

cal BP to the early twentieth century, has revealed some of the oldest known cultural deposits in Australia. The ceilings of the site contain well over **1300 still-visible paintings in multiple, superimposed layers**. Countless additional paintings cover many of the rock pillars' walls. This art raises questions: is it an expression of the first humans arrived on the Australian continent 65,000 years ago, or the evidence of recent occupation periods? How does this art inform us about the cultural practices of the ancestors of the Jawoyn people and their relationships to their environment, their country as well as their socio-cultural interactions?

To get a better insight into the artistic and cultural practices, the temporality as well as the uses of Nawarla Gabarnmang since the first prehistoric activities until the recent periods, **we are studying the colouring and coloured matters**, found in trial excavations under the painted panels on the ceilings or at the bottom of decorated pillars. Subjected to macroscopic observations and non-invasive micro-analytical techniques along with structural techniques, as well as techniques using synchrotron radiation, the analysis of the colouring and coloured matters has revealed a much more variety and a complexity of the mineral compounds in the recent occupation periods used in the rock art of Nawarla Gabarnmang. The analysis also allows us to rebuild the steps of the "*chaîne opératoire*" leading to the production of pictorial matter: from the sources of raw materials to the methods of transformation and preparation (grinding, mixing with mineral extenders and/or organic binders, heat treatment). Then, cross-referenced with archaeological, archaeo-morphological and rock art studies, the physico-chemical characterization allows to better understand the cultural and traditional practices of the Jawoyn community, to emphasize their interactions with other Aboriginal communities and/or Europeans and to suggest a chronological framework for the different superimposed layers of paint linked to the periods of activities that marked the history of the site.

The results provided by the integrated study of the colouring and coloured matters bring information as well on technical and behavioral evolutions, as on the cultural involvement of this site, not only in its spatial but also in its temporal dimensions.

Mots-Clés: Rock art, Colouring and coloured matters, Physico chemical characterisation, Integrated study, Nawarla Gabarnmang