introduction by **Benoît Vannière (ECMWF)** about the need for a novel information system that can be potentially provided by the Extremes Digital Twin, **Xiaohua Yang (Denmark Meteorological Institute)** introduced the Extremes Digital Twin workflow and the implementation of the daily runs and operational team with weekly rotation. This close-to-real-time operation has performed more than 120 sub-km on-demand model executions during the first two months. **Roger Randriamampianina (Norwegian Meteorological Institute)** presented the potential impact sector models which are being incorporated into the Extremes DT workflow. These applications are built to provide fit-for-purpose information on flood and storm surges, air quality, and renewable energy (both wind and solar). Further, **Aristofanis Tsiringakis (ECMWF)** introduced the effort done on the development of ensemble systems, both in global and on-demand, kilometric and sub-km scales respectively. Furthermore, **Jonathan Demaeyer (Royal Meteorological Institute of Belgium)** talked about the need for detection and triggering frameworks for

an on-demand Extremes DT, then described in detail the implementation of such algorithms into the Extremes DT workflow. Finally, **Estíbaliz Gascón (ECMWF)** presented a use case success story from detection, triggering and forecasting to impact modelling and reviewed the added-value of increasing the resolution of the global DT to the km scale, as well as that of the on-demand Extremes DT to the sub-km scale.

Discussion took place after the presentations when, among others, the importance of careful triggering of the on-demand Extremes DT to provide relevant information for relatively long-lasting extreme events (e.g. preconditioning of the soil condition for some flooding cases). A feedback mechanism will be implemented to solve this kind of situation by adding a detection and triggering algorithm based on information provided by the impact modelling. Then, it was discussed the possible discrepancy of using different resolutions for the detection and initialisation of extreme events in the on-demand digital twin. Indeed, the triggering algorithm of the on-demand digital twin forecast is based on the detection of extremes in the ECMWF operational ensemble forecast, using a 9km resolution while the initialisation is done from the global digital twin at a resolution of 4.4km. Progress has been made towards developing an accurate and affordable ensemble at a kilometre scale, which can potentially improve the detection of most of the not-well-detected or even missed (small-scale) extreme events. The use of the local high-resolution ensemble products could potentially improve this kind of situation, but access permissions to such data needs to be clarified.

7 INTERACTING WITH DIGITAL TWINS

Session chaired by James Hawkes (ECMWF)

The “Interacting with Digital Twins” session focused on showcasing interactive elements within the Digital Twin (DT) engine, emphasising tools that empower users to personalize workflows. Additionally, it provided a platform for presenting software solutions developed within the broader Destination Earth community, illustrating how these tools enable the creation of interactive DT workflows tailored to specific needs.

James Hawkes (ECMWF) opened the session with an overview of the Digital Twin Engine, detailing four key components: Plume, Polytope, Aviso, and Earthkit. He highlighted how Plume allows users to interact with models directly by adjusting outputs in real time. Polytope works on generated data to extract specific features, which Earthkit then visualizes through plotting, statistical analysis, and data transformation libraries. Finally, Aviso serves as a notification system that links these components, ensuring a cohesive interactive workflow.

In the second presentation, **Xiaohua Yang (Denmark Meteorological Institute)** introduced the On-Demand Extremes Digital Twin workflow, focusing on how it leverages Aviso to alert users when extreme events are detected, enabling real-time response. This workflow is designed to begin from a global model and progress through various

components, providing valuable insights on end-to-end DT interactions.

Silvia Caprioli (Politecnico di Torino) presented Aqua, a quality assessment tool integrated within the Climate Digital Twin. Aqua is designed to facilitate continuous and automatic testing through a streaming framework. This tool allows climate scientists to monitor and evaluate data quality on the fly, ensuring reliability in high-resolution DT simulations.

Iker Gonzalez (Barcelona Supercomputing Centre) concluded with a discussion on the Generic State Vector (GSV) interface, a Python-based tool that allows standardised access to climate model data. Using MARS keywords, GSV enables easy data access, making it simpler for users to locate and analyse specific data within DT workflows.

The session provided valuable insights into innovative ways of interacting with Digital Twins. Tools such as Aviso offer real-time notifications and can trigger actions based on new data, while Aqua facilitates continuous testing within a streaming data environment. These advancements demonstrate how interactive workflows, and modular components can improve accessibility and responsiveness, paving the way for more efficient and user-driven applications in the Digital Twin ecosystem.

8 INTERACTING WITH THE DESTINE PLATFORM AND EDGE SERVICES

Session co-chaired by Ines Sanz Morère (ESA) and Borys Saulyak (EUMETSAT)

This session focused on guiding the user community on interacting with the DestinE Platform, including steps for registration, accessing services, and onboarding new services that align with the objectives of the Destination Earth initiative. It also introduced the range of services available on the DestinE Platform, including the Edge Services provided by DestinE Data Lake.

The session included four presentations:

Borys Saulyak (EUMETSAT) and Inés Sanz Morère (ESA) presented an overview of the DestinE System's implementation, explaining how to access the system through the DestinE Platform and utilise the Edge Services provided by the DestinE Data Lake.

Matteo Cortese (Serco) described the user journey on the DestinE Platform, covering aspects such as registration, requests for upgraded access, exploring the service registry, and obtaining support.

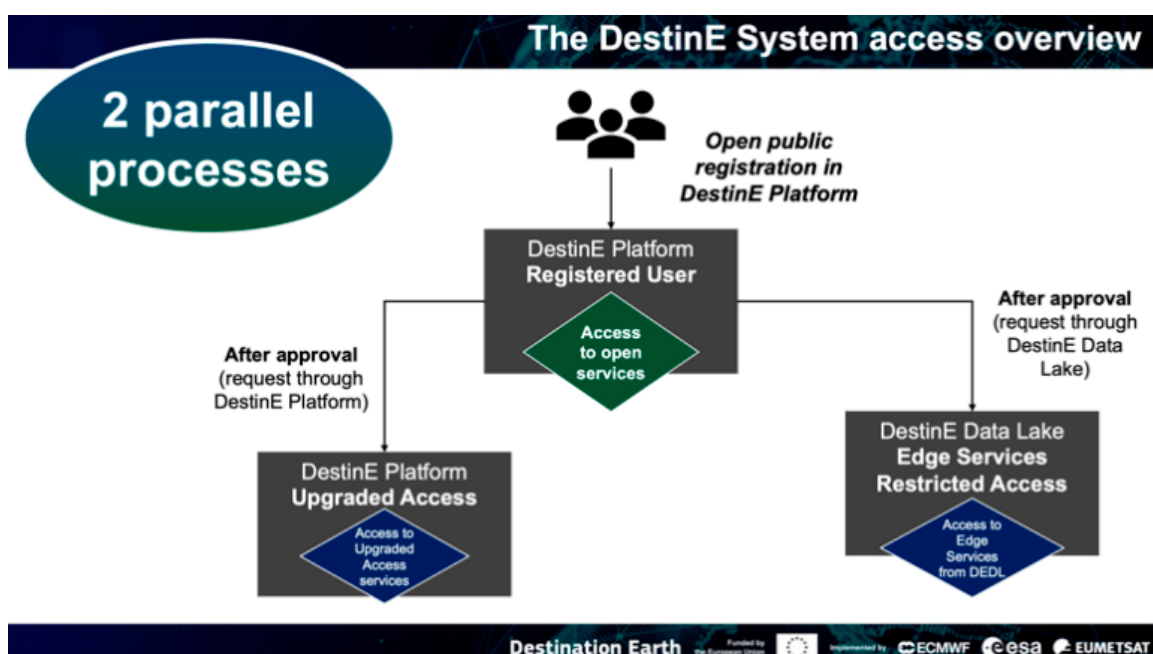
Borys Saulyak (EUMETSAT) provided an overview of the DestinE Data Lake and its EDGE services. He highlighted the benefits these services offer for storing, managing,

and analysing large datasets, making them an invaluable resource for users engaged in earth observation and climate-related research.

Finally, **Najla Said (Serco) presented** the onboarding procedure proposed by the DestinE Platform to support the integration of external services into the DestinE System.

The session was highly interactive, allowing the participants to register on the DestinE Platform and explore the access point to the system in real time. Interesting feedback was received from the users on how to improve the user experience of the platform and how to increase its interoperability. Live discussions centred on the specific functionalities provided by the Data Lake's Edge Services as well as on how external services could be integrated in the system, and the evaluation procedure for these integrations.

In conclusion, the session showed that users are still understanding how the DestinE System works and the way to interact with it. The active participation of the attendees underscored the user community's the motivation to explore and effectively engage with the DestinE Platform, further reinforced by the opportunity to access the system during the event.



Overview of the DestinE System access process

9 INTERACTING WITH DESTINE DATA PORTFOLIO

Session chaired by Danaële Puechmaille (EUMETSAT)

10

The session aimed to introduce participants to the DestinE Data Portfolio, focusing on how to interact with this data catalogue, access various datasets, and create applications using these resources. The goal was to equip attendees with knowledge of the tools and services available within the DestinE for better data discovery, access, and application development.

Danaële Puechmaille (EUMETSAT) introduced the DestinE Data Portfolio and how it integrates multiple and various datasets including DestinE Digital twins new data. The Data portfolio enables data fusion and the development of data-driven applications. Danaële presented how to access the services hereafter described.

Simone Mantovani (MEE0) presented the EDEN service, which enables to discover and access the DestinE data portfolio including the Earth's Digital Twin. Simone highlighted how the service supports the integration of spatial and temporal data to address complex challenges. EDEN provides both a machine-to-machine and user-friendly interfaces to offer a comfort zone both to developers and non-experts for a seamless experience in combining satellite data, in-situ observations, and model outputs.

Aubin Lambaré (CS Sopra Steria) introduced the Harmonized Data Access (HDA) service, which provides a unified interface to discover and access to DestinE Data Portfolio: DestinE Digital twin data and large diversity of different data spaces. The service uses the STAC (Spatial Temporal Asset Catalogue) API for presenting and cataloguing data with spatial and temporal dimensions, streamlining the discovery process through a web portal or API, with features such as data filtering and caching to optimize access speed and reliability.

Frédéric Le Fur & Patrick Pradier (Gael Systems)

introduced the SesamEO service, which offers a simplified way to access and manage Earth observation data. They explained how the service integrates data from various satellite missions and supports advanced analysis. The session highlighted how SesamEO can facilitate the development of comprehensive, data-driven solutions.

Nicola Masotti (B-Open) showed the Earth Data Hub, a service designed to provide pre-processed, ready-to-use Earth observation data. The platform is optimized for high-performance computing, making it ideal for developers, scientists, and data-intensive users who need efficient access to large datasets.

Wolfgang Kapferer (Geoville) presented DestinE Streamer, a service that enables users to stream compressed data directly from the DestinE Platform cache. This tool is particularly useful for accessing big- data in a fast and efficient way, supporting the capabilities of the data cache and machine learning applications in a streamlined manner.

The key takeaway from the session was that DestinE provides an extensive array of tools and services for accessing, visualizing, and utilizing data from the DestinE Data Portfolio. The integration of data from multiple providers through services enables the creation of sophisticated applications. A strong emphasis was placed on the importance to avoid data copy over multiple data stores and data federation was strongly encouraged. This also highlighted the importance of data selection, compression and visualization for handling large datasets, especially when managing petabytes of data. The session highlighted the need for innovative solutions that can efficiently process, visualize, and stream data to unlock the full potential of the DestinE Data Portfolio.

10 VISUALISATION TALKS AND DEMOS

Session chaired by Gian Piero Izzo (Alia Space Systems)

The session highlighted the critical role of visualization tools in advancing the DestinE initiative. It aimed to showcase cutting-edge technologies, share best practices, and encourage collaboration by demonstrating how visualization enhances the usability and understanding of DestinE's vast data ecosystem.

Andreas Mueller (ECMWF) highlighted the potential of Unreal Engine to create visually engaging representations of climate and Earth system data. He emphasized the tool's ability to render complex digital twin data in real time, improving accessibility and decision-making. The Q&A explored the adaptability of such tools for varying user needs and how to balance technical detail with accessibility for broader audiences.

Patryk Grzybowski (Cloudferro) demonstrated the use of JupyterLab environments integrated with DestinE Data Lake. He showcased tools like PyStack, EODAG, and Matplotlib for harmonized data access and visualization. A key takeaway was the need for user-friendly interfaces and interactive features, which make these tools accessible even to those with minimal programming experience.

Gianluca Palumbo (Exprivia) presented prototypes integrating augmented and mixed reality technologies, allowing users to visualize climate and digital twin data in immersive environments. The discussion included how these technologies could bridge the gap between scientific data and public understanding through intuitive and impactful visualizations.

Arturo Montieri (Alia Space) introduced a storytelling service aimed at contextualizing DestinE data for diverse audiences. He discussed the use of narrative techniques and interactive elements to make data relatable and actionable. The Q&A addressed the challenges of catering to different user demographics while maintaining scientific rigor.

Kylian Berrebi (Atos) and **Madleen Bultez (Mews Partners)** showcased demonstrators, including a climate game developed in Godot and an AI chatbot leveraging DestinE data for media professionals. The climate game educates users on climate change through interactive gameplay, while the chatbot enables quick visualization of data for storytelling. The audience inquired about scalability and plans for future AI-driven enhancements.

The session highlighted the essential role of visualization tools in enhancing the usability of DestinE's complex datasets. It emphasized the importance of user-centric design, ensuring tools balance scientific detail with accessibility for diverse users. Technologies such as augmented reality and interactive dashboards were noted for their ability to boost engagement and comprehension. Collaboration between developers, scientists, and end-users was deemed vital to refine tools and align them with practical needs. Future innovations, including expanded AI integration, adaptive storytelling, and leveraging advanced game engines, are expected to drive significant advancements. The session also underscored the potential of plugins and emerging data formats like Zarr and HEALPix in improving data access and visualization.

Overall, the session presented a comprehensive roadmap for using visualization tools to support DestinE's environmental and policy goals, with a strong focus on interactivity, innovation, and collaboration.



11 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN DESTINE

12

Session co-chaired by Mariana Clare (ECMWF) and Miruna Stoicescu (EUMETSAT)

The objective of the session was to illustrate what each of the three DestinE Entities (ECMWF, EUMETSAT and ESA) offer to end users in terms of AI/ML capabilities and share plans about the future functionalities that are under development. Additionally, the session highlighted the experience that three invited use cases had when developing AI/ML applications in the DestinE Framework.

Joffrey Dumont Le Brazidec (ECMWF) outlined ECMWF's AI initiatives within DestinE, including developing a full AI Earth System model, using AI to quantify uncertainty through generative downscaling and enhancing interactivity with the DestinE twin.

Thomas Nipen (Met Norway) introduced a project working on a limited area data-driven ensemble. The model will be trained on high-resolution regional data, enabling more precise forecasts in real-time. He highlighted a training strategy starting with coarse resolution data before refining it on higher-resolution data, aiming to achieve a user-ready prototype soon.

Sebastien Tetaud (ESA) discussed ESA's progress in providing AI-powered data services such as Earth Data Hub and visualisation tools. DESP will expand into machine

learning operations (ML Ops) over the next two years to support AI-driven insights.

Lasse Rabsensein (Drift+Noise Polar services) presented on using AI to generate high-resolution sea ice concentration maps by combining Sentinel-1 satellite data with AMSR-2 microwave imagery. The integration of these datasets improves predictive accuracy, which is essential for polar operations. The session emphasised the need for publicly available raw data to foster further innovation.

Miruna Stoicescu (EUMETSAT) presented the services provided by DEDL and their planned evolutions for supporting users in the development of AI/ML applications.

Tobias Edman (Research Institutes of Sweden) discussed a machine learning model for predicting cyanobacteria blooms in the Baltic Sea. This tool provides short-term forecasts to support environmental monitoring and public health. The predictive model demonstrates DestinE's potential beyond climate data, expanding into environmental applications.

The panel discussed on the challenges and opportunities in using AI/ML in DestinE. One key challenge is the data availability: lack of ground truth data (e.g., sea ice distribution, 500m-resolution observations) makes it difficult to validate ML model or also dataset heterogeneity requires significant



preparation for AI readiness. The panellists agreed that DestinE offers opportunities to overcome some of the current challenges that are limiting ML applications. DestinE provides a centralized data access and the Data Lake offers a unified way to access various high-quality data sources fostering data fusion. By combining physical modelling, diverse datasets, and ML, DestinE aims to improve user interaction and support real-time applications.

Panelists outlined their plans to integrate their ML models with DestinE. These include operationalizing models, extending existing forecasting tools to longer time scales, and helping local stakeholders like municipalities develop and deploy their ML-based applications. They also stressed

the importance of user engagement, calling for clearer guidance on deploying applications and broader outreach to onboard more end-users to the platform.

The discussion emphasized several priorities: building an active AI-weather modeling community, integrating impact models into DestinE's predictive frameworks, and fostering collaboration through user-centric development and feedback loops. Recommendations included improving data accessibility, expanding support for ML operations, and ensuring the DestinE's future growth through sustainable user-focused enhancements. Overall, the session underscored DestinE's potential to transform weather and climate predictions through AI and ML innovations.

12 FLOOD RISK MANAGEMENT

Session chaired by Björn Backeberg (Deltares),

14

The session on **Flood Risk Management** aimed to showcase the scope and objectives of enhancing Destination Earth (DestinE) services for compound flood forecasting and adaptation planning. Key findings were presented from two DestinE projects focusing on flood risk mitigation and adaptation modeling. The session culminated in a panel discussion featuring experts from policy, technical fields, operational weather forecasting, and satellite remote sensing, who addressed critical improvements needed to optimize DestinE's flood forecasting capabilities and its broader applicability to adaptation planning.

Kun Yan (Deltares) introduced the concept of compound flooding, which arises from the convergence of multiple flood drivers, such as heavy rainfall, river discharge, and storm surges, particularly in estuaries and coastal areas. He presented five global compound flooding demonstrators—Humber Estuary (UK), Reunion, the Philippines, Basque Country (Spain), and the Caribbean Netherlands—that are being developed using a global to local approach. The approach integrates a range of relevant data for compound flood forecasting, including Extremes DT and Climate DT. A key takeaway is that Extremes DT can improve flood forecasting, although that depends on several factors, e.g. use case location, flood drivers, as well as the importance of local bathymetry for accurate flood forecasting. Recommendations to service evolution include pilot service development and using AI to better handle uncertainties in predictions.

Ursula McKnight (Swedish Meteorological and Hydrological Institute) presented a pan-European project aiming to co-develop end-to-end workflows (from detection to impact modeling) for on-demand operational flood forecasting. Phase one saw the initiation of two pathways ensuring both a seamless internal workflow, as well as ensuring external coupling to DT data using a diversity of

locally-driven operational hydrological prediction systems. While phase 1 focused on reconstructing historical extreme flood events, phase two aims to enhance real-time flood forecasts with continuing to explore the added value of higher-resolution ensemble NWP data. To ensure this, operational forecasters will be directly engaged in phase 2 efforts to ensure the system meets real-world needs. Challenges were highlighted, including the need for access to critical data, such as hydraulic systems and other water management regulations (e.g. dams; reservoirs), and improving visualisation tools for better decision-making. The ultimate goal is to provide actionable insights to mandated authorities and downstream users across Europe.

The panel included **Kun Yan (Deltares)**, **Martin Schobben (TUWien)**, **Thomas Geenen (ECMWF)**, and **Roger Randriamampianina (Norwegian Meteorological Institute)**. The discussion emphasised the importance of flexible data access, enabling users to interact with both basic and advanced processing options. High-quality, consistent boundary data (e.g., storm surges, river discharges) is vital for reliable flood models. Panelists discussed challenges in resource allocation and data gaps, particularly in bathymetry and socioeconomic data, which are necessary for a complete understanding of flood risks. The potential different business models were explored, balancing the need for broad accessibility with long-term sustainability. The discussion concluded by reinforcing the importance of ensuring interoperability and harmonizing datasets across multiple platforms and ecosystems.

The session highlighted significant progress in using digital twins for flood forecasting, while also emphasizing ongoing challenges related to data integration, user engagement, and managing uncertainties. The sustainability of the DestinE, and its ability to support operational flood forecasting with AI and improved datasets, are key priorities moving forward.

13 AGRICULTURE AND BIODIVERSITY

Session chaired by Sofia Ermida (LSA-SAF, Instituto Português do Mar e da Atmosfera)

The objective of this session was to highlight practical applications and use cases where the DestinE initiative can support data-driven approaches to tackle challenges of climate change in agriculture and biodiversity.

Claus Weiland (Seckenberg) discussed a use case focused on tracking and predicting hazards to European crops caused by climate change. Leveraging crop growth models integrated with DestinE data, this approach enables early warning and real-time monitoring of climate impacts on agriculture. The use case centered on the potential to improve crop resilience and agricultural productivity by proactively addressing climate-induced threats.

Matti Motus (VTT) presented on monitoring forest biodiversity using DestinE's data capabilities. This application provides insights into forest ecosystem health and biodiversity by tracking environmental stressors and biodiversity changes over time. The use case highlighted how this data could support conservation efforts and inform forestry practices under changing climate conditions.

Tina Odaka (IFREMER) introduced a global fish tracking use case that uses DestinE data to model and predict fish movement and migration strategies. By providing information on oceanic conditions and fish track reconstructions, this tool supports sustainable fishing practices and the protection of marine biodiversity. The discussion addressed how this tracking system could assist in regulating overfishing and safeguarding marine habitats.

Eva Ivits (European Environment Agency) focused on bridging the gap between scientific data and policymaking, discussing DestinE's support in translating complex data into actionable insights for European policy priorities. She highlighted the need for clear, concise information to guide policy decisions, especially in the context of the European Climate Risk Assessment (EUCRA) report. Ivits emphasized that policymakers need accessible scenarios and solutions, next to complex models, to effectively address climate risks. The discussion stressed the importance of collaboration between policymakers, scientists, and industry.

The panel discussion and session takeaways converged on the critical role of DestinE in addressing climate challenges through data-driven strategies, emphasizing the need for a unified data infrastructure. The discussion highlighted the importance of easy access to comprehensive data for informed environmental policymaking, underscored by calls for a centralized platform accessible to experts and non-experts alike. Collaborative efforts among scientists, policymakers, and industry were deemed essential for developing actionable tools, scalable solutions, and integrating real-time climate and biodiversity insights. Moreover, the session showcased ongoing European initiatives, such as interconnecting data spaces under DestinE, and emphasized nature-based solutions and scenario planning to build resilient ecosystems and sustainable agriculture. Overall, the discussions reflected optimism about DestinE's potential to enhance environmental and agricultural resilience through streamlined data access and robust intersectoral collaboration.

14 HEALTH AT RISK

Session moderated by Nele Veldeman and Filip Lefebre (VITO)

16

The session examined the wide-ranging health impacts of air pollution and climate change. Compelling sector studies demonstrated how interactions with DestinE provide valuable insights and lead to significant improvements. Innovative strategies from real-world case studies were discussed, and potential future opportunities for enhancing collaboration and engagement to tackle health challenges more effectively were explored.

Cathryn Tonne (ISGLOBAL) highlighted the significance of addressing climate change as a critical health issue. She discussed both the evolving health impacts of climate change and the emerging opportunities for health improvement through climate action. Her presentation referenced the Lancet Countdown³, a transdisciplinary research initiative that tracks progress on health and climate change in Europe. Additionally, she introduced the CATALYSE⁴ project, part of the European Climate Change and Health Cluster, which is funded by the European Union under the Horizon Europe research and innovation framework programme. This project seeks to answer key questions, such as how to optimize health in climate change mitigation and adaptation, how to bridge the gap between knowledge and action to accelerate climate action, and how health systems should adapt to climate change while reducing their environmental footprint. The project aims to explore how climate action can foster healthier societies across Europe.

Ignasi de Pouplana and Laurence Sigler (International Center for Numerical Methods in Engineering) presented an urban-scale air pollution model utilising Data Lake's near-data computing. They showcased a prototype numerical tool implemented on the DestinE platform, designed to predict short-term particulate matter levels at an urban scale, allowing for street-level tracking of pollution events. The tool is built within a flexible computational framework that can be extended to monitor other pollutants, such as nitrogen dioxide, odors, and allergens, making it highly adaptable for broader environmental monitoring. Additionally, the system is easily transferable and can be adapted to different geographical areas and datasets,

increasing its reusability and scalability across various regions and contexts.

Nieves Peña Cerezo (TECNALIA) introduced the Adaptation Modelling Framework for Heat Stress Exposure⁵, an interactive tool powered by Destination Earth's Climate Adaptation digital twin (Climate DT). This tool facilitates the transition from risk quantification to the development of adaptation strategies for heat stress, enabling the evaluation of various adaptation options under climate change scenarios. The framework places particular emphasis on managing public health in the context of heat stress adaptation. It allows to simulate climate change what-if scenarios, identifying critical areas and population at higher risk, as well as opportunities to implement adaptation solutions to reduce the impacts of climate change on health.

Xavier Rodo (ISGLOBAL) focused on vector-borne diseases, which are projected to spread and intensify as climate change alters the habitats and behaviours of vectors like mosquitoes, enabling them to thrive in previously unaffected regions. He introduced ArboCat, a platform designed to assess the risk of various arboviral infectious diseases that could emerge and spread in Catalonia, considering a range of factors including climate, ecology, and socio-economic data specific to the region. Additionally, he discussed the challenges involved in adapting and transferring ArboCat to Thailand, known as ArboThai.

Stijn Vranckx (VITO) discussed the use of Local Digital Twins to assess the impact of mobility decisions on air quality. He introduced the DUET Digital Twins⁶, which offer virtual city replicas to simplify understanding the complex relationships between traffic, air quality, noise, and other urban factors, using the city of Ghent in Flanders as an example. Additionally, the challenges and approach to integrating an air quality model with a digital twin were emphasised, with key focus areas being standardization and interoperability.

The discussions emphasised the critical role of interdisciplinary collaboration and scalable solutions in advancing public health resilience and fostering healthier, climate-adapted societies across Europe.

3 [Home \(Europe\) - Lancet Countdown](#)

4 [Catalyse | Climate Action to Advance Healthy Societies in Europe \(catalysehorizon.eu\)](#)

5 [Adaptation Modelling Framework for Heat Stress Exposure - Destination Earth \(destination-earth.eu\)](#)

6 [Flanders Twin | digital urban european twins \(digitalurbantwins.com\)](#)

15 DESTINE IN THE ENERGY SECTOR

Session co-chaired by Irene Schicker (GeoSphere Austria) and Francesc Roura Adserias (Barcelona Supercomputing Center)

The objective of the session was to know the needs of the energy sector in order to engage them into DestinE and tackle the needs across all sectors. At the same time, the session aimed to show what has been developed to date in DestinE related to Energy.

Bruno Schyska (DLR, German Aerospace Centre) presented a use case on how to optimize power system reliability and renewables integration by combining meteorological and techno-economic data. Key tools include machine learning to streamline complex power flow calculations and assess sensitivities to meteorological parameters, while a proof-of-concept demonstrated that ML models could accurately predict power dispatch needs, reducing computational costs. The team's work aims to provide a scalable platform to bridge research, industry, and policy for actionable insights into climate-resilient energy systems.

Angelos Georgakis (National Observatory of Athens) presented how his use case aims to advance renewable energy forecasting and integration into energy grids through sophisticated modeling and the HYREF software. In alignment with global climate targets like the UN Sustainable Development Goal 7 and the European Green Deal, DRE addresses key challenges in data accessibility, forecasting accuracy, and user involvement for energy planning. The DRE framework combines solar and wind power forecasting models with the extremes digital twin data to enhance site-specific energy predictions. HYREF software offers short-term forecasts for solar and wind production, integrates user data, and provides tailored insights for power producers. Further developments include enhanced security, DevSecOps support, user-friendly interfaces, and thorough system testing to optimize HYREF's reliability and scalability in renewable energy management.

Gerard Mor and Miriam Méndez (International Centre for Numerical Methods in Engineering) described a work that focused on how to derive the electricity demand in Catalonia. A set of drivers for electricity demand (e.g. household income, built area) complemented by a data-driven model to predict consumption, is used to build the use

case. The application used a novel approach by selecting the regions by postal code, to get a finer granularity in deriving the energy consumption. The data that was used came from the data lake, using simulations from the Climate adaptation digital twin and all the development has been performed on DestinE Data Lake taking advantage of near data processing services. Presenters highlighted possible evolutions to use Extreme DT data for short-term and next-year energy forecasting.

Francesc Roura Adserias' (Barcelona Supercomputing Centre) presentation showcased the Climate DT's ability to provide climate information globally at a local scale, specifically tailored to the renewable energy sector's requirements. These indicators are created in parallel to the climate simulation so that this approach eliminates the need for expensive post-processing once simulations are finished. The Climate DT efficiently manages the vast climate data from projections by calculating essential, energy-focused indicators. Some of these indicators are wind turbine capacity factors and future frequencies of high- and low-wind speed events, facilitating assessments of potential changes in energy production in the context of climate change.

Irene Schicker (GeoSphere Austria) presented what is done in the On-Demand Extremes Digital Twin, what is the added value of the hectometric runs for the industry, what are our requirements and needs as forecast providers from the industry. Two case studies were presented: storm Eunice (used to define ramping thresholds for wind events) and storm Boris (wind energy and hydropower impact). The presentation highlighted the technical needs of enhanced metadata, rooftop PV data (ideal resolution: 0.5m), and accurate wind farm parameterization. Irene highlighted the added value of user engagement and collaboration to define and address extreme energy events.

The session successfully outlined the diverse needs and advancements within the energy sector through the DestinE initiative. Key takeaways included the importance of user engagement, improved forecasting tools, and scalable models tailored to extreme events and local needs. The discussions underscored the value of collaboration between researchers, policymakers, and industry stakeholders to achieve a resilient and climate-adapted energy system.

16 TRANSPORTATION AND URBAN DYNAMICS

Session co-chaired by **Alessandra Feliciotti (MindEarth)** and **Simone Fratini (Solenix)**

18

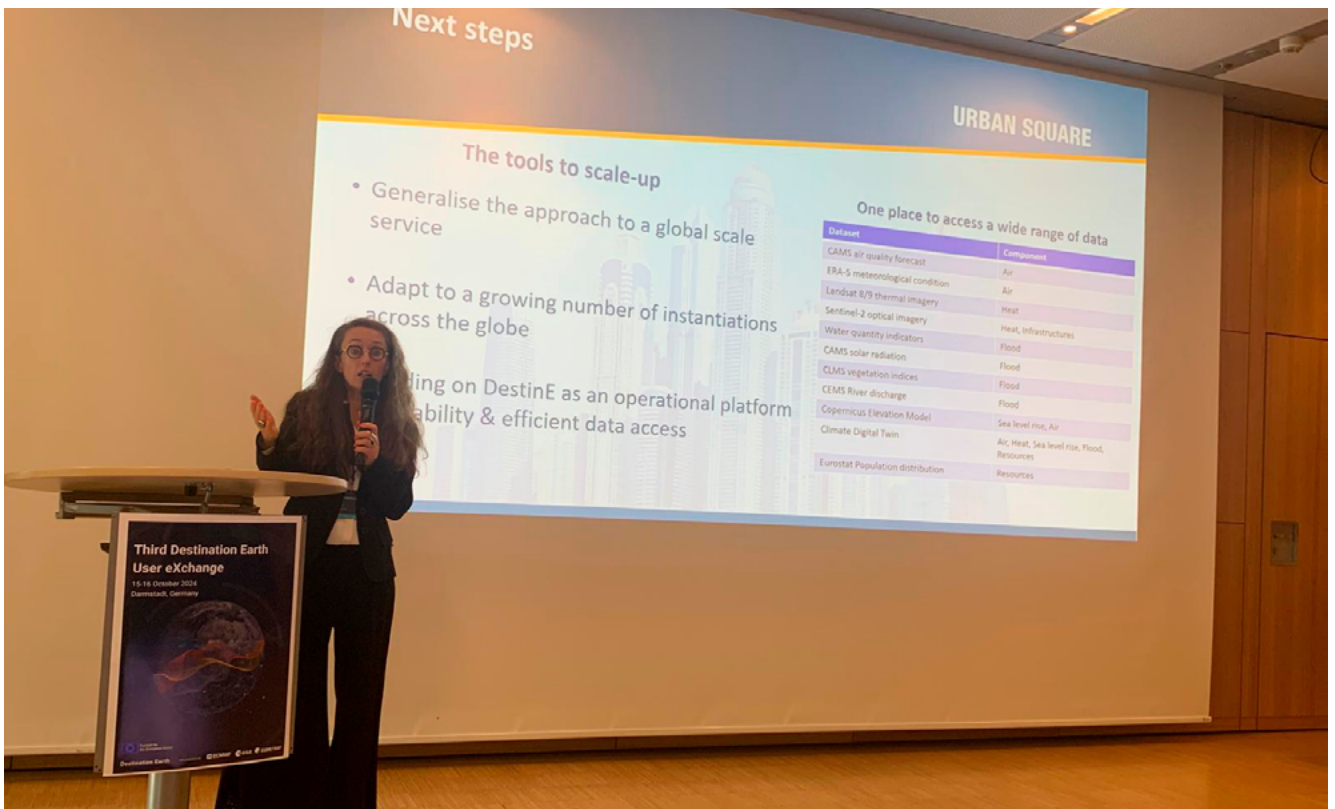
The session explored how digital twin technologies can address urban challenges like traffic management, air quality, disaster resilience, and infrastructure adaptation. Three applications were highlighted: CityNexus, UrbanSquare, and an urban heat service, each tackling challenges such as mobility, climate resilience, air quality, and heat.

Piloted in Copenhagen, CityNexus, presented by **Simone Fratini (Solenix Engineering GmbH)**, is a service that allows city planners to simulate infrastructure changes, such as speed limits and road use, to analyse effects on traffic and air quality. Built on high-frequency and diverse data, this tool provides dynamic insights for sustainable urban planning, although each city requires customised data inputs.

Laure Pialot (Murmuration) & Mariana Damova (Mozaika) described UrbanSquare, a service focused on climate resilience, that helps cities assess impacts of climate risks like sea level rise, flooding, air pollution, and urban heat islands. Led by Murmuration and developed with partners including Mozaika, it integrates satellite and environmental data and provides a set of tools enabling cities to test nature-based solutions for resilient urban planning.

The urban heat service, based on VITO's urban climate model and presented by **Nele Veldeman (VITO)**, UrbClim, provides heat maps to aid cities in adapting to climate change impacts. It models current and future heat stress, and allows to assess the impact of climate adaptation measures like green roofs, soil unsealing and tree planting. UrbClim's metrics help cities, including Lisbon and Prague, identify vulnerable areas and plan targeted climate.

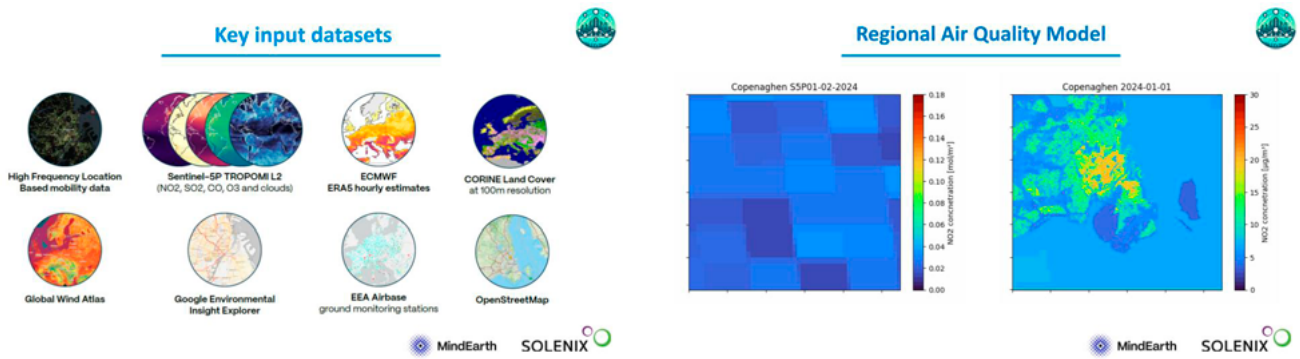
Rasmus Reeh from Urban Digital, working with the Local Council of Amager Vest and other Copenhagen municipalities, shared insights on the challenges cities face in adopting digital twins in the panel session. He emphasised the need for these tools to align with municipal priorities like ease of use, interoperability, and data accessibility, especially in complex environments. Reeh noted that for resource-limited cities, the complexity of digital twins can be a barrier and advocated for user-centered, simplified designs that provide actionable insights to support quick, informed decisions. He also highlighted the importance of cross-municipal collaboration, as urban issues often cross administrative boundaries, requiring integrated, scalable solutions. Digital twins, he concluded, should not only simulate but also actively support decision-making aligned with policy and community needs.



The interactive session underscored the need for digital twins to go beyond simulations, focusing on resilience, public engagement, and seamless integration with other technologies to support informed, collaborative urban planning. Key data needs for climate-focused planning included resilience data, socioeconomic, and mobility data.

By showcasing use cases from DestinE, the session illustrated the value of digital twins in urban planning and infrastructure. The session emphasised that digital twins

must be adaptable, collaborative, and integrated into urban planning. Interoperability is key, allowing data sharing across platforms and city boundaries. Tools should be user-centric, practical, and easily integrated for planners and policymakers. Collaboration between cities, policymakers, and technical teams is crucial to align digital twins with urban priorities. Finally, digital twins should be scalable to fit various city sizes and contexts, ensuring broad applicability and cost-effectiveness.



17 DESTINE COMMUNITY FORUM

Session chaired by Rob Carillo (Trust-IT)

20

The event began with a summary of the achievements of the DestinE Community to date and key findings from a user survey shared with participants. Following this, a dynamic Spectrum Session took place, featuring a diverse panel sharing their perspectives on statements related to DestinE elements and services. This format encouraged open dialogue and the exploration of different viewpoints.

The event concluded with a Community Pulse session, which involved live polling via Slido. The discussion primarily centred around the core value propositions of the DestinE platform and its potential impact on decision-making and policy development.

The discussions emphasized the critical importance of high-quality data and its accessibility through DestinE. DestinE was recognized as a gateway to diverse data sources, but participants noted the need for clear data standards and interoperability to enable seamless data sharing and analysis. These measures were seen as essential to maximizing the DestinE usability and ensuring its long-term success.

User-centric design was highlighted as a core principle, with participants stressing the need to prioritise the end-user experience. Services must be intuitive and accessible to a broad audience. Capacity-building initiatives were identified as crucial for empowering users to fully utilise the platform's features, while semantic technologies were recommended to make data more understandable for non-technical users.

Collaboration with other initiatives and organizations was discussed as a mean to enhance DestinE's reach and impact. However, participants also noted the importance of balancing collaboration with maintaining DestinE's unique identity and objectives. Standardization was deemed critical, with calls for the adoption of common standards and protocols to support interoperability and efficient data-

sharing across different platforms and systems.

The role of compelling use cases was underscored as a way to demonstrate the DestinE value and attract new users. Participants emphasized the need to balance the development of platform-specific services with a broader ecosystem of user-driven applications.

Looking ahead, the community identified several priorities for community building in DestinE for the next three years in a live survey. A self-organizing and growing community was envisioned, with a focus on involving more users and understanding their needs. Co-design was seen as a central strategy for future development, alongside networking and opportunities to showcase resources.

The survey highlighted key values for the community included openness, trust, impact assessment, and transparency. Participants suggested expanding ties with other communities to foster collaboration and shared learning. Networking opportunities, such as user exchanges, webinars, and social events, were highly valued as means to strengthen connections and promote co-design.

To support community interaction, several online features were recommended, including a helpdesk, a forum with expert moderators, regular updates, and easy access to resources and event calendars (some of which have already been put in place). Quarterly interactions were proposed as an effective way to maintain engagement and momentum within the community.

Overall, the session reinforced the importance of prioritizing data quality, user-focused design, collaboration, and standardization, while leveraging compelling use cases to showcase DestinE's value. The feedback highlighted clear pathways for fostering community growth and ensuring the DestinE continued relevance and impact.



18 THE BROADER DIGITAL TWIN LANDSCAPE

Session chaired by Thomaas Geenen (ECMWF)

The objective of the session was to give an overview and a status update of other digital twin initiatives, funded by Horizon Europe but also national initiatives, in the topical area of the Green Deal. The main focus of the session was on the status update of the projects but also touched on how they relate to DestinE and how they could benefit from the information provided by DestinE. The format was a series of short presentations of ten minutes each with limited time for Q&A. Most presenters also presented a poster to give more background information and facilitate in depth discussions about the projects in the poster sessions and during the breakouts.

Liina Munari (DG-CNECT) opened the session and explained how digital twin initiatives funded in Horizon Europe projects fit into the overall objective of DestinE. She also mentioned the technology transfer activities in DestinE and the engagement model envisioned between DestinE and other digital twin initiatives, in the topical area of the Green Deal.

Dirk Pleiter (KTH Royal Institute of Technology) introduced the BioDT project that is developing digital twins in the biodiversity domain. He discussed integration and federation concepts and the different maturity levels that can be identified to work towards full integration, not only on a technical level but also semantically and in terms of governance and regulations. He also mentioned a BioDT use case in DestinE to investigate integration opportunities in the domain of crop wild relatives in agriculture.

Andrea Manzi (EGI) introduced interTwin, a project to develop a framework for the development of new digital twins. DestinE is working with interTwin to agree on architectural and semantic concepts to make it easier to

move digital twins between systems.

Arne Berre (Sintef) discussed the Iliad digital twin of the ocean project and how it relates to EDITO the European Digital Twin of the Ocean initiative from Mercator. He also explained the system setup and interoperability aspects with DestinE mainly through the data lake components and the data handling services in DestinE.

Jacqueline Le Moigne (NASA) introduced the Technology for Earth System Digital Twins program. She touched on several use cases developed in that initiative and highlighted the collaboration with several European institutions for developing twins.

Gabriella Scipione (Cineca) introduced the GLORI4DE project that aims to improve the interoperability between DestinE and GLORI Digital Twins. Gabriella showed a video highlighting the project and provided more technical details on where and how we improve interoperability. This project will provide a blueprint for other national initiatives that develop earth system digital twins for interoperability with DestinE.

Martin Wearing (ESA) talked about the digital twin earth project from ESA with its member states and how that relates to DestinE. He highlighted integration points with the DestinE platform and the data lake.

The session provided a comprehensive overview of digital twin initiatives beyond DestinE, highlighting their connections to DestinE and progress toward interoperability. This aligns closely with the objectives outlined by DG-CNECT, as introduced by Liina Munari, supporting the goal of developing new digital twins and enhancing digital twin capabilities within Horizon Europe-funded projects, while fostering closer integration with DestinE.

19 CO-DESIGN WORKSHOP

Session co-chaired by Malik Terfous, Alexandre Azoulay and Elena Magliaro (Mines Paris PSL)

22

The session aimed to familiarise participants with a novel co-design toolkit and methodology designed for the DestinE platform. The primary objective was to demonstrate how these methods could effectively bridge the gap between highly specialised technical data experts and various potential users of climate services. By focusing on practical applications, the workshop highlighted how these methods can support service developers in identifying potential users, building productive relationships, and ensuring that the developed services meet user needs while fostering a resilient approach. This hands-on approach allowed participants to engage directly with the tools, providing a foundation for applying co-design principles within their own contexts.

The first presentation from **Malik Terfous, Alexandre Azoulay Magliaro (Mines Paris PSL)**

emphasised the importance of co-design in the DestinE context, particularly for creating user-centric Earth Observation services. It introduced the co-design toolkit and methods, offering insights from the co-design collaboration with the City of Marseille. The presentation included video testimonies from stakeholders involved in the project, showcasing real-world applications of the methodology.

The interactive part of the workshop, moderated by the chairs of the session, consisted of two key exercises, designed to apply the co-design toolkit in real-world scenarios. The first exercise, “Phase 1 – Diagnosis of Co-Design Needs,”

involved participants mapping out their specific co-design challenges using a tool called the “data-information-value journey.” Guided by co-design facilitators, participants analysed their ecosystems, identifying the key stakeholders and their roles within these systems. The feedback session that followed allowed participants to reflect on their use of the framework, with many acknowledging the value of this structured approach in revealing gaps in their current engagement strategies. This exercise emphasised the importance of understanding user needs in detail to better align the services provided.

Building on these insights, the second exercise, “Phase 2 – Structuring Co-Design Sessions,” required participants to design a tailored structure for co-design sessions, based on the challenges identified during the first phase. Facilitators supported participants in drawing conclusions from their diagnosis and envisioning effective session structures.

During the feedback portion, participants shared their proposed session designs, emphasizing the need for co-design approaches. Discussions highlighted the importance of maintaining flexibility in session design to accommodate diverse user needs, along with the value of iterative feedback to refine the co-design process.

The key takeaway from this session was the critical role of the co-design diagnosis that structured co-design methodologies in developing services that are closely aligned with user needs. Participants recognised the importance of understanding the ecosystem of users, fostering productive interactions, and iteratively refining their approaches.



20 TRAINING

A training session, organised by **Alexis Longuet (Serco)** and repeated multiples times to accommodate participants priorities, providing hands-on insights into the DestinE Platform services.

This interactive training session has provided key insights on functionalities of some services available on DestinE Platform. Presented services were the following:

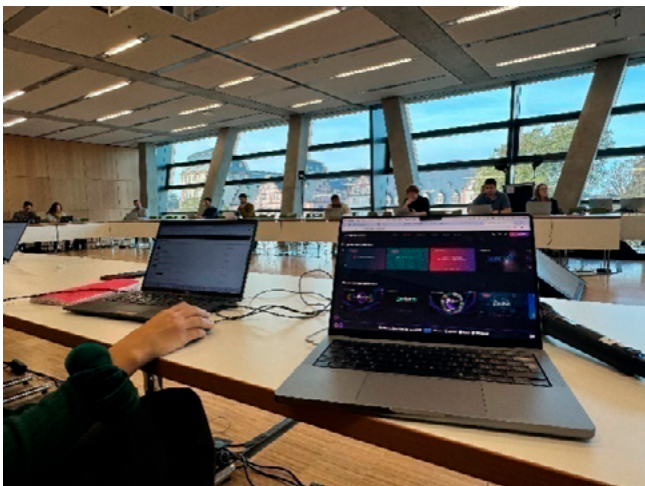
- 🔗 Insula service (**Cesare Rossi, CGI**)
- 🔗 SesamEO, DeltaTwin (**Christophe Demange, Gael Systems**)
- 🔗 DestinE streamer (**Wolfgang Kapferer, Geoville**)

Elisabetta Giuliani (Serco) also highlighted the streamlined process for potential service providers to apply for the onboarding of their service on the DestinE Platform.

Attendees were encouraged to explore the DestinE platform and its multiple services, particularly its ability to integrate custom algorithms and process large datasets. For those interested in onboarding their services to the DestinE platform, audience was advised to contact Elisabetta Giuliani or Alexis Longuet for further guidance.

More than 100 participants have explored the available options to gain access to Destination Earth data, coding and processing resources. Participants have also engaged through polls, providing recommendations on the evolution of services.

23



21 CONCLUSION

The event concluded with remarks from representatives of each organising entities and by the European Commission, which leads the Destination Earth initiative.

Lothar Wolf (EUMETSAT) thanked all participants, organizers, and venue staff, recognizing the collective effort that made the event a success. He specifically highlighted the professionalism of the venue (Darmstadtium) and the support teams handling logistics and participant assistance.

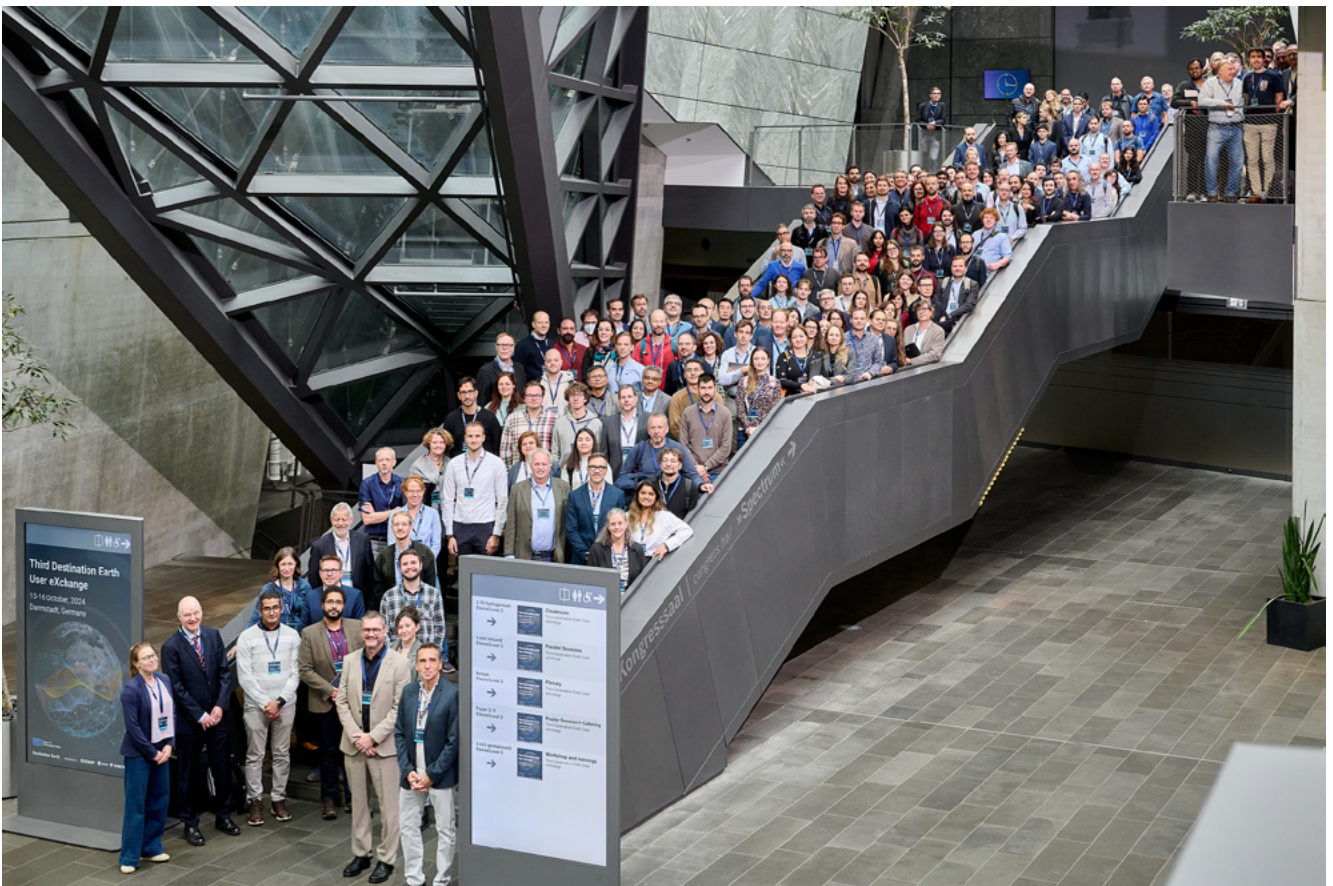
Jörn Hoffmann (ECMWF) reflected on the event's achievements, noting significant progress since the previous DestinE User eXchange in November 2023. He discussed the importance of the "twins," data lake, and platform advancements and how these technical milestones had contributed to the event's success. He emphasised the pivotal role of participant feedback in guiding future developments.

Kathrin Hintze (ESA) expressed gratitude toward EUMETSAT for logistical organization, applauding the engaging discussions and sessions over the past two days.

She announced that the next DestinE User eXchange would take place in June 2025, alongside the ESA Living Planet Symposium, encouraging attendees to continue their engagement and provide ongoing feedback on the platform and services.

Liina Munari (European Commission), expressed satisfaction with the event's vibrancy and high attendance, both in person and online. She highlighted that Destination Earth is a continually evolving platform, welcoming user engagement to drive improvements. Liina also shared updates on upcoming initiatives, including the renewal of the Strategic Advisory Board, aimed at integrating independent expertise into the project's strategic direction.

Liina concluded the session by thanking everyone and reaffirming the commitment of the European Commission and the three key entities (ECMWF, ESA, and EUMETSAT) to sustaining the Destination Earth initiative. She encouraged participants to stay tuned for future events and updates.



Credit: EUMETSAT/Axel Gaube

APPENDIX A: PROGRAMME COMMITTEE

- 🌐 Björn Backeberg, Deltares
- 🌐 Mariana Clare, European Centre for Medium-Range Weather
- 🌐 Mara Dambour, European Organisation for the Exploitation of Meteorological Satellites
- 🌐 Sofia Ermida, EUMETSAT LSA-SAF, Portuguese Institute for Sea and Atmosphere
- 🌐 Alessandra Feliciotti, MindEarth
- 🌐 Simone Fratini, Solenix
- 🌐 Thomas Geenen, European Centre for Medium-Range Weather
- 🌐 James Hawkes, European Centre for Medium-Range Weather
- 🌐 Jörn Hoffmann, European Centre for Medium-Range Weather
- 🌐 Eleni Karachaliou, Aristotle University of Thessaloniki
- 🌐 Nikolay Koldunov, Alfred-Wegener Institute
- 🌐 Filip Lefebre, VITO
- 🌐 Alexis Longuet, Serco
- 🌐 Sylwia Miechurska, European Organisation for the Exploitation of Meteorological Satellites
- 🌐 Sebastian Milinski, European Centre for Medium-Range Weather
- 🌐 Gian Piero Izzo, Alia Space Systems
- 🌐 Danaële Puechmaille, European Organisation for the Exploitation of Meteorological Satellites
- 🌐 Roger Randriamampianina, Norwegian Meteorological Institute
- 🌐 Francesc Roura Adserias, Barcelona Supercomputing Center
- 🌐 Inés Sanz Morere, European Space Agency
- 🌐 Borys Saulyak, European Organisation for the Exploitation of Meteorological Satellites
- 🌐 Irene Schicker, GeoSphere Austria
- 🌐 Miruna Stoicescu, European Organisation for the Exploitation of Meteorological Satellites
- 🌐 Benoît Vannière, European Centre for Medium-Range Weather
- 🌐 Nele Veldeman, VITO
- 🌐 Claudia Vitolo, European Space Agency
- 🌐 Kun Yan, Deltares

APPENDIX B: THIRD DESTINE USER EXCHANGE PROGRAMME

Also available online : <https://destination-earth.eu/event/3rd-destination-earth-user-exchange/>

Day 1 (15 October)

09:00-09:30	Arrival and registration	
09:30-09:45	<p>Opening</p> <p>Representatives from the European Commission and hosting organisation EUMETSAT share their perspectives on the future of DestinE.</p> <ul style="list-style-type: none"> 🌐 Welcome by Lothar Wolf, DestinE Programme Manager, EUMETSAT 🌐 Welcome by Liina Munari, Deputy Head of Unit, DG CNECT.C1 High Performance Computing and Applications, European Commission 	
09:45-10:00	<p>Keynote</p> <p>Extremes in a Changing Climate</p> <ul style="list-style-type: none"> 🌐 <i>Roar Skalin, Director of Norwegian Meteorological Institute</i> 	
10:00-10:50	<p>Progress</p> <p>The three Entrusted Entities – ESA, ECMWF, EUMETSAT – will give an update on key achievements, status of the system and plans for Phase II.</p> <ul style="list-style-type: none"> 🌐 Overall status of the initiative DestinE (Phase I achievements and Phase II main goals) 🌐 DestinE Services and Interfaces, <i>Kathrin Hintze (ESA)</i> 🌐 DestinE Digital Twins: characteristics models and interaction, <i>Irina Sandu (ECMWF)</i> 🌐 DestinE Data Lake, characteristics and services, <i>Lothar Wolf (EUMETSAT)</i> 	
10:50-11:00	<p>Live demonstration of DestinE Service Platform</p> <p>Overview of the web portal features and services from a user perspective.</p> <ul style="list-style-type: none"> 🌐 Alexis Longuet (Serco) 	
11:00-11:30	Morning Break	
11:30-12:45	<p>Climate Models and Data</p> <p>This session will present the progress of climate simulations performed with three Climate DT models. It will discuss several types of simulations currently available to users, provide the results of their scientific evaluation, and give initial examples of using simulation data in practice.</p>	<p>Flood Risk Management</p> <p>This session aims to showcase the scope and objectives of enhancing DestinE services for compound flooding forecasting and adaptation planning. We will present key findings from two DestinE projects on flood risk mitigation and adaptation modelling. A subsequent panel discussion with experts from policy, technical fields, operational weather forecasting, and satellite remote sensing will address critical improvements needed for DestinE.</p>

	<p>Additionally, the session will discuss plans for the simulations that will be conducted in the coming year.</p> <p><i>Co-chairs: Nikolay Koldunov (Alfred-Wegener Institute) and Sebastian Milinski (ECMWF)</i></p> <ul style="list-style-type: none"> · Climate DT overview: objectives, models and simulations, <i>Theresa Kiszler (CSC)</i> · Climate simulations, <i>Pablo Ortega (Barcelona Supercomputing Centre)</i> · Storyline simulations, <i>Amal John (Alfred Wegener Institute)</i> · Model evaluation: overview of Phase 1 simulations, <i>Silvia Caprioli, Jost von Hardenberg and Paolo Davini (Politecnico di Torino)</i> 	<p><i>Co-chairs: Kun Yan, Björn Backeberg, and Albrecht Weerts (Deltares)</i></p> <ul style="list-style-type: none"> 🌐 Forecasting Compound Flood Impacts using Extremes DT, <i>Kun Yan (Deltares)</i> 🌐 Co-developing the On-demand Extremes DT Floods 🌐 Application, <i>Ursula McKnight (Swedish Meteorological and Hydrological Institute)</i> 🌐 Panel discussion moderated by Björn Backeberg (Deltares) 🌐 Kun Yan (Deltares) 🌐 Martin Schobben (GFM, TUWien) 🌐 Thomas Geenen (ECMWF) 🌐 Roger Randriamampianina (Norwegian Meteorological Institute)
12:45-14:15	Lunch	
14:15-14:42	<p>Lightning talks</p> <p>3-minute talks about DestinE and its applications</p> <ul style="list-style-type: none"> 🌐 Immersive Visualisation Metaverse for EO Applications, <i>Simone Fratini (Solenix)</i> 🌐 Advancing Geospatial Data Analysis with XDGGS, <i>Tina Odaka (IFREMER)</i> 🌐 Case studies towards cryosphere digital twin applications, <i>Ilja Maljutenko (TalTech) & Tero Aalto (CSC)</i> 🌐 Danube Delta water reservoir in DestinE using Data Lake services, <i>Charlotte Delmas (CS Group)</i> 🌐 Post-processing for wind energy production, <i>Irene Schicker (GeoSphere Austria)</i> 🌐 A new tool to obtain relevant indicators for the energy sector, <i>Sushovan Ghosh (BCS)</i> 🌐 Validation of DestinE's Climate DT with high-resolution ground- and satellite-based observations of radiation and wind speed, <i>Bruno Schyska (DLR)</i> 	
	Transition	

14:45-16:00	<p>Extreme Digital Twin</p> <p>The Extremes DT simulates extreme weather events and their impacts. In this session, we will show the Extremes DT workflow and the products that users will be able to access.</p> <p><i>Co-chairs: Roger Randriamampianina (Norwegian Meteorological Institute) and Benoît Vannière (ECMWF)</i></p> <ul style="list-style-type: none"> 🌐 Model configurations, workflow and data, <i>Xiaohua Yang (DMI)</i> 🌐 Impact sector models, <i>Roger Randriamampianina (Norwegian Meteorological Institute)</i> 🌐 Uncertainty quantification, <i>Aristofanis Tsiringakis (ECMWF)</i> 🌐 Detection/triggering, <i>Jonathan Demaeyer (KMI)</i> 🌐 Success Stories Use Cases from forecasts to impacts, <i>Estíbaliz Gascón (ECMWF)</i> 	<p>Agriculture and biodiversity</p> <p>This session will showcase some applications and use cases for studying agriculture and biodiversity from the climate and weather perspective. A panel discussion with key users will address current and potential applications in DestinE to advance the impacts of extremes and climate change on agriculture and biodiversity. The session will collect feedback and needs from the participants.</p> <p><i>Chair: Sofia Ermida (LSA-SAF, Instituto Português do Mar e da Atmosfera)</i></p> <ul style="list-style-type: none"> 🌐 User case: To track and predict hazard to agricultural crops in Europe induced by climate change using crop growth models and DestinE data, <i>Claus Weiland (Seckenberg)</i> 🌐 Forest biodiversity use case in DestinE, <i>Matti Motus (VTT)</i> 🌐 Global fish tracking use case, <i>Tina Odaka (IFREMER)</i> 🌐 DestinE and European policy priority needs: from science to policy support, <i>Eva Ivits (European Environment Agency)</i> 🌐 Panel discussion with invited speakers 	<p>Workshop</p> <p>DestinE Co-design toolkit & methodology – User testing and feedback</p> <p>Through the project “Co-Design for DestinE”, ESA has procured a novel co-design methodology specifically adapted to bridge the gap between DestinE and actual users. The project will deliver a validated co-design methodology and toolkit for registered service providers.</p> <p>In an interactive workshop segment, participants will engage in a dynamic course-training mix. They will receive an introduction to the co-design methodology, supplemented by quick exercises to apply the method. Through this hands-on approach, attendees will not only gain practical experience but also have the opportunity for self-reflection, adapting co-design best practices to their own environments.</p> <p><i>Co-chairs: Malik Terfous, Alexandre Azoulay and . Elena Magliaro (Mines Paris PSL)</i></p> <ul style="list-style-type: none"> 🌐 Introduction to co-design within the DestinE Framework 🌐 Introduction to the interactive part of the workshop 🌐 Phase 1 – Diagnosis of co-design needs 🌐 Phase 2 – Structuring co-design sessions
16:00-16:30	Afternoon break		

16:30-17:45	<p>Interacting with the Digital Twins</p> <p>This session examines how we can interact with Digital Twins, and how Digital Twins can interact with each other. Presentations will highlight the developments in DestinE that support these interactions, including demonstrations.</p> <p><i>Chair: James Hawkes (ECMWF)</i></p> <ul style="list-style-type: none"> 🌐 The Digital Twin Engine: Enabling Interoperability and Interactability, <i>James Hawkes (ECMWF)</i> 🌐 Triggering the On-Demand DT, <i>Xiaohua Yang (DMI)</i> 🌐 AQUA: the quality assessment tool for the Climate Digital Twin, <i>Silvia Caprioli (Politecnico di Torino)</i> 🌐 GSV interface: a new python access to the Climate Digital Twin data, <i>Pierre-Antoine Bretonnière (Barcelona Supercomputing Centre)</i> 	<p>Health at Risk: Exploring the Impacts of Climate Change and Air Pollution and the Power of User Collaboration</p> <p>This session will explore the far-reaching health consequences of both air pollution and our changing climate. Discover compelling sector studies that highlight how user interactions with DestinE drive meaningful insights and improvements. Engage with experts and peers to discuss innovative in approaches real-world case studies. Explore future avenues for increasing collaboration and interaction to better address the health challenges posed.</p> <p><i>Co-chairs: Filip Lefebvre and Nele Veldeman (VITO)</i></p> <ul style="list-style-type: none"> 🌐 The evolving impacts of climate change on health, and the emerging health opportunities of climate action, <i>Cathryn Tonne (ISGLOBAL, The Lancet Countdown)</i> 🌐 Urban-scale air pollution model using Data Lake's Near-Data Computing, <i>Ignasi de Pouplana and Laurence Sigler (International Center for Numerical Methods in Engineering)</i> 🌐 Adaptation Modelling Framework for Heat Stress Exposure, <i>Nieves Peña Cerezo (TECNALIA)</i> 🌐 Vector-borne diseases: focus on current research, bottlenecks and how DestinE could help, <i>Xavier Rodo (ISGLOBAL)</i> 🌐 The use of Local Digital Twins to evaluate the impact of mobility choices on air quality, <i>Stijn Vranckx (VITO)</i> 🌐 Panel discussion (session speakers)
17:45-20:00	<p>Poster Session and Ice Breaker</p> <p>Posters will expand on selected technical or application aspects in DestinE. All posters will also be available online. Live demonstrations will run during this session as well.</p> <p>From 18h30 food and drinks will be served.</p>	

<p>09:00-10:15</p>	<p>Interacting with the DestinE Platform and Edge services</p> <p>This session aims to describe to the user community how to interact with DestinE Platform, including registering, accessing services, and potentially onboarding new services supporting the objectives of the DestinE initiative. It will additionally present the available services accessible from the DestinE platform, including the Edge Services provided by the DestinE Data Lake.</p> <p><i>Moderators: Ines Sanz Morere (ESA) and Borys Saulyak (EUMETSAT)</i></p> <ul style="list-style-type: none"> 🌐 Overview of DestinE Access Policy, including requesting access to Edges services, <i>Ines Sanz Morère (ESA) and Borys Saulyak (EUMETSAT)</i> 🌐 DestinE Platform – Overview of the User Journey (registration, upgrade access process, service registry, support section), <i>Matteo Cortese (Serco)</i> 🌐 DestinE Data Lake – Overview to Edge Services, <i>Borys Saulyak (EUMETSAT)</i> 🌐 DestinE Platform – Onboarding a New Service (onboarding procedure, scenarios of integration, runtime platform & security benefits), <i>Najla Said (Serco)</i> 	<p>DestinE in the Energy sector</p> <p>The aim of this session is to highlight the added value that DestinE and its energy-related workstreams can bring to the renewable energy sector. We will present already finalised and available data-models-products and the most recent highlights of ongoing work from the different workstreams, followed by an interactive discussion about the needs, wishes, ideas that the energy sector has of DestinE energy workstreams.</p> <p><i>Moderators: Irene Schicker (GeoSphere Austria) and Francesc Roura Adserias (Barcelona Supercomputing Center)</i></p> <ul style="list-style-type: none"> 🌐 Model Sensitivities, Data Validation and ML: final results of the DestinE Use Case Energy Systems, <i>Bruno Schyska (DLR)</i> 🌐 Destination Renewable Energy, <i>Stelios Kazadzis (National Observatory of Athens)</i> 🌐 Energy in Catalonia use case, <i>Pere-Andreu Ubach (International Center for Numerical Methods in Engineering)</i> 🌐 Climate Adaptation Digital Twin: the energy use case, <i>Francesc Roura Adserias (Barcelona Supercomputing Center)</i> 🌐 On-demand Extreme Events Digital Twin: Renewable energy, <i>Irene Schicker (Geosphere Austria)</i> 	<p>Training session 1</p> <p>75-minute training providing hands-on insights into the DestinE data access services.</p> <p><i>Chair: Alexis Longuet (Serco)</i></p> <ul style="list-style-type: none"> 🌐 Insula service, (<i>Cesare Rossi, CGI</i>) 🌐 SesamEO, (<i>Christophe Demange, Gael Systems</i>) 🌐 DestinE streamer (<i>Wolfgang Kapferer, Geoville</i>) 🌐 DestinE – service onboarding (<i>Elisabetta Giuliani, Serco</i>)
<p>10:15-10:45</p>	<p>Morning Break</p>		

10:45-12:00	<p>Interacting with DestinE Data Portfolio</p> <p>In addition to new outstanding DestinE Digital Twins data, DestinE provides access to datasets from various other data spaces and data providers. All datasets accessible through DestinE constitute the so-called DestinE Data Portfolio. Accessing the Data Portfolio is a first step toward data fusion to unlock applications responding to the DestinE challenges.</p> <p>The session aims to inform participants on ways to interact with the DestinE Data Portfolio to create applications. Speakers will explain how to discover the Data catalogue and visualise data.</p> <p><i>Chair: Danaële Puechmaille (EUMETSAT)</i></p> <ul style="list-style-type: none"> 🌐 Presentation of DestinE Data Portfolio, <i>Danaële Puechmaille (EUMETSAT)</i> 🌐 EDEN service in the platform, <i>Simone Mantovani (MEE0)</i> 🌐 Harmonised Data Access service a unified API for DestinE Data Portfolio, <i>Aubin Lambarre (CS Sopra Steria)</i> 🌐 SesamEO service, <i>Frédéric Le Fur & Patrick Pradier (Gael Systems)</i> 🌐 The Earth Data Hub, <i>Nicola Masotti (B-Open)</i> · DestinE Streamer, <i>Wolfgang Kapferer (Geoville)</i> 	<p>Transportation and Urban dynamics: Transforming Transportation and Urban Planning with Digital Twin Technologies</p> <p>This session will delve into the role of digital twin technologies in advancing sustainable urban planning and management. Through innovative urban applications, we will showcase how these technologies address critical urban challenges, including accessibility to key facilities, traffic congestion, multi-hazard risks, and climate-related issues such as air pollution and the urban heat island effect. The session will emphasise the added value that Destination Earth use cases bring to urban planning, infrastructure, and mobility sectors. Presentations will be followed by an interactive discussion with key end-user representatives, focusing on their needs, priorities, and requirements.</p> <p><i>Co-chairs: Alessandra Feliciotti (MindEarth) and Simone Fratini (Solenix)</i></p> <ul style="list-style-type: none"> 🌐 Setting the framework and the stage on the urban challenge, <i>Alessandra Feliciotti (MindEarth) and Miguel Morcillo (EU Covenant of Mayors)</i> 🌐 Presentation of CITYNEXUS, <i>Alessandra Feliciotti (MindEarth)</i> 🌐 Presentation of URBAN SQUARE, <i>Laure Pialot (Murmuration-sas) and Mariana Damova (Mozaika)</i> 🌐 Presentation on UrbClim for UHI, <i>Nele Veldeman and Filip Lefebvre (VITO)</i> 🌐 Panel discussion with invited guests 	<p>Training session 2</p> <p>75-minute training providing hands-on insights into the DestinE data access services.</p> <p><i>Chair: Alexis Longuet (Serco)</i></p> <ul style="list-style-type: none"> 🌐 Insula service, (<i>Cesare Rossi, CGI</i>) 🌐 SesamEO, (<i>Christophe Demange, Gael Systems</i>) 🌐 DestinE streamer (<i>Wolfgang Kapferer, Geoville</i>) 🌐 DestinE – service onboarding (<i>Elisabetta Giuliani, Serco</i>)
12:00-13:15	Lunch		

13:15-14:30	<p>Visualisation talks and demos</p> <p>Visualisation tools are a cornerstone of the DestinE initiative, and this session is set to dive into the cutting-edge advancements in this field. We aim to both enlighten users about the available solutions and spark a dynamic exchange of expertise across industries.</p> <p><i>Chair: Gian Piero Izzo (Alia Space Systems)</i></p> <ul style="list-style-type: none"> 🌐 Using Unreal Engine to Promote DestinE Data, <i>Andreas Mueller (ECMWF)</i> 🌐 A Notebook-Based approach to visualise data from DestinE Data portfolio, <i>Patryk Grzybowski (Cloud Ferro)</i> 🌐 Visualisation and Immersive Technologies, <i>Gianluca Palumbo (Exprivia)</i> 🌐 DestinE Interactive Storytelling Service and beyond, <i>Arturo Montieri (Alia Space)</i> 🌐 DestinE demonstrators, <i>Kylian Berrebi (Atos) and Christophe Taillandier (Mews Partners)</i> 	<p>DestinE Community Forum</p> <p>This session will focus on collecting user experience feedback on the use of DestinE services, based on a survey sent out before the event. It aims to create a dynamic and informative environment for exploring the topic from multiple angles, fostering dialogue, and providing a clear visual representation of the diversity of opinions.</p> <p><i>Chair: Eleni Karachaliou (Aristotle University of Thessaloniki)</i></p> <ul style="list-style-type: none"> 🌐 DestinE Community Insights 🌐 Spectrum session 🌐 Community Pulse 	<p>Training session 3</p> <p>75-minute training providing hands-on insights into the DestinE data access services.</p> <p><i>Chair: Alexis Longuet (Serco)</i></p> <ul style="list-style-type: none"> 🌐 Insula service, (<i>Cesare Rossi, CGI</i>) 🌐 SesameEO, (<i>Christophe Demange, Gael Systems</i>) 🌐 DestinE streamer (<i>Wolfgang Kapferer, Geoville</i>) 🌐 DestinE – service onboarding (<i>Elisabetta Giuliani, Serco</i>)
14:30-15:00	Afternoon break		

15:00-16:15	<p>Artificial Intelligence and Machine Learning in DestinE</p> <p>Artificial Intelligence (AI) offers fantastic opportunities for advancements in novel weather and climate modelling/ information systems such as DestinE. This session will show how AI approaches complement our work in DestinE, expanding what we can achieve in terms of impact sector reach and interactivity.</p> <p><i>Co-chairs: Mariana Clare (ECMWF) and Miruna Stoicescu (EUMETSAT)</i></p> <ul style="list-style-type: none"> 🌐 Machine Learning for DestinE at ECMWF, <i>Joffrey Dumont Le Brazidec (ECMWF)</i> 🌐 A data-driven digital twin for On-Demand Extremes simulation, <i>Thomas Nipen (Met Norway)</i> 🌐 DestinE Platform AI/ML capabilities, <i>Sebastien Tetaud (ESA)</i> 🌐 DestinE Sea Ice Decision Enhancement using AI, <i>Lasse Rabsensein (Drift+Noise Polar services)</i> 🌐 Facilitating Artificial Intelligence Activities in the DestinE Data Lake, <i>Miruna Stoicescu (EUMETSAT)</i> 🌐 Baltic Sea cyanobacteria blooms – Machine Learning-based short-term prediction (Algae Storm), <i>Tobias Edman (Research Institutes of Sweden)</i> 	<p>The Broader Digital Twin Landscape</p> <p>The development status of other Digital twins, funded by Horizon Europe but also national initiatives, in the topical area of the green deal, will be presented. The main focus will be on the status update of the projects, but the session will also touch on how they relate to DestinE and how they could benefit from the information provided by DestinE.</p> <p><i>Chair: Thomas Geenen (ECMWF)</i></p> <p>CNECT, State of play of Horizon Europe and Destination Earth – opportunities and challenges, <i>Babis Tsitlakidis (European Commission)</i></p> <p>Extending the Destination Earth ecosystem with biodiversity digital twins, <i>Dirk Pleiter (KTH)</i></p> <p>Towards geophysical extremes twins: status and next steps of the DT-GEO project, <i>Arnau Folch (GEO3CBCN)</i></p> <p>The interTwin Digital Twin Engine components for environmental DTs, <i>Andrea Manzi (EGI)</i></p> <p>Iliad: Digital twins of the Ocean, <i>Arne Berre (SINTEF NorwAI)</i></p> <p>Technology for Earth System Digital Twins, <i>Jacqueline Le Moigne (NASA)</i></p> <p>GLORI4DE: the interoperability between DestinE and GLORI Digital Twins, <i>Gabriella Scipione (CINECA)</i></p> <p>EO-based Digital Twin Components of the Earth System, <i>Martin Wearing (ESA)</i></p>
	Transition	
16:15-16:30	<p>Closure</p> <p>Conclusions and outlook from the European Commission, ECMWF, ESA, and EUMETSAT.</p>	
16:30	End of the 3rd User eXchange	

Posters list

Main Author	Main Author Organisation	Presenting Author	Title
Odaka, Tina Erica	LOPS - Laboratoire d'Océanographie Physique et Spatiale UMR 6523 CNRS-IFREMER-IRD-Univ.Brest-IUEM	Odaka, Tina Erica	Advancing Geospatial Data Analysis with XDGGS
Méndez, Míriam	CIMNE	Mor, Gerard	Assessing the Impact of Extreme Weather Events and Long-Term Weather Projections on Catalonia's Electricity Consumption
Oliveira, Ana	CoLAB +ATLANTIC	Oliveira, Ana	Atlantic.SENSE: towards an integrated geospatial intelligence solution
Aalto, Tero	CSC – IT Center for Science	Aalto, Tero	Biodiversity Digital Twin: Advancing predictive biodiversity modeling
Maljutenko, Ilja	Tallinn University of Technology	Maljutenko, Ilja	Case studies towards cryosphere digital twin applications NOrdic CryOSphere Digital Twin – NOCOS DT
Feliciotti, Alessandra	MindEarth s.r.l.	Asaro, Francesco	CityNexus: an advanced urban digital twin use case for high-resolution mobility and air quality “what if” scenario simulations on the DestinE platform.
Trakas, Athina	ECMWF	Trakas, Athina	Code for Earth an ECMWF key innovation action - and what is in for you
Schobben, Martin	Forschungsbereich Fernerkundung, Technische Universität Wien	Schobben, Martin	Communicating Uncertainty in Natural Hazard Digital Twins
Lambaré, Aubin	CS GROUP	Delmas, Charlotte	DEDL Use case: Danube Delta
Grzybowski, Patryk	CloudFerro S.A.	Grzybowski, Patryk	Destination Earth Data Lake Big Data Processing Services - Edge Services
Puechmaille, Danaele	EUMETSAT	Puechmaille, Danaele	Destination Earth Data Portfolio
Warde, Adam	ECMWF	Warde, Adam	Destination Earth Data Retrieval APIs: Earthkit, Polytope and more
Kontoes, Charalampos	National Observatory of Athens - Center for Earth Observation Research and Satellite Remote Sensing BEYOND/ IAASARS	Georgakis, Angelos	DESTINATION RENEWABLE ENERGY: A hybrid (solar and wind) renewable energy application using the Destine's platform data and services
Avolio, Serena	Starion Group	Lambaré, Aubin	DestinE Data Lake – Harmonized Data Access (HDA)
Islam, Tariqul	DigitalTwin Technology GmbH	Islam, Tariqul	Dynamic Digital Twins for Smart and Sustainable City Planning

Main Author	Main Author Organisation	Presenting Author	Title
Manzi, Andrea	EGI Foundation	Manzi, Andrea	Empowering Science through Digital Twins: The interTwin project
Bauer, Daniel	Senckenberg Society for Nature Research	Bauer, Daniel	Enhancing crop sustainability through FAIR data integration
Thillaye, Marie Anne	Airbus Defence & Space	Jaskula, Patryk	Enhancing Deforestation Monitoring for Net Zero Commitments and Effective EUDR Enforcement
Wearing, Martin	ESA	Wearing, Martin	EO-based Digital Twin Components of the Earth System
Möttus, Matti	VTT Technical Research Centre of Finland	Möttus, Matti	Forest Digital Twin
Stramondo, Salvatore	Istituto Nazionale di Geofisica e Vulcanologia	Stramondo, Salvatore	GET-it Geohazards Early Digital Twin Component
Yan, Kun	Deltares	Yan, Kun	Global to local compound flood forecasting for Destination Earth
Demir, Samet	ECMWF	Demir, Samet	Highly Scalable Services for High-Throughput Data and Notifications: Polytope and Aviso
de WAZIERS, Henry	adwaisEO	de WAZIERS, Henry	HIGHWAY Service - Enabling Seamless Data and Processing Access within the Digital Twin Earth Framework
Taillandier, Christophe	Mew Partners	Taillandier, Christophe	How to ensure Destination Earth attractiveness?
Longuet, Alexis	Serco	Longuet, Alexis	How to join the DestinE Platform Ecosystem?
Chandrasekar, Aparna	Helmholtz Center for Environmental Research (UFZ)	Chandrasekar, Aparna	HydroLand application: Providing high resolution information on the impact of climate change on river discharge and soil moisture
Möhrlen, Corinna	WEPROG	Möhrlen, Corinna	IEA Wind Task 51 Forecasting for the weather-driven energy system's connecting the bits on forecast scales
Ressler, Rainer	EOMAP GmbH	Ressler, Rainer	Immersive Virtual Reality Digital Twins (IDT) of natural ecosystems based on true geometries and biodiversity information
Fratini, Simone	Solenix Engineering GmbH	Fratini, Simone	Immersive Visualization Metaverse for EO Applications
Reuter, Stefanie	ECMWF	Reuter, Stefanie	Improving the IO performance gap with MultIO – recent developments and performance studies
Le Moigne, Jacqueline	NASA	Le Moigne, Jacqueline	NASA Earth System Digital Twins (ESDT) Prototypes
Bonanni, Antonino	ECMWF	Bonanni, Antonino	Plume plugin system: an overview of the recent developments

Main Author	Main Author Organisation	Presenting Author	Title
Schicker, Irene	GeoSphere Austria	Schicker, Irene	Post-processing for wind energy production: added value of hectometric NWP forecasts with NWP wind farm parameterization and targeted machine learning
Papazek, Petrina	Geosphere Austria	Papazek, Petrina	PV Forecasting Case Studies
Gfäller, Pascal	GeoSphere Austria	Gfäller, Pascal	Robust satellite derived solar irradiance nowcasting with spatio-temporal neural networks
Kluckner, Sigmund	Sigmund Kluckner / IEEE	Kluckner, Sigmund	Standardization as a critical activity for Digital Twins of the Earth
Leon-Tavares, Jonathan	VITO	Leon-Tavares, Jonathan	Surface albedo and emissivity for Belgian cities (SuaBe)
Manubens, Nicolau	ECMWF	Manubens, Nicolau	The ECMWF FDB: a Versatile High-Performance Store for Earth System Data
Sayed, Susan	Deutscher Wetterdienst	Sayed, Susan	The HydroMet Use Case: Extreme rain event analysis and catalogization
Lacima-Nadolnik, Aleks	Barcelona Supercomputing Center (BSC)	Ghosh, Sushovan	The new tool to obtain relevant indicators for the energy sector
Backeberg, Björn	Deltares	Backeberg, Björn	Towards a digital twin for flood risk management
Koren, Gerbrand	Utrecht University	Oliveira, Ana	Towards a Quality Control concept for Destination Earth (DE373)
Dantas de Paula, Mateus	Senckenberg BIK.F	Dantas de Paula, Mateus	Towards global maps of vegetation trait change: the VESTA project
Roura Adserias, Francesc	Barcelona Supercomputing Center (BSC)	Roura Adserias, Francesc	Towards the operationalization of use cases in the framework of the Climate Adaptation Digital Twin
Rizou, Stamatia	SingularLogic	Pisa, Claudio	Transforming urban development and construction practices: the BUILDSPACE project
Szintai, Balazs	ECMWF	Szintai, Balazs	Uncertainty quantification products for the Extremes DT
de Pouplana, Ignasi	CIMNE	de Pouplana, Ignasi	Urban-scale air pollution model using Data Lake's Near-Data Computing
Schmidt, Thomas	German Aerospace Center (DLR)	Schyska, Bruno	Validation of DT climate solar radiation data with high-resolution ground-based solar irradiance observations
Tuomenvirta, Heikki	Finnish Meteorological Institution	Tuomenvirta, Heikki	Wildfire risk and damages, now and in the future – A set of Destination Earth use cases

Some of the report sections have been generated with the assistance of AI.

