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A11c-Des nouvelles solutions pour des vieux problèmes: l'utilisation des nouvelles technologies pour la documentation et la conservation de l'art préhistorique

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Remediation in prehistoric painted caves; concepts and practices from French sites.

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During the last 150 years, many prehistoric decorated caves suffered from growing touristic exploitation and invasive archeological operations. This resulted in irreversible destructions and in uncontrolled degradations of the remains, associated with permanent or temporary destabilization of cave microclimates. We propose remediation strategies able to restore satisfactory conservation properties in these sites.

Multisite, multiparametric monitoring in cave and at the surface provides information on karst dynamics and cave microclimates. These data are compared with in situ observations of the evolution of the remains and of their rock support. The identification of multiple buffering mechanisms responsible of stable condition in karstic caves and former work in Chauvet cave led to define underground confined state, which possesses optimal conservation properties.

In le Mas d'Azil and Marsoulas caves, exchanges conditions with outside had been dramatically changed by modifications of the entrance and even internal geometry of the cave, resulting in open microclimatic conditions expanding to most of the decorated zones. Restoration of confined zones in le Mas d'Azil reduced the thermal impacts due to visits and to the outside climate influence, preventing condensation on parts of the decorated walls. Further improvements are needed in this site. In Marsoulas, remediation is expected in the future with a double door structure whose buffering properties will mimic those of the initial scree removed by archeologists in 1931. In Pech Merle tourist cave, recurrent painting fading was related to natural seasonal drying of walls. Comparing microclimate studies achieved 30 yrs ago and present ones lasting since 1998, allows to assess the effects of improvement of the cave closure system which restored a confined state insuring a permanent stable and optimal visibility of the paintings. In Gargas, starting from a completely open state with documented degradations, optimization of the closure and of the lightning system as well of the number of visits, allowed to reach gradually a semi-confined state that improved the conservation properties of the cave.

Remediation operations in decorated caves have to be based on the identification of regulation processes that should be re-established. A particularly important point is to refer to a realistic "initial state" of the cavity, which often has to be reconstructed from documents, archeology, geology, or geomorphology. Remediation consists of restoring progressively natural buffers or introducing new ones, and should be assessed by monitoring physical and chemical parameters of the cave atmosphere especially near archaeological remains.