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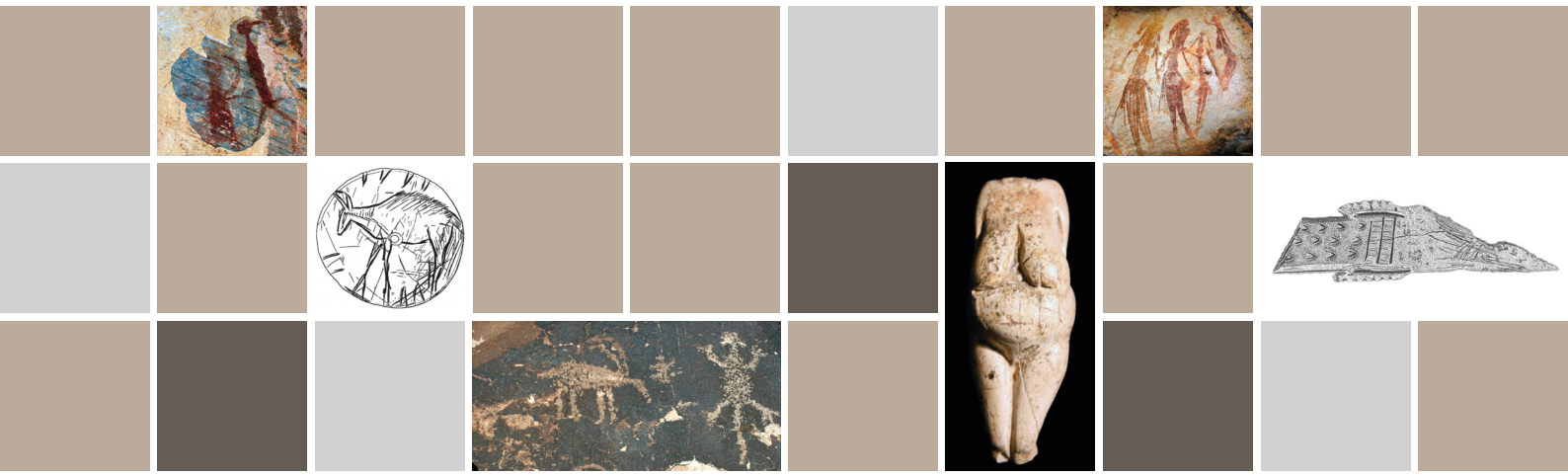

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TAPHONOMIC APPROACH TO THE WALLS OF DECORATED CAVES

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Objectives

In decorated caves, the aim of taphonomic studies is to understand the evolution of the wall surfaces. It is thus possible to reconstruct the initial state of a wall before the realization of art works and understanding the processes that occurred after the presence of humans:

- what processes modified the drawings after their realization? Can we identify the parts of the cave where artistic representations have disappeared? What is the difference between the initial corpus and that which is preserved today?
- what were the reasons for choosing certain panels and techniques?
- can we predict the phenomena that will degrade the representations and identify the sectors that will be affected?

Procedure

The states of the wall result from physical, chemical and biological processes that act at the interface between the stone and the atmosphere of karstic conduits. To understand their genesis, our procedure consists of constructing a database of the facies and studying a non-decorated cave that we use as a cave-laboratory, permitting the use of instruments and experiments.

Results

The following are four examples of facies drawn from our study of the cave of Chauvet.

Facies anterior to the human presence

Microformes inherited from the speleogenesis

On the panel of the Segmented Rhinoceros, the states of the wall correspond to three staged facies inherited from the early history of the cave. The smoother median facies was chosen for the realization of the figure. In the adjacent Cactus Gallery, two bears were drawn on an analogous facies. This morphology thus appears to have been favored for use as a support.

Phosphate coating due to bat guano

The walls of the Hillaire chamber are affected by sub-vertical, gray trails of hydroxyapatite, interpreted as a neogenesis due to leaching by bat guano. On the Megaceros Panel, this facies, which is anterior to the drawings, appears to have limited their extension.

Facies contemporary with the human presence

Rubefaction and flaking: thermal facies

With an anthropogenic origin characterized by red and gray shades and by flaking of the stone. This is the result of a thermal impact caused by fires probably dating to the end of the Aurignacian human presence. Chauvet Cave is the first example showing that fires could have a significant effect on the walls. The impact on the artistic representations is nonetheless limited.

Facies posterior to the human presence

Run-off: erosion and concretions

Run-off more or less intensively eroded or masked the artistic representations. On the Panel of Horses, concentrated run-off led to the erosion of pigment and micro-incisions, due to the softness of the stone, while on the Panel of the Red Bear, they only eroded the drawing. The formation of concretions produced seven colored calcite trails in the Alcove of Lions. The trails did not destroy the lines of the figures as they did on the nearby Panel of Horses.

Distribution of the facies in time and space

The changes in the state of the wall could have occurred between two stages in the realization of the art works: on the Megaceros Panel, the first drawings were done with charcoal on hard stone. A fan-shaped sign was made by scraping on a wall surface that had become plastic.

Chauvet Cave, Horse Sector (length: 9.50 m). Several wall facies are present on these panels: phosphate formation, run-off with erosion and concretion formation (photo: C. Fritz, G. Tosello).

The facies vary spatially as well, and at different scales. If we consider Chauvet Cave as a whole, the microforms inherited from its speleogenesis affect two large sectors. The first one, near the entrance, has mostly irregular surfaces on which isolated animal representations are the most numerous. The second has walls with regular surfaces on which the large panels were realized.

In the same sector, some states of the wall are intermittent and of variable dimensions, while others occur in stages parallel to the ground. This is true on the Megaceros Panel where the lower part of the wall, marked with depressions made by corrosion, was not used as a support, in contrast to the smoother facies higher up.

At the scale of a panel, run-off can result in variable facies produced by multiple factors (type of fissures, hardness of the stone, ...).

Conclusion

The study of the facies of the walls raises numerous questions that can be addresed through collaborations involving new research fields. To understand the karstic ecosystem, an interdisciplinary research approach is necessary, bringing together parietal art specialists, geoarchaeologists and archeometric specialists. Other disciplines currently being developed for the study of decorated caves could be more systematically integrated (e.g. modeling and microbiology).


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