

## Climate change as a threat for cultural heritage: learning from the past and protecting the future

Sophia Zoumbaki | Greece

Climate change is an inevitable natural process which human communities always had to face. Nowadays this phenomenon is accelerated by anthropogenic causes and has evolved to become one of the most threatening dangers for our planet, raising also numerous practical and ethical issues, one of them being the responsibility to protect world cultural heritage.

The links between climate change and cultural heritage will be discussed focusing on results of an interdisciplinary research project (implemented by the *National and Kapodistrian University of Athens*, the *National Hellenic Research Foundation* and the *Hellenic Ministry of Culture*), which aims at contributing to the efforts to preserve the cultural capital of Greece from the impacts of the ongoing climate change. A number of archaeological sites and monuments located at climate vulnerable eco-systems have been selected as cases for a closer investigation with the prospect of offering a useful tool to decision-making authorities as well as an example for the prediction and management of crises related to climate dangers.

Our interdisciplinary project analyzes the peculiarities of each site under examination in order to provide models of high spatial resolution aiming at the prediction of climatic dangers in the sites in question, classifying natural threats and assessing the sensitivity and adaptive capacity in each case. The analysis of historical sources and archaeological data offers the parameter of diachrony to the investigation of the existing environmental weaknesses in the micro-scale of a certain region as well as of the effects of natural events, which can only be assessed by their impact on concrete human societies.

The case-studies Olympia and Delphi –both inscribed on the UNESCO World Heritage Sites list– were two of the most important and frequented sanctuaries of antiquity, where festivities and games of a panhellenic level were organized. Both are located at splendid, imposing, but environmentally vulnerable places. Different environmental peculiarities of the surrounding eco-systems result in an increased vulnerability of both sites to climatic phenomena, a vulnerability which is to be observed throughout their history, from the prehistoric period until today. Olympia was always threatened by river floods, while an additional danger in the modern period are the wildfires which have destroyed a big deal of the surrounding landscape. Delphi is located in a tectonic setting with intersecting faults and thermal springs, on stiff cliffs from where rocks have been repeatedly detached and where torrents rush towards the site after heavy rainfalls. Delphi was therefore always threatened by flooding, landslides, erosion and subsidence. All these environmental weaknesses of both sites are deteriorated by the ongoing climate change.

Examination of these two sites as well as of each individual case included in our project, aims at suggestions of concrete management planning and interventions necessary in each site, in order to secure sustainability of cultural heritage. Archaeological and historical dimensions of this examination raise reflection on the notions of ‘adaptive capacity’ and ‘resilience’ and offer useful observations for modern society which faces the challenge to ensure the safekeeping of cultural treasures and to generally secure sustainability of the complex system including environment and human civilization.



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