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Making sense of climate risk information: The case of future indoor climate risks in Swedish churches

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ABSTRACT

Organizations and institutions managing built heritage have to make use of increasingly detailed, elaborate and complex climate change impact assessments. It is a challenge to determine how, when and by whom climate predictions should be translated into risk estimates usable for decision-making. In this paper results from the Climate for Culture project are used to study how heritage decision-makers interpret future indoor climate-related risks to Swedish churches. Different sets of risk maps were presented to ten engineers, ten building conservators and five experts on indoor climate related risks. Interviews were used to understand how the interviewees made sense of the presented information and if they associated it with a perceived need for adaptation. The results show that the risks were interpreted and assessed largely dependent on their pre-understanding and familiarity with the individual risks. The magnitude of change and the lack of uncertainty estimates were subordinate to the overall impression of the information as being credible and salient. The major conclusion is that the dissemination of risk information, also from projects which at the outset have aimed at producing knowledge relevant for end-users, should be both customized and tested in collaborative efforts by stakeholders and scientists.

1. Introduction

In recent years there has been much effort invested to assess the impact of climate change to cultural collections and built heritage in Europe. The predominant approach has been to use top-down modelling where the outcome is predictions of how deterioration rates and patterns will change in the future. This is a necessary but not sufficient condition for the planning and implementation of adaptation and mitigation measures. In order for the risk assessments to have an effect they must be communicated to the end users. The overall problem addressed in this paper is how generic, complex and uncertain risk information should be disseminated to adaptation practitioners in the heritage sector.

The impacts of climate change on built heritage have been studied both for individual sites e.g. (Grossi et al., 2011) and for geographic areas e.g. (Sabbioni et al., 2010). The NOAH's ARK project (Sabbioni et al., 2010) assessed the effects of climate change to cultural heritage in Europe by applying damage functions to projections of the future climate. The main result of the project was a collection of maps over Europe, where key environmental variables were linked to potential damage for heritage materials. Recently, there have also been studies on how the indoor climate in selected historic buildings and the related risks will be affected by climate change (Bratasz et al., 2012; Brimblecombe and Lankester, 2012; Lankester and Brimblecombe, 2012b, 2012a). Huijbregts et al. (2012) showed how simplified building simulation of generic buildings

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is a feasible methodology to produce maps of future indoor climates. The methodology was applied at a large scale in the recently finished project Climate for Culture (Leissner et al., 2014), which aimed to produce information useful for the management of historic buildings and cultural collections in Europe.

Organizations and institutions responsible for cultural heritage management now face the challenge of how to make use of increasingly detailed, elaborate and complex impact assessments in decision-making for climate change adaptation. It has been suggested that predictions of earth-system processes are most useful for decision making when they are related to near-term events and when predictive skill is known (Sarewitz et al., 2000). Predictions of climate change impacts are both highly uncertain and relate to events which, in a heritage management perspective at least, are located in the distant future. Despite this there is a demand from policy-makers and adaptation practitioners for more detailed and refined predictions about climate change impacts to cultural heritage, and a scientific community keen to supply this demand. However, to what extent existing predictions of impacts to cultural heritage have been useful for adaptation planning remains largely unknown. This situation calls for an urgent need to understand how researchers and stakeholders can collaborate to transform abstract and complex information about uncertain climate change impacts into actionable knowledge for adaptation decision-makers in the heritage sector.

The point of departure for this paper is the intersection between results from Climate for Culture (CfC), a research project supplying risk information, and the Church of Sweden, an organization in need of risk information for adaptation planning. In this intersection, concerns were raised about how the risk information should be selected, packaged, and assessed, and to what extent it actually was rendered as useful by decision-makers. To better understand the process of how the quantitative results of this and other climate change impact projects should be communicated, this exploratory study uses qualitative interviews to get a better understanding of how complex and uncertain risk information is subjectively interpreted by decision-makers.

The CfC project used climate modelling and building simulations to produce a set of European maps depicting future changes of deterioration for materials kept inside historic buildings. The project set out to produce results relevant for end-users by involving stakeholders throughout the research process. Dissemination of results was inscribed as a critical factor for reaching the project's aims. Questions about the identities of the end-users and the ways in which the results could be used received some attention in the initial phase of the project. A quite heterogeneous user group could be anticipated, ranging from policy makers at the national level to private owners of historic buildings. It was decided that the main strategy for dissemination should be to make results of the project easily accessible for decision-makers to choose based on their own needs (Leissner et al., 2014). There had been a process internal to the project where technical experts collaborated with stakeholders in the design of the maps. This kind of procedure is known to be insufficient to guarantee effective communication (Morgan et al., 2001, p. 19).

The Church of Sweden is responsible for the majority of historic churches in Sweden. During 2014, the organization investigated potential ways of re-organizing their building management. An assessment of climate change impacts to churches was considered necessary in order to understand the future need of adaptation. The results of the recently finished CfC project became a timely opportunity for delivering the kind of information sought by the Church of Sweden.

In the researcher-stakeholder dialogue that followed, a key question was identified: how the quantitative information produced by CfC should be transformed into statements about risk usable for adaptation planning. The results from CfC are meant to be used by heritage professionals whom have the necessary knowledge about local circumstances to judge the relevancy of the information in relation to specific cases. Building management expertise from within the Church of Sweden had to be involved in the risk assessment process to contribute with the necessary local knowledge – but it was uncertain how this should be carried out. Therefore, it remained a challenge to determine how, when and by whom the predictions made by CfC should be translated into risk estimates usable for the decision-making process.

How scientific information successfully translates into action has been described as a key question for climate risk management (Travis and Bates, 2014, p. 1). Empirical research has shown how the use of information in decision making can be dependent of a range of factors, such as institutional barriers, resolution of the information, level of skill among users, trust between producers and users, etc. (Kirchhoff et al., 2013). It has been suggested that to create actionable knowledge, information about climate change must fit into existing contexts to close the usability gap between what scientists understand as useful information and what users recognize as usable in their decision-making (Lemos et al., 2012). To achieve this, there is a need to tailor climate information through sustained interactions between researchers and decision-makers (Lemos et al., 2012, p. 789; Moss et al., 2013, p. 697). Previous studies addressing the usefulness of climate risk information for heritage practitioners have pointed out the necessity to contextualize climate change information in order to make it relevant for practical management (Cassar and Pender, 2005; Haugen and Mattsson, 2011).

There is no shortage of advice for how to communicate risk and uncertainty effectively e.g. (Morgan et al., 2001, p. 19; Renn, 2008; CCSP, 2009; Fischhoff, 2011; Mastrandrea et al., 2011; Fischhoff and Davis, 2014). One thing that different strategies have in common is that risk communication should focus on issues that are relevant for the target audience. Another commonality is the importance of testing communications before final dissemination. Despite the abundance of advice, there is little empirical evidence on the efficacy of different strategies for climate communication (Pidgeon and Fischhoff, 2011). Furthermore, there are competing understandings of what constitutes good risk communication and different ends will require different sets of best practices (Demeritt and Nobert, 2014).

It has often been argued that uncertainties in climate change impacts should be characterized, quantified (based on historic data or expert judgment) and communicated to the end user in order to improve decision-making e.g. (Mastrandrea