



Acropolis under snowstorm on 17 February 2021

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

EU OMC Member States` expert group

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**"Resilient Cultural Heritage: managing Human Heritage
against sea-level rise"**

Fondazione Cini - Isle of S. Giorgio - Venice
November 8, 2023

2023 Year with highest number of extreme events

Report released on 24 October 2023 by PIK (Potsdam Institute for Climate Change Impacts)

BioScience, biad080, <https://doi.org/10.1093/biosci/biad080>

February 2023:

‘Very precarious’: Europe faces growing water crisis as winter drought worsens –In northern Italy, tourists can walk to the small island of San Biagio, normally reached only by boat, from the shore of Lake Garda, where the water level is 70cm (27in) lower than average. The Alps have had 63% less snow than usual.

Parts of Europe face risk of drought after historically low winter rainfall – in the past 500 years

June 2023

Northern Italy hit by torrential rainfalls

August 2023

10 minutes of tennis ball-sized hailstorm destroyed oldest monastery in Germany

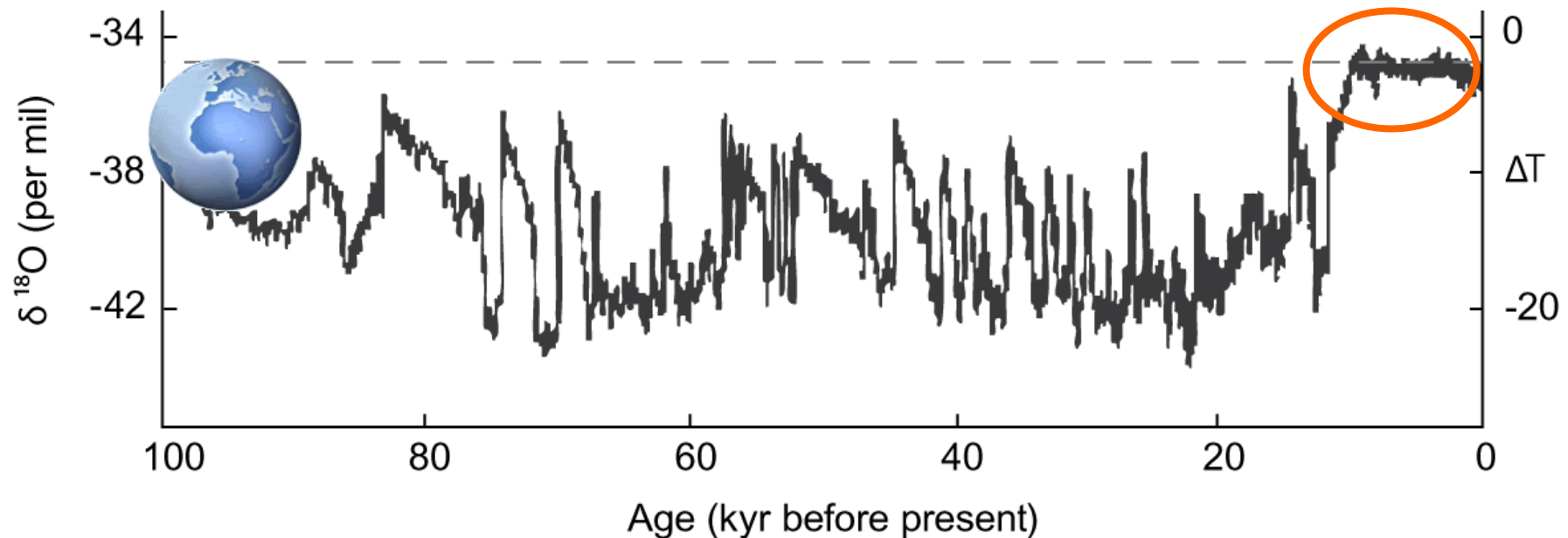
October 2023

Storm surge hits Baltic sea – Northern coast left behind with more than 500 million € reconstruction costs

November 2023

Storm Ciarán leaves seven dead in Italy as torrential rain causes flooding

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!**



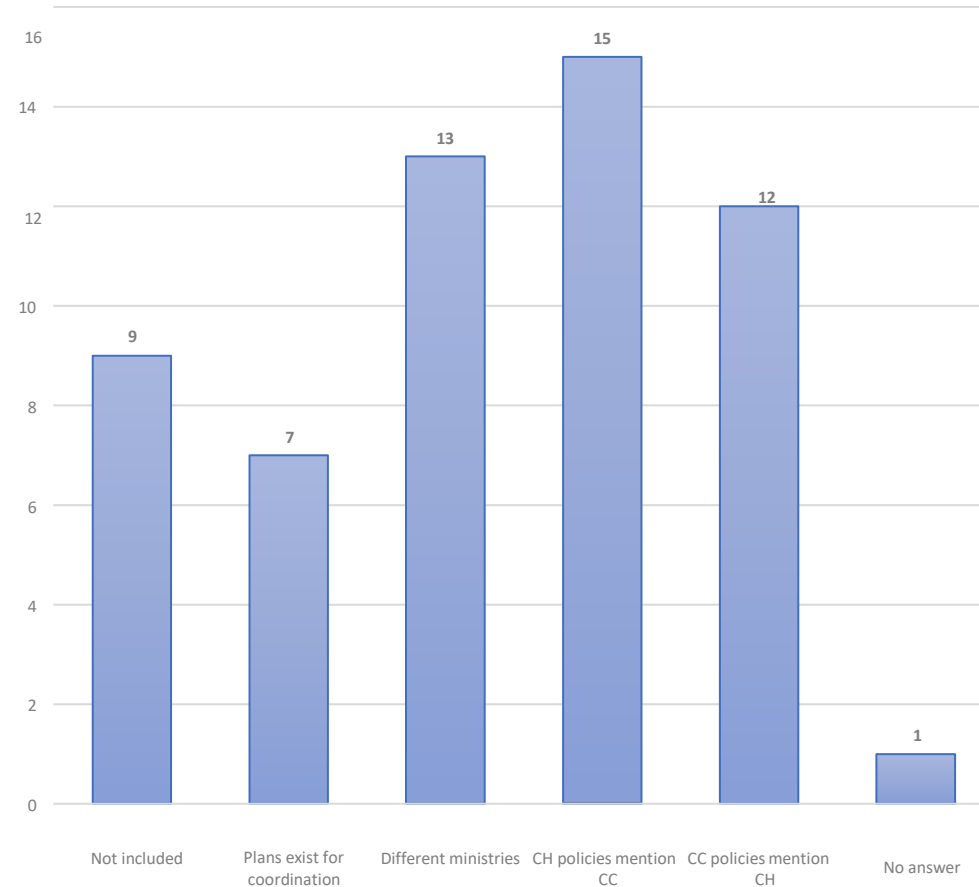
EU OMC Expert Group of Member States “Cultural Heritage Resilience for Climate Change” 2021 -2022

- 25 EU Member States and 3 associated countries have sent delegates
- The **first time a political mandate** was given to this topic
- Tasks
 - Identify the **state of play in EU and Member States** regarding **policies**
 - Identify **emerging threats of climate change** on cultural heritage
 - Collection of **Good Practice examples**
 - Identify what cultural heritage **can contribute** to solve climate crisis
 - **Awareness raising** for the topics in society, **political decision making and arts and creative sectors**
 - Output: a **report and 10 recommendations** for **EU** and its **Member States**

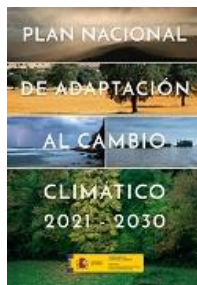


Situation cultural heritage / climate change in policies

- 1) Cultural heritage not included in policies – 9 countries
- 2) Some plans exist for coordination of climate change and cultural heritage – 7 countries
- 3) Different ministries responsible
- 4) Cultural Heritage policies mention Climate Change – 15 countries
- 5) Climate Change policies mention Cultural Heritage – 12 countries
- 6) No answer – one country



Examples: Spain and Italy



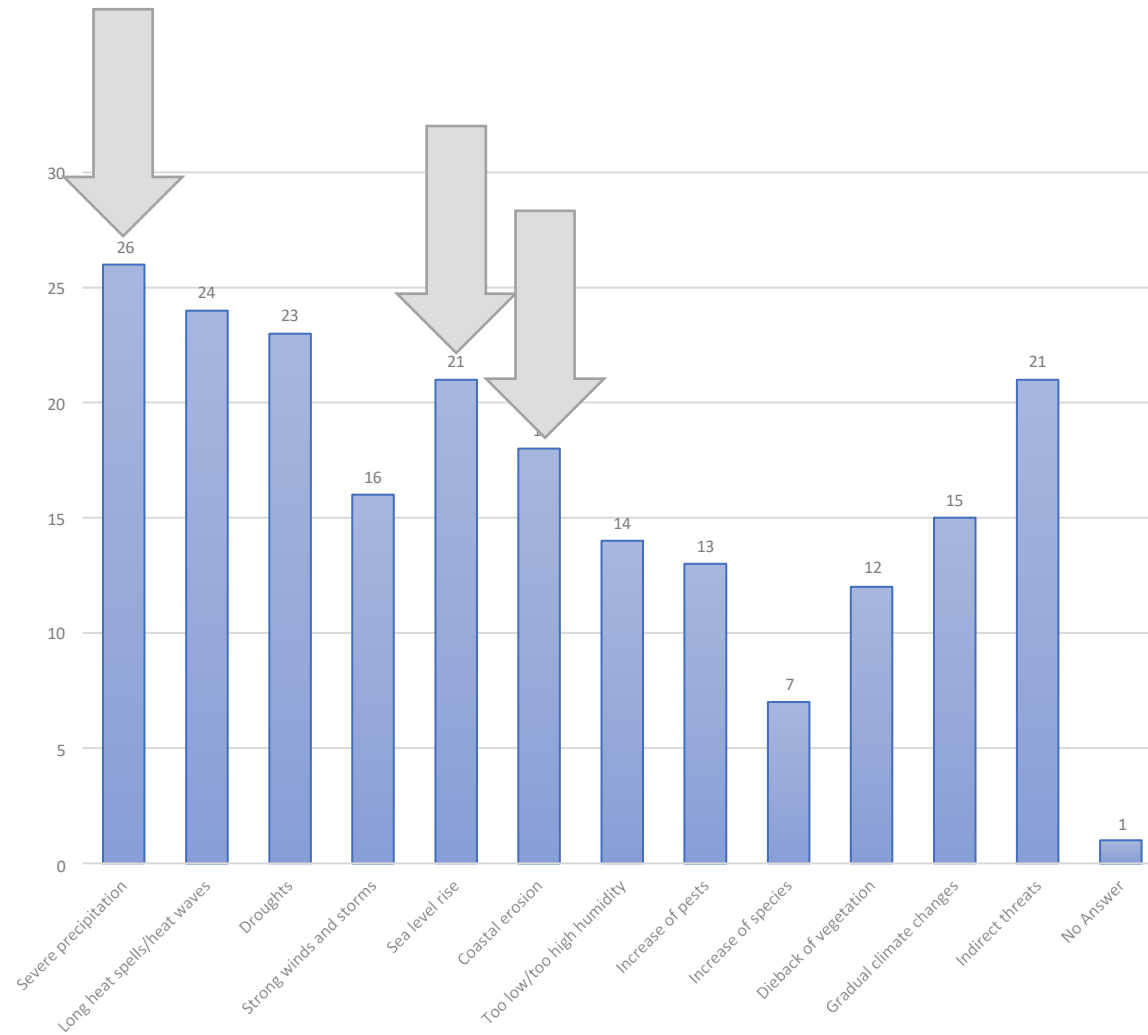
2015 National Strategy of Adaptation to Climate Change
2018 National Plan of Adaptation to Climate Change

Overview of national policies that mention cultural heritage in Europe

Country code	Country	National sustainability strategy	National climate adaptation plan	National recovery and resilience plan
AT	Austria	Yes	Yes	Yes
BE	Belgium	No	No	Yes
CH	Switzerland	No	No	No
CY	Cyprus	Yes	Yes	No
CZ	Czechia	Yes	Yes	Yes
DE	Germany	Yes	No	No
EE	Estonia	No	Yes	No
EL	Greece	Yes	Yes	Yes
ES	Spain	Yes	Yes	Yes
FI	Finland	No ⁽¹⁾	Yes	No
FR	France	No	No	No
HR	Croatia	Yes	Yes	Yes
IE	Ireland	Yes	Yes	No
IS	Iceland	No	No	No
IT	Italy	Yes	Yes	Yes
LT	Lithuania	No	Yes	Yes
LV	Latvia	Yes	Yes	Yes
MT	Malta	No	No	No
NL	Netherlands	Yes	No	Yes
NO	Norway	Yes	Yes	Yes
PL	Poland	No	Yes	Yes
PT	Portugal	Yes	Yes	Yes
RO	Romania	Yes	Yes	Yes
SE	Sweden	No ⁽²⁾	Yes	Yes
SI	Slovenia	Yes	Yes	Yes
SK	Slovakia	Yes	Yes	Yes

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



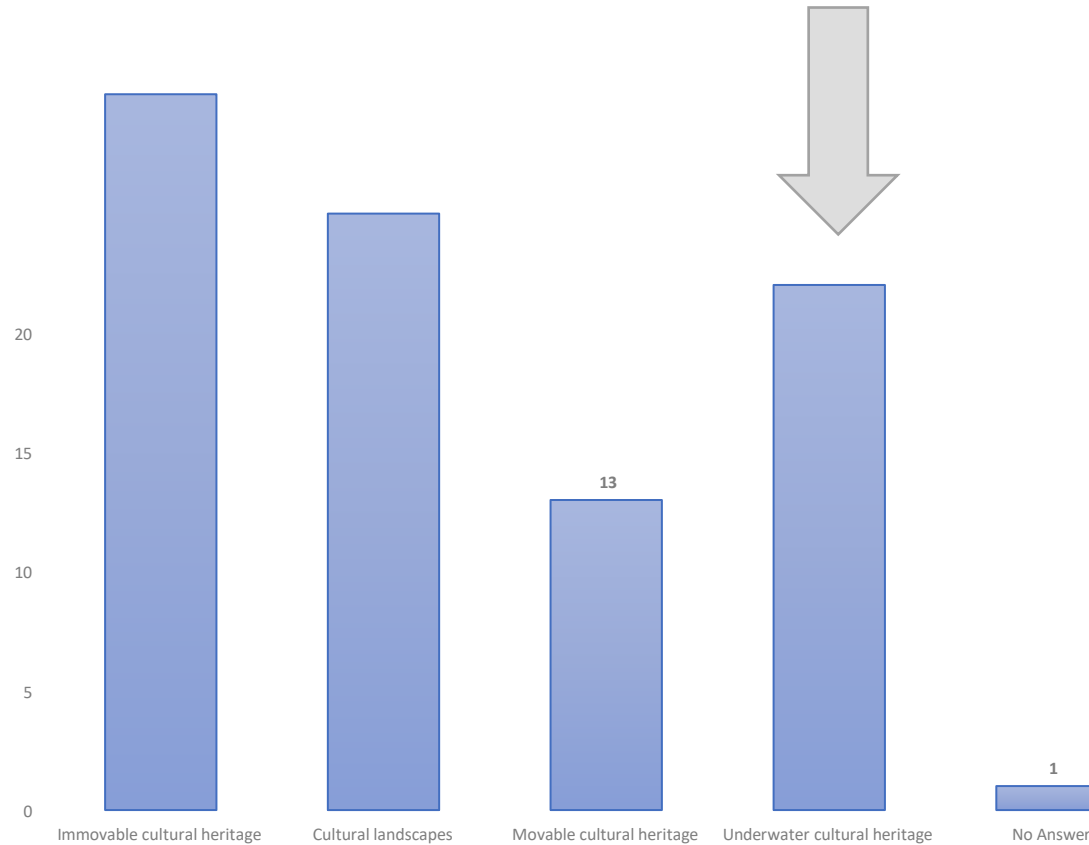
Severe precipitation



Increase of pests

Risk potential by type of heritage

1. Buildings and monuments
2. Cultural landscapes
3. Underwater heritage
4. Movable heritage
5. No answer



Karlštejn Castle, CZ



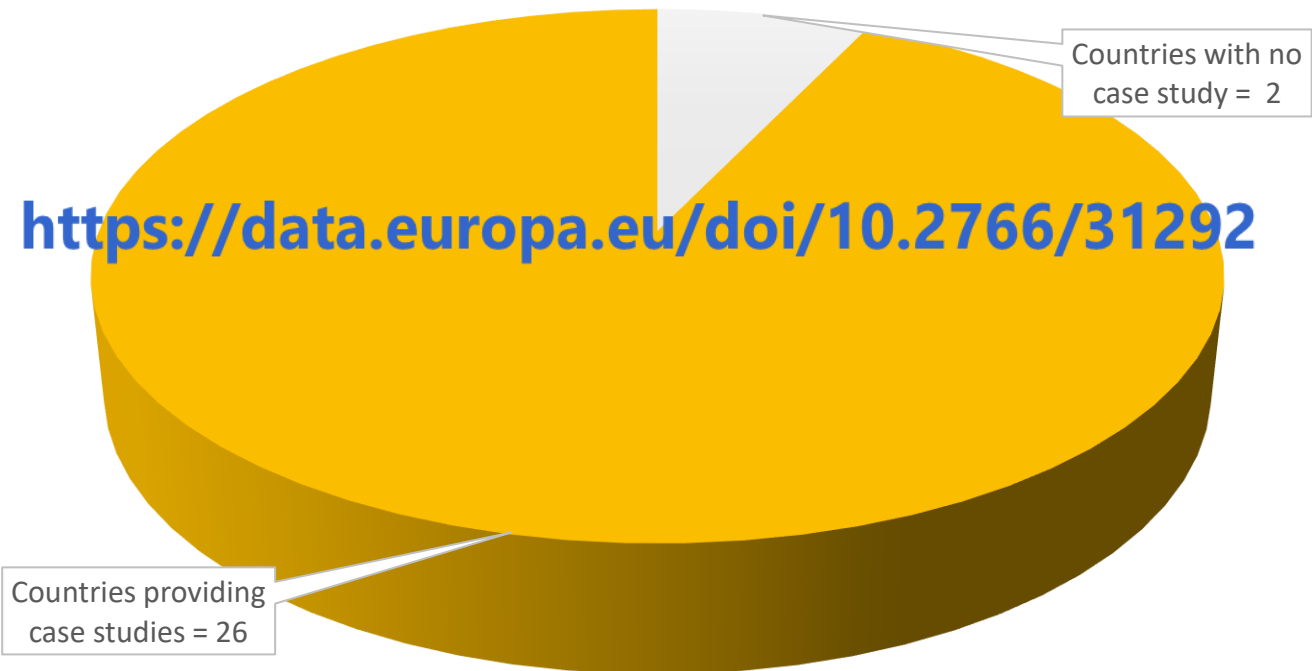
Cultural landscape



Indoor and movable heritage

83 Good practice examples from Europe what cultural heritage can contribute to fight against the climate crisis!

- a source of inspiration and for up-scaling and economic development of handicraft SMEs – that will not disappear with Artificial intelligence
 - driven by research projects
 - extremely difficult to collect the information



KERES – Protecting cultural heritage in Germany from extreme climate events

Investigation of the effect of extreme weather events

- Heat and drought episodes
- Heavy precipitation,
- Strong winds
- Long lasting weather periods
- Sea level rise and storm floods

Use of simulations to predict future climate conditions

- Vulnerability of buildings & parks
- High-Resolution urban climate models
- Hygrothermal building simulations
- Adaptation strategies / prevention
- Ontological knowledge platform



KERES Fallstudien

Source : Wiki Commons



Source : Rictor Norton, Wiki Commons



Source : Wiki Commons



Source : Freilandmuseum Bad Windsheim

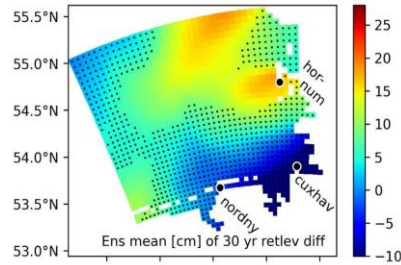


Source Fraunhofer IBP, Ralf Kilian

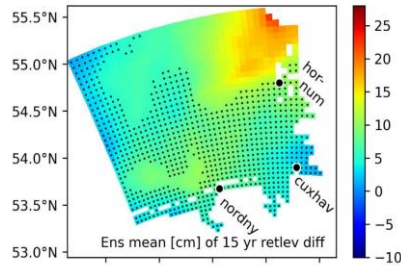
Climate Change scenarios – end of 21st century



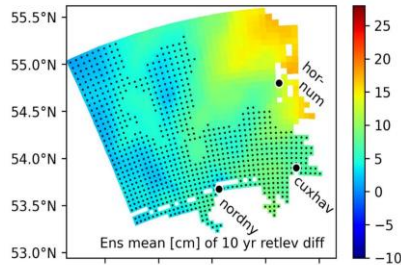
30-year event



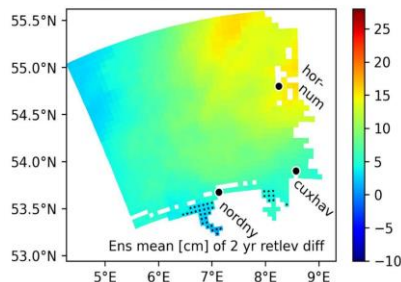
15-year event



10-year event



2-year event



Storm surge projections German Bight

The strongest changes are predicted along the north Frisian coastline (RCP8.5)

Hörnum: highest and most significant increases in storm floods

Ensemble mean of the rcp85-hist differences of 30-, 15-, 10-, 2-year return levels (top to bottom) in the German Bight

Mayer et al. 2022. RCP8.5-projected changes in German Bight storm surge characteristics from regionalised ensemble simulations for the end of the 21st century. Frontiers, accepted

Open air museum Bad Windsheim – flooding event on 9 July 2021



Open air museum Bad Windsheim – flooding on 9 July 2021

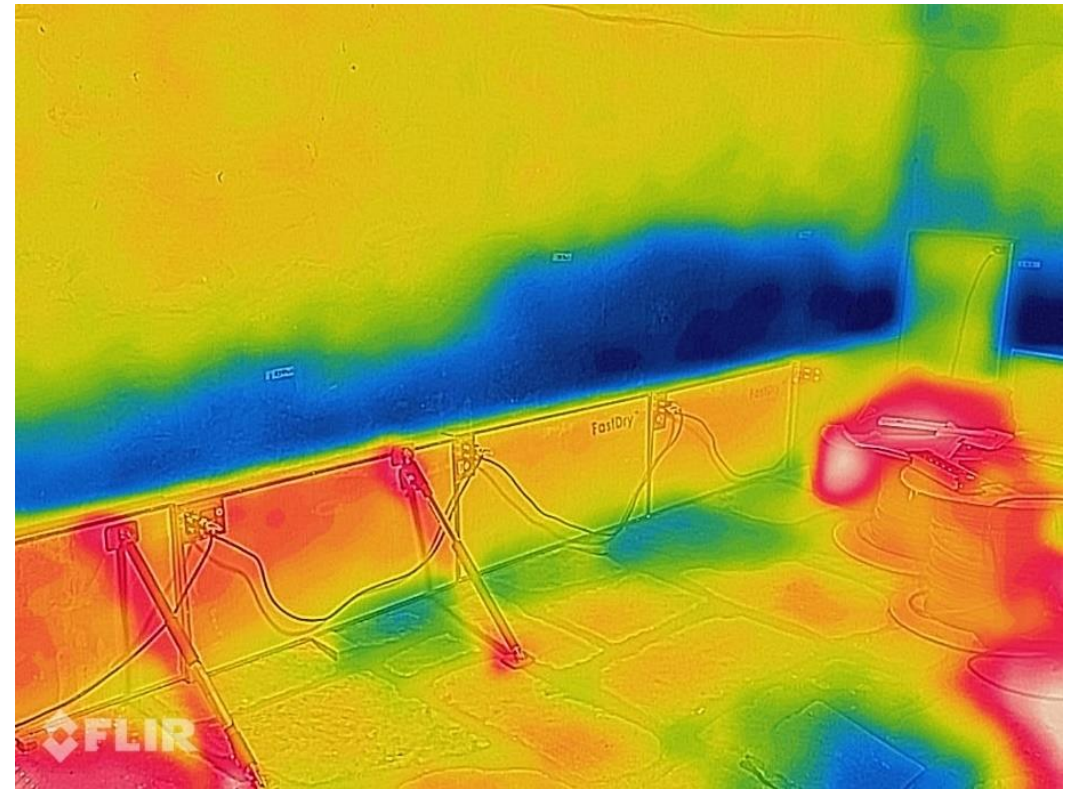
Problem: extremely wet walls, immediate mould growth

Testing of an innovation from Fraunhofer: FastDry wall systems

Advantages: 80% energy saving compared to industrial dry heat blowers, low noise production, scavenging pollutants released from the wet walls



Fast Dry wall systems by Fraunhofer – successful testing on site



Floods in Germany 2002 and 2021

Example of the City of Grimma in Saxony – water level 6m above normal (August 2002)

After the flood, **Heavy investments into flood protection measures**, around **57 million €**:

Various above-ground and underground measures free-standing flood protection wall with lockable gates, the strengthening of existing building walls and an underground sealing wall as a bored pile wall. Historic Pöppelmann stone bridge has been reconstructed and reinforced. In 2013 the city was again hit by a flood but was well prepared.

Example of the Ahrtal – water level 8-10 m above normal (July 2021)

185 people died, reconstruction is still going on but is not really adapted to flood protection, damaged historic bridge has been dismantled! Climate change risk not considered (business as usual). Civil protection was poorly organized. This is the result of an expert report commissioned by the public prosecutor's office in Koblenz. The district's operational concept was not sufficiently developed. **Formalized systematic procedures were lacking and there was no administrative staff.** The **technical operations management had not** been adequately **staffed**.

Damage: around **30 billion €!!!**



10 recommendations to the EU and MS - some key messages

- **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** and start planning - **training and upskilling of experts** is central
- The collection of 83 **best practice examples** shows that traditional buildings are sustainable & climate friendly. **It is more climate friendly to repair than to demolish, invest into continuous maintenance!**
- **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**
- There is a need for a **common platform** at EU and **national level to collect all relevant information**



Dry stone walling



Demolition of buildings



Traditional farm houses



Orthodox church



Skokloster Castle

Thank you

Let`s join forces to fight against climate change

OMC Report at: doi.org/10.2766/44688

Good practice examples at: <https://doi/10.2766/31292>

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