

## Decay Mechanism according to Climate Change

Proposal by

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The proposal will address the following area of research from ICOMOS - Climate Change and Heritage Working Group:

>>> • **Loss & Damage** (Climate change may result in systemic loss and destruction of sites and values. What impacts can't be avoided? How do we prepare for this; assess and manage risk; measure and insure against losses, including "non-economic losses")

### Introduction

ISCS and ISCEAH Committees would like to submit a proposal to build a new project gathering several committees on a common interest: the follow up of decay mechanism according to climate changes. Indeed the question regarding « how climatic changes impact the conservation of cultural heritage? » is regularly asked to our experts. In parallel, the Copernicus European program proposes to open satellite data that could be followed by using imaging of specific areas, such as sites, towns, monuments or buildings, and the corresponding data, as flow of temperature, humidity, pollution, density of population, etc. This represents a source of important information that needs to get measurable and comparative data, on a long period of time (several decades) and evaluate the impact of climate change on cultural heritage. Those satellites were in used since only 4 years; therefore the project would start through a monitoring process on identified sites.

The two committees, ISCEAH and ISCS, already agreed to jointly build an international project, based on Copernicus opportunities, gathering for now, building materials problems from stone and earthen heritage, and later, if other ISCs join the project too, it could also address other types of heritage, as decorated caves and concrete buildings. This represents a transversal way, over the material specificity's, to create a connection between the Climate Change and Heritage Working groups, in ISCEAH, ISCS, and others committees.

### Some examples of identified decay mechanisms to follow up:

- Potential freeze-thaw risk increase of building stones (case studies in France, Belgium are already identified);
- Extensive salts decay on exposed coast areas (case studies in France, Asia are already identified);
- Anthropogenic climate change effects on decline of adobe and rammed earth construction in the Indian Himalayan ranges;
- Anthropogenic climate change, pollution emission, on new figures of alteration (metallic structure and concrete);
- Influence of vegetation changes on the CO<sub>2</sub> increase within decorated caves;
- Modifications in protected landscapes (identified case studies through ISCEAH landscape survey, e.g. Natural Parc of Cévennes)

### Strategy of the project:

Committees will need to address a list of potential cultural sites (untouched from recent restoration processes), that reflect the possible decay mechanisms, as well as the nature of the "object";

Identification of the type of data that needs to be collected, will be followed through a long-term period on the selected sites through corresponding satellites – the scale of measurements will be also addressed (xx km; xx m)

A parallel monitoring on site should be done, one or twice a year, by in situ measurements and/or photographic and mapping recordings;

Therefore, we will be able to correlate condition survey done on site with satellites data's and see the influence of selected parameters on decay mechanisms.

**Tools to build the project:**

Committees involved in the project will send a call for experts in their committees to contribute to the work, identify sites and questions; some experts have been already identified (see below);

Committees will ask EU for a Copernicus access and training on the use of the data;

Committees may apply for financial calls to help experts who will do the monitoring (travels, material collection, etc.)

**To conclude:**

To work within an international project that could be transversal among the different ICOMOS Scientific Committees and that could address the decay mechanisms of distinct materials, could definitely have a stronger and strategic purpose, with further impact across different disciplines.

To have access to satellite images would be a great advantage and could have a stronger potential on the long run, as it would allow the team to better access, compare and analyse data. Also, to access data as flow of temperature, humidity, pollution, etc., would be very relevant, as it would allow to correlate readings and define different climate change effects.

As a result, this could help develop recommendations for possible corrective measures or a plan of action to face climate change and its impact on heritage.

It would be indispensable to address the research in the different continents.

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