



## The impact of changing climate on the preservation of Mediterranean cinematographic archives

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A changing climate significantly impacts the preservation of cultural heritage both outdoors and indoors. In the case of cultural collections preserved indoors, buildings play a key role in buffering the short-term outdoor climate fluctuations, being still heavily influenced by long-term outdoor climate trends. This makes indoor climate control challenging, especially when stable indoor temperature and relative humidity conditions should be kept preserving climate-vulnerable materials (e.g., polymeric-based materials). In the last decades, this approach is becoming increasingly unsustainable due to the extensive use of air conditioning systems, which contribute to the emission of greenhouse gases. This study examines the potential challenges in indoor climate control in the Mediterranean cinematographic archives -preserving cellulose acetate motion picture films- under the intermediate Shared Socio-economic Pathways climate scenario (SSP2-4.5). The analysis employs the "degree-days" index, using temperature thresholds recommended by standards to limit climate-induced degradation in cinematographic collections. The expected increase of the outdoor temperatures will be responsible for a significant increase in the cooling degree days with a different extent throughout Mediterranean countries. This will make more challenging the preservation of cinematographic collections as they are highly vulnerable to temperature greater than 15°C. These findings can support strategies to adapt to predicted warming by fine-tuning indoor climate control to preserve collections while enhancing energy efficiency. This may lead to the construction of new more-efficient cinematographic archives in climate resilient areas and to the development of new standards incorporating future climate projections and adaptation measures.