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Marble Deterioration and Climate: Examples from the Schlossbrücke Berlin

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Protective structures for works of art or antique artefacts have a long architectural tradition and have been known in Germany since the 19th century. The effect of such covers on the microclimate around artworks of natural stone, and hence, their protective capability are insufficiently documented and understood.
In 2007, an inter-disciplinary model project and part of a pilot study coordinated by the Berlin State Office for the Protection of Monuments was planned with the aim of developing an innovative winter covering system for marble statuaries located on the Schlossbrücke in Berlin. Such a system would need to fulfil the various requirements for structural stability, aesthetics, climate and practical use. This applied research represents the first complex scientific study of the sustainability of a winter covering system. A climate monitoring system was designed to create a dense database for the numerical prediction of the effect of protective systems, and to compare the given climate conditions to the known factors influencing the marble deterioration. Based on these findings a prototype of an innovative shelter was designed and tested.
The project shows, that beside a temporary covering regular inspection and maintenance combined with regular cleaning ensures an effective and sustainable protection of marble sculptures. Such a maintenance program is the precondition for preserving the sculptures of the Schlossbrücke as a historical ensemble.
Important scientific results of the project are transferable to similar objects of Carrara marble. The results throw a new light on the conventional protection of such objects and leads to a discussion on the necessity of an all-season protection.