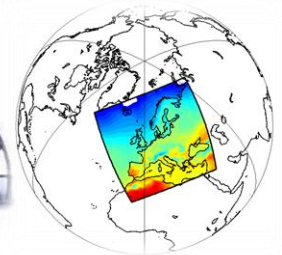
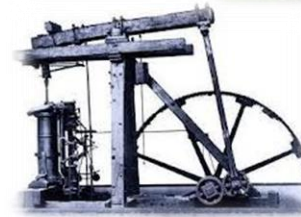


The role of cultural heritage research in meeting the challenges of the European Green Deal



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The Lisbon Treaty, Part I Treaty on the Functioning of the European Union,

entered into force 1 December 2009

Article 3

..... [The Union] shall respect its rich cultural and linguistic diversity, and
shall ensure that Europe's cultural heritage is safeguarded and enhanced.
.....

Article 167

Action by the Union shall be aimed at encouraging cooperation between Member States and, if necessary, supporting and supplementing their action in the following areas:

improvement of the knowledge and dissemination of the culture and history of the European peoples,

conservation and safeguarding of cultural heritage of European significance

Cultural heritage is Europe`s most prominent and unique selling point – but still highly undervalued

- Irreplacable granary of knowledge and diversity to fight climate crisis
- **A resource for the creative industry**, for economic growth, employment and social cohesion
- Digitisation and online accessibility enable unprecedented forms of involvement and open up new revenue streams [**don`t forget the object!**]
- An excellent tool to foster diplomacy and external relations
- Supports peace and understanding

EU Commissioner Andrea Vassiliou 2012:

“Unfortunately, the fact is that much of our heritage is under threat – from environmental degradation and climate change, from socio-economic pressures and the accelerating pace of urbanisation, from the strains of global tourism, from forgery in trade with stolen artworks and from catastrophic events like human ignorance and wars”

The European Cultural Heritage Research Programmes since 1986 – still world leader!

- 
- 1986 - 1990 1st Period:
"Effects of Air Pollution on Historic Buildings"
 -
 - 1999 – 2002 5th Period
"Protection, conservation and enhancement of European Cultural heritage" within the Key Action "The City of Tomorrow and Cultural heritage"
 - 2003 - 2006 6th Period
"Protection of the Cultural Heritage and associated conservation strategies" – within Priority 8 "Scientific support to policies"
 - 2007- 2013 7th Period
"Protection, conservation and enhancement of cultural heritage, including human habitat"
 - 2014-2020 8th Period – Horizon 2020
"Cultural heritage in societal challenges"
 - 2021-2027 9th Period – Horizon Europe
"**Culture, creativity and inclusive society**"
more than 200 multidisciplinary research projects



INNOVATORS WALL

Innovative solutions for Cultural Heritage from EU funded R&I projects

FAIR OF EUROPEAN INNOVATORS IN CULTURAL HERITAGE

15-16 November 2018, Brussel

<p>CLIC Circular models Leveraging Investments in Cultural heritage adaptive reuse</p> <p>2 The Circular Heritage Impact Assessment (CHIA) and the Urban Heritage Development Fund (UHDRF) for adaptive reuse of built heritage</p>	<p>Smart Cities - Crowd Analytics</p> <p>3 ROCK VN video neuro-analytics and City People Flow application for urban regeneration</p>	<p>RiBuild_LCC/A</p> <p>4 A life-cycle assessment software probability-based for retrofitting historic buildings</p>	<p>Decision Support System</p> <p>5 A Decision Support System (DSS) to improve energy performance of historic districts</p>	<p>n Cities</p> <p>6 A free open source app to support the Cultural and Creative Cities Monitor</p>	<p>31 CULTURAL ROUTES</p> <p>7 A map journal tool for citizen engagement</p>	<p>CALI</p> <p>8 A high-resolution airborne laser scanning for mapping cultural landscapes</p>	<p>HERCULES</p> <p>9 A Knowledge Hub for Landscape Practices supporting landscape stewardship</p>	<p>Zeno, the autonomous Underwater Vehicle for archaeological research</p> <p>10</p>	<p>HERACLES</p> <p>11 An ICT Platform to help restoring and maintaining cultural heritage under climate change impacts</p>
<p>STORM</p> <p>12 A toolkit of technologies and methods to protect cultural heritage from threats</p>	<p>HeAT</p> <p>13 Understanding threats, improving policies for cultural heritage</p>	<p>PROTHGO</p> <p>14 Space Technologies for monitoring geo-hazards in heritage sites</p>	<p>CHIME</p> <p>16 A novel app and a research tool for music festivals</p>	<p>HERITAMUS</p> <p>17 Web tool for participatory curatorship of tangible and intangible heritage</p>	<p>EURO MAGIC</p> <p>17 Linternauta, a web app for magic lantern slides</p>	<p>PLUGGY</p> <p>18 A software platform and smartphone tool to bring out and share local cultural heritage</p>	<p>meSch</p> <p>19 A digital platform for creating smart objects and spaces linked to physical visiting experiences</p>	<p>EMOTIVE</p> <p>20 A platform and a toolbox for emotional storytelling experiences for cultural heritage</p>	<p>TRACES</p> <p>21 Creative Co-Productions for heritage transmission</p>
<p>COHERE</p> <p>21 Interactive e-book</p>	<p>EHRI</p> <p>22 Graph technologies for integrating information and collections on Holocaust</p>	<p>COURAGE</p> <p>23 The platform for sharing hidden counterculture collections and cultural practices</p>	<p>IMARECULTURE</p> <p>24 Virtual Reality applications for virtual underwater visits</p>	<p>ITN-DCHVIMM</p> <p>25 Augmented and virtual reality technologies for digital cultural heritage</p>	<p>ARCHES</p> <p>26 Simax, the translation software and sign language avatar for all audience in museums</p>	<p>NANORESTART</p> <p>27 Advanced materials for the conservation of contemporary artworks</p>	<p>InnovaConcrete</p> <p>28 Multifunctional treatments for historic concrete conservation</p>	<p>GRAVITATE</p> <p>29 A platform for the reconstruction and reunification of fragmented archaeological artefacts</p>	<p>ArchaIDE</p> <p>30 A novel app for automatic image recognition of archaeological ceramic</p>
<p>NANOMATCH</p> <p>31 Consolidants for stones and stone-like materials to improve the resistance and durability of historic materials</p>	<p>HEROMAT</p> <p>32 Photocatalytic self-cleaning coating and consolidants for mineral substrates</p>	<p>Scan4Reco</p> <p>33 Advanced decision support technologies for 3D digitisation and conservation of cultural heritage artefacts</p>	<p>SMooHS</p> <p>34 NDT wireless system for monitoring environmental conditions impacting on architectural materials</p>	<p>AMECP</p> <p>35 Glass sensors assessing the environmental impact on cultural heritage</p>	<p>NEMOSINE</p> <p>36 Packaging solutions based on cellulose derivative for storage and conservation of 20th century cultural heritage artefacts</p>	<p>iRESIST+</p> <p>37 Advanced materials and system for improving earthquake resistance and energy retrofitting of buildings</p>	<p>CLUSTERS:</p> <ul style="list-style-type: none"> 'Circular, sustainable and creative cities' 'Heritage at risk' 'Shared management of cultural heritage' 'Advanced future technologies for heritage and arts' 		

A look back to the beginnings of cultural heritage research – a time of environmental crisis - acid rain destroying monuments.....



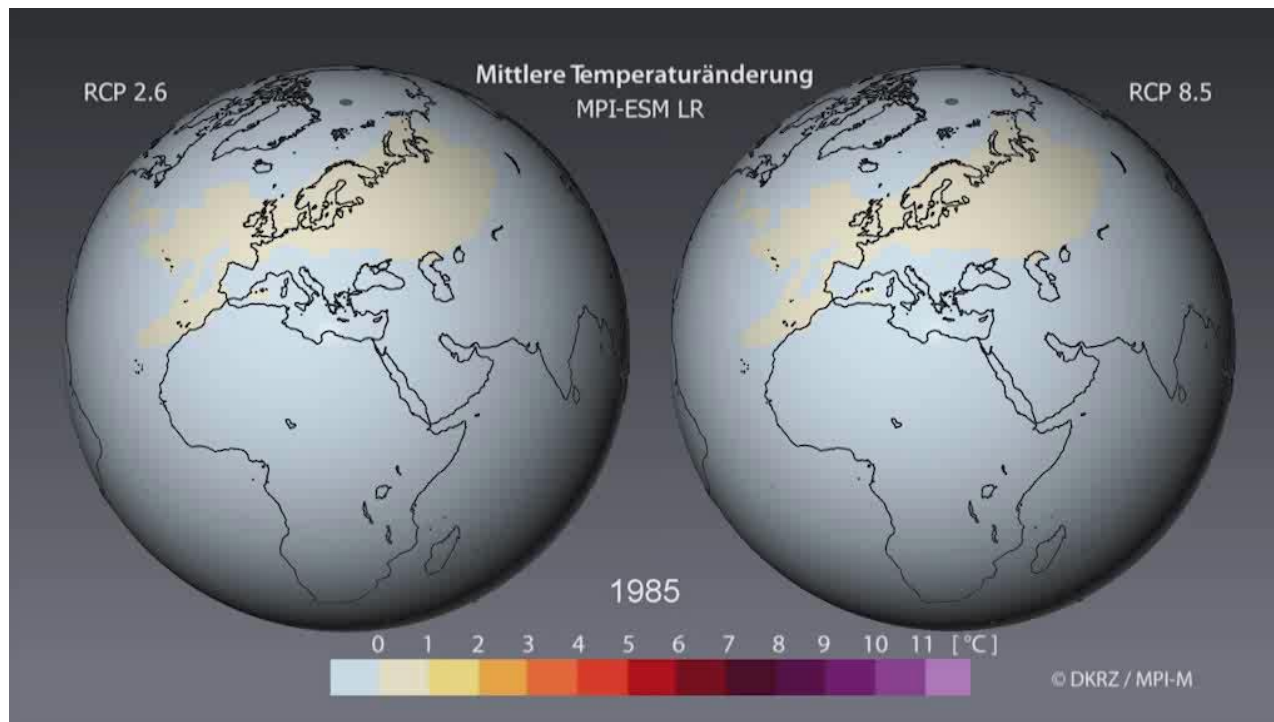
We are on a 'highway to climate hell,' UN chief Antonio Guterres says at COP26 in Egypt



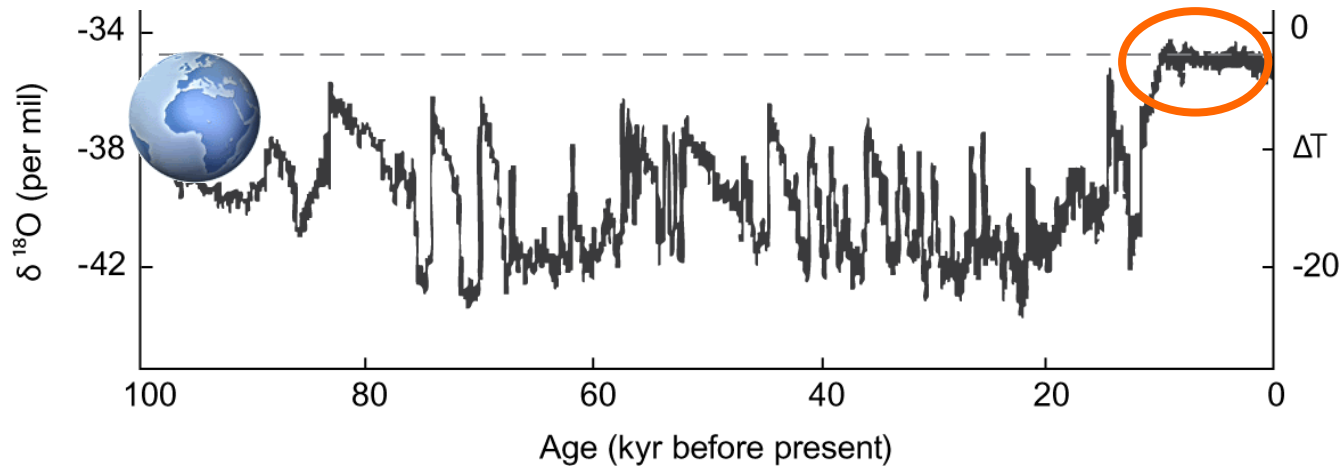
2021 Nobel Prize for climate research

Klaus Hasselmann received Nobel Prize in Physics together with [Syukuro Manabe](#) and [Giorgio Parisi](#).

Already in 1976 he could show in his models that global warming is caused by increased fossil fuel burning. Temperature on Earth without **CO₂ in atmosphere: - 18°C**



The past evolution of the Earth has been very dynamic with different climate modes, ice periods and interglacial periods. Only in the last 10,000 years Humanity has had -
a stable climate!



@Greenland Ice Core Project /European Science Foundation)

Historic signposts – from research findings to policies

19th century - 1824 **Jean Baptist Fourier** discovered „green house effect“



- 1896 **Svante Arrhenius** suggested that at the current rate of coal burning, the atmosphere could begin to start warming **in a few centuries**



20th century - 1988 establishment of **Intergovernmental Panel on Climate Change**



21st century - **2003 EU Commission DG Research`s first call on climate change impacts on cultural heritage**

- 2006 Stern Review on the Economics of Climate Change
- 2015 Paris Climate Agreement signed by 197 countries
- **2021 OMC Group strengthening cultural heritage resilience for climate change**
- 2021 **Nobel Prize for Climate Research**
- **2022 Publication of OMC Report and Recommendations to EU and MS**



Conserving and managing cultural resources impacted by a changing climate

Public Symposium, Whaling Museum, Nantucket 8 December 2022



<https://doi.org/10.2766/44688>

Acropolis under snowstorm on 17 February 2021

STRENGTHENING CULTURAL HERITAGE RESILIENCE FOR CLIMATE CHANGE - WHERE THE GREEN DEAL MEETS CULTURAL HERITAGE

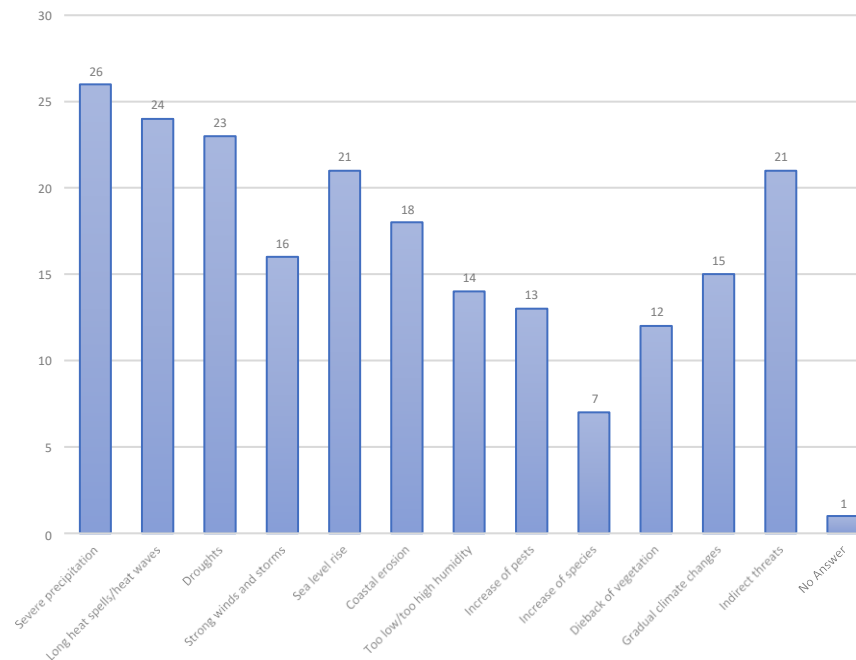
Final Report and Executive Summary 2021 - 2022

EU OMC Member States' expert group

Chair: Johanna Leissner  Fraunhofer

Threats to cultural heritage from climate change

- 1) Severe precipitation
- 2) Long heat waves
- 3) Droughts
- 4) Sea level rise
- 5) Indirect threats
- 6) Coastal erosion
- 7) Strong winds
- 8) Gradual climate change
- 9) Too low/high humidity
- 10) Increase of pests
- 11) Dieback of vegetation
- 12) Migration of foreign species



Strong winds



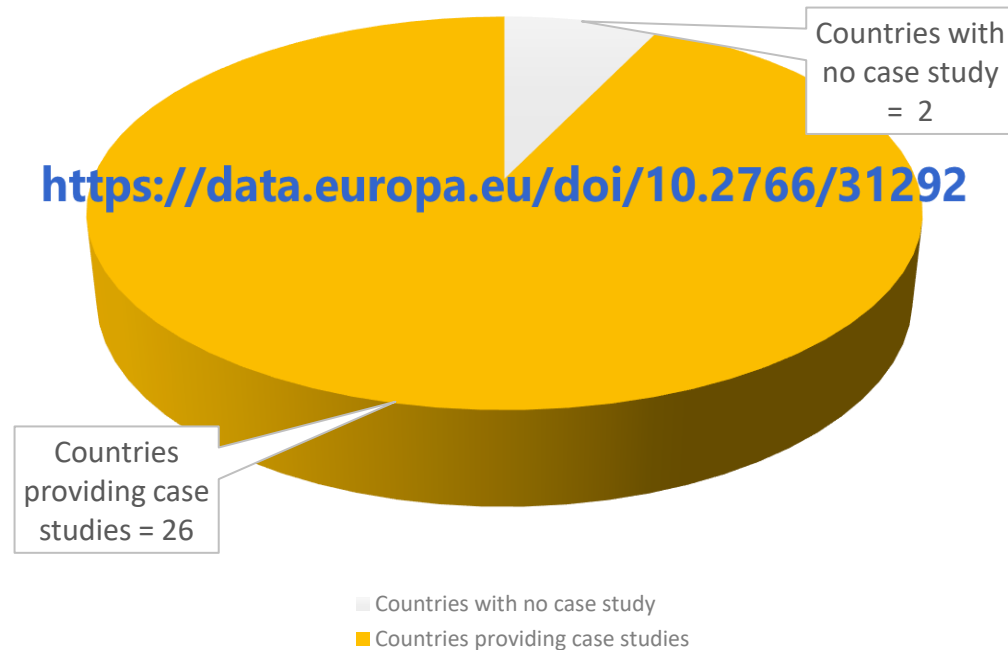
Severe precipitation



Increase of pests

83 Good practice examples from Europe!

- a source of inspiration and for up-scaling
- driven by research projects
- extremely difficult to collect the information



Adaptation and mitigation – cultural landscapes and intangible heritage

- **Alpe Pedroria and Alpe Madrera – IT.**

Restoration agricultural landscapes and traditional huts in the Alpine region of Lombardia to increase the resilience and function as carbon sinks

Measures:

- Recovery of pastureland began in 2014 (7 % of the original pastureland),
- **Restoration of wooden huts, stone houses and paths**
- **Revitalisation of traditional production of Bitto cheese** by returning of pasture and livestock
- Repopulation of animal species in danger of extinction

Impact:

- **Renewed awareness in the local community, starting with the youngest, of the importance of the pastoral activity and culture and of the recovery of abandoned pastures.**
- Promotion and enhancement of the intangible heritage
- Original Alpine Brown and the Orobica goats were reintroduced.
- Grasslands (pastures) act again as net carbon dioxide
- Grasslands continue to store carbon even during extreme drought simulations.



Alpe Pedroria, restored stone house in the mountains

© 2015, Roberto Segattini, FAI - Fondo Ambiente Italiano

EU OMC Member States' expert group



PARIS2015
CONFÉRENCE DES NATIONS UNIES
SUR LES CHANGEMENTS CLIMATIQUES
COP21-CMP11

Strengthening Cultural Heritage Resilience for Climate Change 2021 - 2022

25 EU MS and 3 **associated countries** sent delegates:

Austria, Belgium, Croatia, Cyprus, Czechia, Estonia, Denmark, Finland, France, Germany, Greece, Hungary, **Iceland**, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, **Norway**, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Spain, **Switzerland**



Modelling of a building in times of
climate change



Storm damage



Heavy rainfalls damage a historic
building

Some key messages from the 10 recommendations of the OMC report

- **Cultural Heritage is threatened by climate change in an unprecedented speed and scale.** At the same time **cultural heritage offers solutions and inspirations to the climate crisis**
- **Cultural Heritage and Climate Change** needs to be considered in **all policies** and **planning decisions** (ministries of finances, economy, environment, spatial planning, mobility and culture) on all levels
- **Cross-sectorial cooperation on all levels** needs to be enhanced
- **Research** programmes are **the indispensable drivers** for implementation and are **missing mainly on national level**
- **National authorities** must build capacities - training and **upskilling of experts** is central
- The collection of 83 **best practice examples** shows that traditional buildings or the art of making dry stone walls are sustainable & climate friendly. **It is more climate friendly to repair than to demolish**
- There is a need for a **common platform** at EU and **national** level to collect all relevant information
- **National/regional and local level decision** makers must incentivise by **monetary and fiscal policies** – no data about the economic costs for adaptation and mitigation of cultural heritage are available



Dry stone walling



Demolition of buildings



Traditional farm houses



Orthodox church



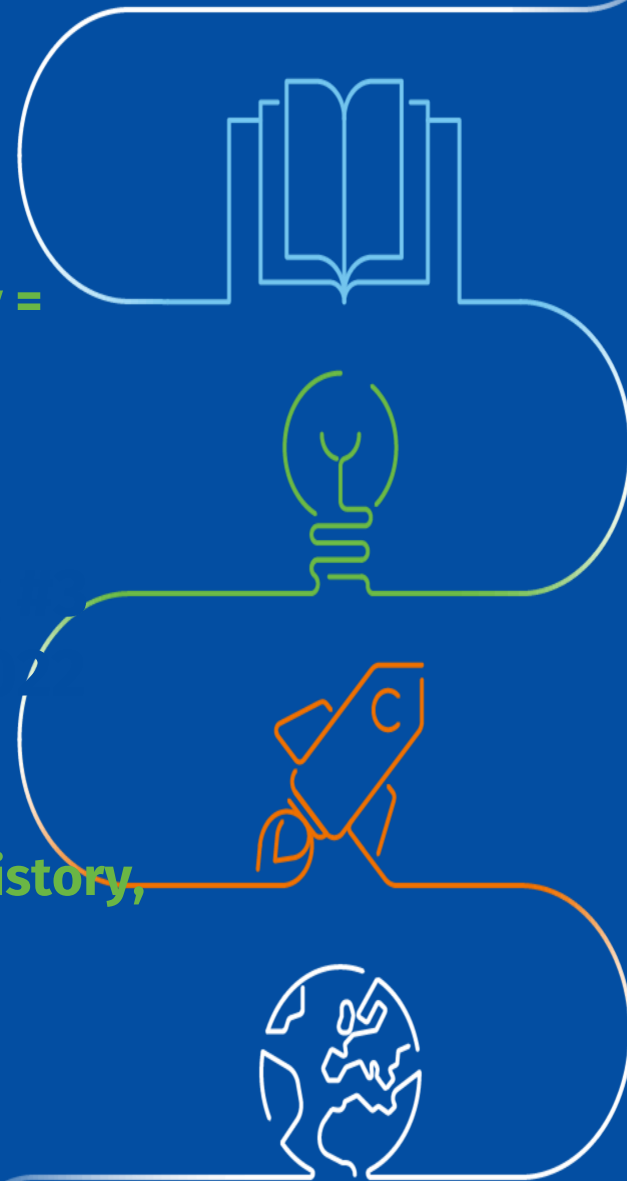
Skokloster Castle

The EIT Culture & Creativity is the first programme world wide that brings together the cultural heritage sector with the creativity sector in a structured way.

This new approach will fertilise both sectors and make substantial contributions the climate transition¹⁸ in line with the 2030 goals of the European Green Deal.

Ideas for collaboration: Creativity of the past and creativity of today = Future!

- **Arts and Design**
- **Architecture: New European Bauhaus**
- **Fashion**
- **Skills – old and new**
- **Digitalisation**
- **Story telling (films, games, media)**
- **Education and Research – Philosophy, History, and Sciences**



Thank you

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