



14TH CONFERENCE ON
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OF ENERGY, WATER AND
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October 1-6,
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BOOK OF ABSTRACTS

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Hygrothermal Simulation to Predict the Preservation Risk and Thermal Comfort in Historic Buildings. Effects of Future Climate Change in the Mediterranean

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Abstract

Institutions managing built heritage have to make use of increasingly detailed, elaborate climate change impact assessments. In this paper we evaluated the risks for valuable historical objects and buildings exposed indoor conditions and users thermal comfort due to external climate change.

Dynamic computer simulation modelling was used to investigate the potential impact of future climate change scenarios on the risk of overheating and annual primary energy requirements for historic buildings.

This outdoor climate was constructed from the present to predict future data from outdoor climate prediction computer models (for the next 50 years). The indoor climate simulation CCWorldWeatherGen (Climate change world weather file generator) was used to evaluate the indoor climate conditions. The tool enabled us to generate climate change weather files ready for use in DesingBuilder 5.5.2 software.

The main aim of this research is quantification and evaluation through monitoring and simulation models the consequences of climate change about the hygrothermal parameters of Baroque church of in southern Spain, (Mediterranean climate). Moreover, their impact on the preservation of property, thermal occupant comfort and passive techniques.

This research was developed following an experimental method combining analytical formulations and in-situ experimental measurements with simulation techniques to predict the hygrothermal behaviour of religious spaces. Simultaneous measurements were carried out to obtain representative climate data.

The climate change scenarios were based on projected temperature changes. The results showed that the risk of overheating increases under the climate change scenarios. Furthermore, space heating demand is reduced and cooling demand is increased for the analysed building, and the changes are proportionally more significant for the passive compared to current situation.