A methodological framework to assess disaster risks at cultural heritage sites: the case of the Roman Ruins of Tróia

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The UN's Sendai Framework for Disaster Risk Reduction 2015-2030 has emphasised the protection of cultural heritage within its disaster resilience framework, particularly in its Priority for Action 1 'Understanding disaster risk' and in Priority 3 'Investing in disaster risk reduction for resilience'. Recognising this progress, the STORM (Safeguarding Cultural Heritage through Technical and Organisational Resources Management) project aims to provide a cooperation platform for enhancing knowledge, processes and methodologies on the sustainable and effective safeguarding and management of European Cultural Heritage. Within the context of the STORM project, this paper aims to present an integrated methodology of risk assessment for cultural heritage properties facing the adverse effects of natural hazards and climate change-related events. Applicability of the proposed method to the field of heritage conservation is particularly taken into account. The paper develops a Cultural Heritage Risk Index comprising three components: 'hazard' (leading to sudden- and slow-onset disasters), 'exposure' (the elements of heritage sites and their associated values), and 'vulnerability' (susceptibility, coping capacities, and adaptive capacities), to measure the level of risks. The proposed risk assessment methodology was applied to the case of the Roman Ruins of Tróia, in Portugal. The three above-mentioned components were analysed based on the specific indicators defined in accordance with the characteristics of cultural heritage properties. The score of the components was incorporated into the risk index for measuring the level of risk corresponding to each hazard. Undertaking the assessment procedure in Tróia enables the clear identification and ranking of the natural hazards and climate change threats affecting the site, and subsequently, classifying their associated risks into the acceptable, tolerable and intolerable regions. In accordance with the STORM risk map concept, relative risk maps were generated to allow sharing a common understanding of the risks among the risk management team, including site managers and other stakeholders. The output of the site risk assessment offers a more reliable guidance on the ascription of risk treatment priorities, thus further supporting decision making on risk mitigation and preparedness strategies.

Keywords: Cultural heritage; Disaster risk assessment; Natural hazards and climate change; Tróia; Vulnerability analysis

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