

## WP23\_25: Urban Heritage Climate Observatory

1515,195

### Basic Information

#### Full title of the Initiative

Urban Heritage Climate Observatory

#### Short Title or Acronym

UHCO

#### Current category in the 2020-2022 GWP

Community Activity

#### Proposed category in the 2023-2025 GWP

Pilot Initiative

### Points of Contact

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### Purpose

#### Objective

The Urban Heritage Climate Observatory (UHCO) provides a forum for relevant partners to share good practices, needs and expertise to enrich and coordinate processes for the preservation, monitoring, and management of urban heritage, as well as communication and advocacy around local, national and international Climate Action through co-producing targeted innovative tools and services focusing on climate change risks and impacts to urban heritage.

#### Please provide a short description of the Initiative

Climate change is one of the most critical issues of our time and its impacts on World Heritage properties are more evident than ever. Increasing exposure both to slow-onset climatic processes, as well as extreme weather events, are the most obvious of threats to the existence of cultural and natural heritage properties. In the case of urban heritage, there is an additional critical need to integrate different aspects of the sustainable development agenda, including urban resilience and sustainable urbanization, with the protection of heritage values, especially in World Heritage Cities, considering the centrality of cultural heritage's social, ecological and economic dimensions for sustainable urban development. Earth observations (EO) hold great potential to shield urban heritage from climate change risks. Especially in World Heritage Cities, EO derived information can facilitate the creation of bridges between climate change and cultural heritage communities and offer a framework for the design of joint, multi-disciplinary and multi-governmental approaches to tackle climate change

risks and impacts on cultural heritage. Yet, gaps exist in relation to integration and usability of different EO assets, along with increasing technical capacity. UHCO, led by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre (WHC) and the Greek GEO Office (GGO), aims at developing a network of competent stakeholders for the effective and coordinated preservation, monitoring, and management of urban heritage.

### **Why is this Initiative needed?**

Climate change impacts on both cultural and natural World Heritage are indisputable, with increasing exposure both to slow-onset climatic processes, such as desertification and sea level rise, and extreme weather events including floods, droughts, storms, wildfires and temperature extremes. Such processes and events directly threaten the preservation and existence of cultural heritage sites and their built structure, and also pose an indirect threat to the local communities and the transmission of intangible cultural heritage, as well as to associated tourism and other socio-economic activities. In the case of urban heritage, there is a critical need to identify and address climate change risks and impacts, while also furthering aspects of the sustainable development agenda and building urban resilience focusing on disaster risk, to ensure the preservation of past lessons and safekeeping for future generations.

### **What evidence is there to support this need?**

UNESCO has been at the forefront of exploring and managing the impacts of climate change on World Heritage, defined as "the designation for places on Earth that are of outstanding universal value to humanity" and as such, have been inscribed on the World Heritage List to be protected for future generations to appreciate and enjoy. In 2006, under the guidance of the World Heritage Committee, the WHC prepared a report on predicting and managing the impacts of climate change on World Heritage [1], followed by a compilation of Case Studies on Climate Change and World Heritage [2], and a Policy Document on the Impacts of Climate Change on World Heritage Properties [3], in 2008. In 2014, it published a practical guide and continues to build the capacity of site managers to deal with climate change [4]. Moreover, the WHC updated its Policy Document on the impacts of climate change on World Heritage properties [5]. The International Council on Monuments and Sites (ICOMOS), an Advisory Body to the World Heritage Committee, maintains a Working Group on Climate Change and Heritage, and while their main focus is to bolster the link between cultural heritage and climate change, they have identified a need to adjust and update methodologies surrounding heritage practices. The UNESCO 2011 Recommendation is another important framework to integrate heritage preservation with sustainable development and Climate Action [6]. Despite the majority of listed World Heritage Cities being located in Europe, climate change is a global issue, surfacing in different ways and at variable intensity unique to that locale. Any movement aiming to address all those local particularities, within the veil of global climate change, should ensure geographical balance and representation. World Heritage properties that are inscribed on the List of World Heritage in Danger, include Coro and its Port in Venezuela, where flooding threatens to deteriorate the architectural and urban coherence and integrity; the Old City of Sana'a in Yemen, which faces decay of the residential neighborhoods due to desertification; Timbuktu in Mali, where mosques are specifically vulnerable to both flooding and desertification, and demand immediate actions that EO could help inform. Other key risks for World Heritage cities are: pollution, material decay due to harsh weather, change in landscape, environmental degradation, storms/hurricanes, vandalism, and war. With all this in mind, certain gaps arise in relation to assessing and addressing climate change risks and impacts on World Heritage. These gaps exist in policies and regulations, capacities in monitoring, recording, analyzing specific decay process and general impacts, to establish proactive conservation planning. Also, deficiencies are observed in community consultation practices and outreach to create mutually supporting system between formal authorities and informal communities of heritage. (see list of references under "other information")

### **Is this Initiative open to participation by representatives of any GEO Member, Participating Organization, and GEO Associate?**

Yes

### **Are you aware of other projects or initiatives at a global or regional scale (both in GEO and externally) that provide similar products or services?**

Yes

**Please describe.**

Different consulting bodies under UNESCO (e.g. ICOMOS) or other individual project efforts are working in the direction of delivering specific information around the topics addressed by UHCO. Some indicative examples of such initiatives are: the "HERACLES (HEritage Resilience Against CLimate Events on-Site)" project [7], "PROTection of European Cultural HEritage from GeO-hazards (PROTHEGO)" project [8], "SpaceToPlace-EO to empower UNESCO site managers" [9], "REmote SEnsing Techniques for ARCHaelogy" [10]. What is missing is a global, tangible coordination of these efforts in order to align towards a common basis of objectives, avoid duplication and optimize exchange of know-how between the different communities, at the same time promoting the benefits from the usage of EO. Holistic approaches and combination of different types of data (i.e. thematically, technologically, auxiliary) is currently missing. (see projects/initiatives under "other information")

**How is this Initiative unique?**

The scope of UHCO is to reveal to the cultural heritage community the fast-paced growth of EO technology and information to help address climate change risks and impacts on World Heritage cities, to contribute to innovative conservation strategies for the cultural heritage where needs exist. It will also support global efforts for conservation of World Heritage properties with the use of EO data, products, and services in the framework of sustainable development including the UN 2030 Agenda for Sustainable Development and the World Heritage Policy for Sustainable Development. The specific objective focuses on delivering a co-created global methodology and the foundation for the use of EO in cultural heritage preservation and conservation, as well as its testing and evaluation in different geographical contexts, representing a wide range of climate change impacts and preparedness levels. Within the context of GEO's WP, the uniqueness of UHCO stems from the fact that it intersects all four engagement priorities, can serve as an excellent example to understand the relevant nexus complexities and brings together (and closer to GEO) UN level organisations (like UNESCO), urban stakeholders/planners and networks (essential for the new Resilient Cities and Human Settlements Engagement Priority) and finally attempts, by default, to link global to local policies and actions.

**Please identify the most important actual and/or intended outputs (products, services, etc.) produced by the Initiative, along with their intended and/or actual users. This list does not need to be comprehensive but should identify the outputs which are most used and are expected to have the greatest potential impact.**

Output	Status	Users	Additional info
A global platform to collect and integrate EO-based data, information and composite indicators to address climate change risks and impacts on urban heritage	Planned	UNESCO and its consulting bodies, cultural heritage practitioners, national and local governments, urban planners, policy makers, conservation practitioners, site managers	Individual platforms delivering specific components relevant to UHCO's objectives will be taken into account to identify optimum synergies
Co-created global methodology and the foundation for the use of EO in cultural heritage preservation and conservation	In development	UNESCO and its consulting bodies, cultural heritage practitioners, national and local governments, urban planners, policy makers, conservation practitioners, site managers, research communities	Standardization and integration of methodologies is needed.
Collection of use cases where testing and evaluation of the methodologies will take place.	In development	UNESCO and its consulting bodies, cultural heritage practitioners, national and local governments, urban planners, policy makers, conservation practitioners, site managers, research communities, GEO community	The selection of pilots will be based on different geographical contexts, representing a wide range of climate change impacts and preparedness levels

**If needed, please provide additional comments or explanation to accompany the outputs table**

Considering the size and diversity of the consortium, the different communities and approaches that are needed to be brought together, other potential conflicts and priorities by participating entities (esp. at the UN level), the need is created for UHCO to remain as much flexible as possible in the ways and means to pursue the substantiation of its objectives (and outputs).

**What kinds of decisions are the outputs of this Initiative primarily intended to support?**

UNESCO will be further enabled to make data-driven decisions based on EO and all advantages it brings (e.g. in terms of visualizing impacts). National and local governments as well as local cultural heritage practitioners will be enabled to replicate UHCO's approaches to all historic urban areas and their heritage. Similarly, decisions made around the future resilience and sustainability of cities will be influenced by the need to take into account the preservation of urban cultural heritage, which is expected to exert additional pressure for local climate action, due to its high symbolism and value. Scientists from research centers, universities, and space agencies in the fields of EO, cultural heritage, climate change, environmental policy and urban planning, while bringing together their individual expertise and assets, they will be inevitably driven to make common decisions towards amplifying outputs.

**How will these decisions benefit from the outputs of this Initiative?**

Specific users will greatly benefit from EO data and information in terms of identifying site coordinates, the monitoring of sites' state of preservation and threats to their Outstanding Universal Value (such as climate-

related bushfires in remote areas), and general mapping needs helping to illustrate the cultural and natural landscape. Adding EO-derived data to complete and update the existing inventory of World Heritage properties would allow for specific risks to be identified and aid in standardization and integrated site management that goes beyond monitoring, conservation, and preservation to also help equip ministries of culture, local authorities and the urban planning community for emergency preparedness (both monitoring and forecasting), climate adaptation planning, and long-term infrastructure and resilience related initiatives. Detection and monitoring of a variety of environmental and spatial indicators through EO, such as air pollution monitoring for the blackening of structures, vegetation evolution, coastal erosion, and much more, can provide knowledge and advise a variety of users within the cultural heritage community, from national to local users, non-profits, governmental and intergovernmental actors, as well as private foundations. Alternatively, EO and geospatial organizations could also tap into a new and meaningful uses of data, build new relationships and integrate cultural heritage into climate change monitoring services.

**What kinds of impacts (for example, reduced loss of life, monetary savings, conservation of biodiversity, etc.) are anticipated as a result of the use of the outputs of this Initiative?**

UHCO's outputs will be implemented and tested in pilots as a means of fine-tuning the functionality of the global platform to ensure it is fit-for-purpose for its several end-users. In this way, UHCO will pave the path for a wide range of qualitative and quantitative open data sets and propose methodological approaches to confront climate change risks and impacts on World Heritage cities, resulting into improved urban cultural heritage preservation, urban biodiversity conservation (through natural heritage), mitigation of climate change impacts (e.g. disaster risk reduction through preparedness), alignment of local measures with new urban frames (i.e. sustainable-resilient-zero carbon cities). The above, followed by the a gradual modernization of practices for cultural heritage management, will definitely result into substantial cost saving (including the exploitation of EO for substituting working processes currently very expensive and potentially disruptive).

**Has this Initiative been asked to provide specific information (for example, reports, data, services) on an ongoing basis to an international convention, organization, or other multilateral body?**

No

## **Technical Synopsis**

**Please provide a brief description of the methods used by the Initiative to produce its (actual or planned) outputs.**

As UHCO continues to develop and through sustained and increasing interaction with members, the activities are concretized and elaborated upon through a fluid and inclusive co-design process. The methods of UHCO center around the following typologies: matching of needs, increasing resilience, capacity building, education, dissemination of data, and knowledge transfer. The first category includes the identification and linking of the cultural heritage community's needs with EO capabilities and resources, along with building a bridge between these two communities- both principal activities for UHCO. Many activities will fall under building and enhancing the resilience of cultural heritage sites, monuments, practices, and cities. Along the same vein, tasks will further capacity building efforts, especially in regions that face major hurdles in addressing climate change impacts and attend to the preservation and conservation of cultural heritage, with a focus on ensuring wide geographical coverage and increasing technical capacity. Through training and educational efforts, UHCO will build capacities and facilitate the transfer of knowledge and sharing of best practices to enhance local, national and international efforts of using EO in relation to world and urban heritage. The communication of actions, activities, successes and challenges will support networking and the attraction of funding.

**If you would like to provide further details on the technical methods, you may upload one or more documents here.**

- no supporting documents provided -

**Are there any significant scientific or technical challenges that need to be resolved by the Initiative during the 2023-2025 period?**

No

**Does the Initiative expect to complete any key new outputs, improvements to existing outputs, or improvements to the methods of producing outputs, in the 2023-2025 period?**

Yes

**Please describe these new outputs or improvements.**

Improvement and acceleration of specific actions scheduled by UHCO in the 2021-2022 period, that have fallen behind for several reasons including the covid pandemics, the efficiency of partnership operation (given its size and diversity), will be prioritized and intensified in the 2023-25 period. No strategic change with respect to key new outputs is foreseen.

**Please identify the key tasks that must be implemented to ensure delivery of these changes, with target dates for completion.**

Task	Task description	Expected completion (month/year)
Pilot sites definition	Selection and prioritization of sites, ensuring geographical balance and representation	March 2023
UHCO's WGs	Definition of concrete actions for UHCO working groups	June 2023
CH Indicators	Definition of indicators for climate risks and impacts on cultural heritage	December 2023
Platform architecture	Initial design of the architecture for the global platform, including the gathering of requirements and data	June 2024
Piloting	Implementation of pilots and refining through testing and local feedback	June 2025
Platform development	Completion of platform development including the pilot and universal aspects	December 2025

## Resources

**Have all resources required to implement the Initiative's planned work in the 2023-2025 period been secured?**

- Gap in financial resources
- Gap in access to data

**What is the estimated funding gap for the 2023-2025 period?**

As UHCO is at its early implementation stages, its activities are supported through partners own funding.

### **What data sets are needed by the Initiative but are not currently available?**

Issues surrounding confidentiality and ownership of certain cultural heritage data and information exist, and UHCO is in the process of ensuring that they are approached with the necessary sensitivity and will resolve them on an ad-hoc basis.

### **What actions is the Initiative taking to obtain the required resources?**

Significant networking has already been taking place within UHCO consortium resulting to preparation and submission of common proposal that serves holistically or partly, directly or indirectly UHCO's objectives.

### **Please list all financial and non-financial contributions to the Initiative (other than in-kind, voluntary participation by individual contributors) having a value of more than USD 50,000.**

- no answer given -

## **Lessons from the 2020-2022 Period**

### **Were all planned activities for the 2020-2022 period implemented as expected?**

No

### **Please describe which activities were delayed or not implemented and how has this affected plans for 2023-2025.**

The following activities were not completed during the 2020-2022 period, which have now been deferred to the next implementation phase, taking into account the experience gained from the partnership functionality and pace.

- Selection and prioritization of sites, ensuring geographical balance and representation
- Definition of concrete actions for UHCO working groups
- Definition of indicators for climate risks and impacts on cultural heritage
- Initial design of the architecture for the global platform, including the gathering of requirements and data
- Decision on approaches for building awareness and developing educational activities
- Implementation of pilots and refinement through testing and local feedback
- Completion of platform development including the pilot and universal aspects.

### **Were there any key challenges faced by the Initiative in the 2020-2022 period?**

Yes

### **Please describe.**

The key challenges faced are hereby described through listing the activities that have already been implemented during 2020-2022:

- Establishment of a coordination mechanism to facilitate effective governance and coordination: this was decided during the 2-day kick-off meeting of UHCO, where a flexible "core group" (no more than 8 participating entities) was formed, in an attempt to bring together many different and, to the extent possible, thematic and technological expertise. The selection of bodies to meet the decided criteria was a challenge. The administrative/management part and orchestration of the SC and the partnership as a whole, facilitated by GGO jointly with UNESCO, was also challenging given the size of the consortium, and substantial delays occurred in several instances. More flexible mechanisms for day-to-day operations of UHCO is planned.
- Engagement with and collection of needs from users at different levels and within a variety of domains, building off of existing work and data available in the arena: this activity was initiated through the development and launching of an online survey which was distributed among UHCO partners. Engagement was a big challenge and we eventually managed to receive 24 replies.
- Mapping of existing/current projects and initiatives in the domain to build a comprehensive base of knowledge and to exchange information, build synergies, and avoid duplication: this activity commenced by GGO (UHCO's co-lead) which faced the well identified issue of information fragmentation. This is an ongoing,

non-stop process, and until now, we have inventoried more than 290 relevant projects and initiatives.

## **Were there any impacts or changes to operations due to COVID-19?**

Yes

### **Please describe.**

Definitely, the new working conditions and all types of restrictions due to covid, had great impact on UHCO's progress. This includes disturbances and adjustments in each partner's working set ups, difficulties in bonding between partners (usually achieved through participation in workshops and conferences), as well as differentiation in priorities.

### **Please describe the key changes proposed for the 2023-2025 period, for example, new projects, new areas of focus, or adjustments to the activity governance.**

- UHCO plans to intensify coherent networking and common projects submission in an attempt to attract funds.
- More flexible forms of management will be pursued to enable the early engagement of competent partners and timely completion of activities
- The changing landscapes at the global level but also within GEO, call for continuous adjustment of UHCO to new conditions. In this regard, UHCO will pursue more effective integration of its activities within the engagement priorities and will initiate interaction with existing initiatives, as an essential multiplier to its already challenging and ambitious plan.

### **Does the Initiative have outputs (products, services, etc.) available to users now, even if only on a pilot or testing basis?**

No

### **Do you have evidence of any impacts that have occurred in part as a result of using the outputs of the Initiative (for example, policy decisions taken, behaviour changes by users, risks mitigated)?**

No

### **Have there been any internal or external reviews or evaluations of the Initiative since 2019?**

No

### **Please indicate any GEO Work Programme activities with which you have ongoing collaboration.**

- C3S - Copernicus Climate Change Service
- EO4SDG - Earth Observations for the Sustainable Development Goals
- EUROGEO - European Group on Earth Observations
- GEO-EV - GEO Essential Variables
- HUMAN-PLANET - GEO Human Planet

### **Please indicate any additional GEO Work Programme activities with which you would like to establish new collaborations.**

- AFRIGEO - African Group on Earth Observations
- AMERIGEO - Americas Group on Earth Observations
- AOGEO - Asia-Oceania Group on Earth Observations
- CLIMATE-OBS - Climate Observation, Simulation and Impacts
- CAMS - Copernicus Atmosphere Monitoring Service
- EO4SENDAI-MONITORING - Earth Observation and Copernicus in support of Sendai Monitoring
- EO4DRM - Earth Observations for Disaster Risk Management
- GEO-CITSCI - GEO Citizen Science



- GLOFAS - Global Flood Awareness System
- GFRM - Global Flood Risk Monitoring
- GUOI - Global Urban Observation and Information

## **Stakeholder Engagement and Capacity Building**

**Are there specific countries or organizations that your Initiative would like to engage?**

No

**Does your Initiative engage users in the work of the Initiative (for example, consultation, testing, co-design)?**

Yes

**Please briefly describe the Initiative's approach to engaging users.**

Main UHCO users (or via typical representatives) are already part of the consortium.

**Does the Initiative have a user engagement strategy or similar kind of document?**

No

**Are there categories of users that are not represented at this time, but you would like to engage?**

Yes

**Please list these user categories or regions.**

Urban planners, more CH site managers

**What are the plans for further engagement of users in the Initiative?**

The launch of the 4th Engagement Priority on "Resilient Cities and Human Settlements" will further enable approaching city stakeholders and networks, which are essential for bringing UHCO's practices closer to practitioners and decision makers.

**Does the Initiative have a documented capacity development strategy?**

No

**Please describe the approach to capacity development that is being implemented by the Initiative?**

Not yet initiated.

**Are there any commercial sector organizations participating in this Initiative?**

Yes

**Please list the commercial sector organizations.**

Organization name	GEO Member/PO/...	Country in which the organization is based	City in which the organization is based
CGI Deutschland B.V. & Co. KG		Germany	many cities in Germany
DRAXIS Environmental SA		Greece	Thessaloniki, Athens
Planetek Hellas		Greece	Athens
PIBINKO		Italy	Tuscany
Earthlab AI Systems Inc.		Spain	Barcelona
Environment Systems		U.K.	Aberystwyth
Deimos Space UK		U.K.	Bordon
Murmuration		France	Toulouse

### **Are there opportunities for commercial sector uptake of the outputs of the Initiative?**

Yes

#### **Please describe these opportunities.**

Not yet assessed in detail. In general, companies that are activated in providing services for cultural heritage preservation, monitoring of ambient condition, provision of climate change services etc should be interested in the outputs of UHCO.

#### **Is there already commercial uptake occurring?**

No

### **Are there opportunities for further commercial sector participation in the Initiative?**

Yes

#### **Please describe these opportunities.**

UHCO is open and inclusive from its early stages. Especially the private sector was encouraged to be part of the consortium and as a result 8 companies have already been included.

### **Does the Initiative have a plan for commercial sector engagement?**

No

## **Governance**

### **Please describe the roles of each of the key leadership positions, as well as any team structures involved in day-to-day management.**

In the context of the established partnership between UNESCO, GEO, and Greece, UHCO is coordinated by Greece through the Greek GEO Office (GGO) and UNESCO's WHC, jointly. The administrative/management part and orchestration of the Steering Committee (SC) decided actions is facilitated by the GGO (jointly with UNESCO,) initially and for as long as the SC decides, which, for this purpose, has formed a dedicated department.

It is planned that UHCO will also operate through Working Groups (WGs) to be established according to strategic priorities identified, avoiding any duplication of efforts within GEO or UNESCO work activities and

enable interaction between the different disciplines. The chairs of the WGs will be decided internally and serve for a specified term. Critical decisions will be taken by the General Assembly (GA), where all members will be represented, and which is expected to convene once per year. However, there will be regular, dedicated meetings to facilitate exchange and cross-collaboration between WGs. At a more mature stage additional focused committees (e.g., technical/IT, fundraising, private sector engagement) will be formed to provide technology advice and infrastructure support, to pursue funding opportunities, and deliver specific solution design and development, etc.

**Is there a steering committee or other governance bodies that advise the Initiative but are not involved in day-to-day management?**

Yes

**Please describe the roles of each body. If there are multiple governance bodies, please describe the relationships among them (such as through a governance structure diagram).**

A flexible “core group” (no more than 8 participating entities) has been formed, in an attempt to bring together many different and, to the extent possible, thematic and technological expertise including a user perspective, from global to local scales. The “core group” serves as the Steering Committee (SC) of UHCO, with the duty to design its strategic priorities and overlook the implementation of the decided activities. It is co-chaired by WHC and GGO, and includes the Climate Coordinator from the GEO Secretariat.

- governance\_uhco.png ([link](#))

**What methods does the Initiative use to communicate with its participants?**

- Email / e-newsletters

**Please describe the key risks that could delay or obstruct the completion of the planned activities and outputs of the Initiative, along with any actions taken to mitigate these risks.**

Description of the hazard	Description of the possible impacts	Scale of impact	Likelihood of occurrence	Mitigation measures
Partners' lack of engagement	This could be critical for partners with key role in the management and governance of UHCO	Severe	Possible	Continuous exchange of status and reassignment of activities
Lack of human resources	Partners may not have personnel dedicated to UHCO, which results into potential lack of prioritization towards UHCO's tasks	Moderate	Possible	Attraction of funds through common projects and other means
Data accessibility	For sensitive, mostly cultural heritage local data, different policies might be hindering the access to data	Moderate	Possible	Liaison through UNESCO and local partners

**What methods are used by the Initiative to monitor its effectiveness?**

- User or beneficiary surveys
- Consultations or events

**Would the Initiative be interested in assistance from the GEO Secretariat for developing an impact plan?**

Yes

**How are the results of the monitoring and evaluation activities shared with participants and the wider GEO community?**

Not yet available, under development.

**Are any monitoring or evaluation activities required by funders/contributors?**

No

**Participants**

**Please list the active individual participants in the Initiative**

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## Other information

**Please provide any other comments or information that was not included in the previous sections, but you would like to appear in the Implementation Plan.**

### List of References

1. <http://whc.unesco.org/en/climatechange/>
2. <https://whc.unesco.org/en/activities/473/>
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- no supporting documents provided -

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