
Sources of pigments for the Neolithic rock art of Wadi Sura, Gilf Kebir, Western Desert, Egypt

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Résumé

The paper deals with the 2010-2013 field activity of the 'Italian Archaeological and Conservation Project in the Gilf Kebir, Egypt' carried out in the framework of the Egyptian Italian Environmental Cooperation, and directed by B.E.Barich. The conservation work focused on the two caves of Wadi Sura that required the most urgent intervention - Cave of Swimmers and Cave of Archers – and followed a multidisciplinary approach integrating archaeological and geomorphological reconstruction (Tomassetti et al.2016). We discuss geological, mineralogical and geochemical characteristics of the proposed sources of pigments used in the Neolithic Wadi Sura rock art and compare them with similar data from other rock art contexts already known (e.g. Darchuk et al., 2011). Colors used in the paintings comprise white, yellow and a number of reddish hues ranging from pale red to dark reddish brown as well as rare black and greenish hues. White pigments were recorded in the field as thin laminated beds and lenses inside the Wadi Sura sandstone bedrock and also in ancient lateritic palaeosol layers as reworked fragments mixed with ochre. Our study, applying Raman spectroscopy, XRD and XRF techniques on both raw and archaeological materials, shows that the ancient artists widely used inorganic earthen pigments: e.g. kaolinite, anhydrite and gypsum, among others, were used as white substrate of the rock art works; a mixtures of aluminosilicate based clays with iron oxide, gypsum, hematite, goethite or magnetite and quartz, provided reddish pigment; while high content of graphite and birnessite along with goethite and magnetite produced the dark brownish pigments widely used in the rock art of the archaeological area.

Surprisingly, a content of lazurite ($\text{Na}_3\text{Ca}(\text{Si}_3\text{Al}_3)\text{O}_{12}\text{S}$) was also recognized among the raw materials, although actually this blue pigment doesn't seem to have been used in the Wadi Sura rock art panels (however, blueish and greenish traces as violet-reddish hues, along with bluish greenish yellow colors are reported). Lazurite is not well known in the geology of Egypt and has been detected by the present study for the first time.

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Our research highlighted notable similarities in the mineral and chemical composition of both geologic and archaeological raw pigments. Highly noteworthy was also the fact that all the proposed earthen pigments have high binding media properties that make them very suitable for rock art, without any need for using organic binders such as albumen, vegetable resin or blood.

Mots-Clés: Saharan rock art, paintings, inorganic earthen pigments, sandstone bedrock, mineralogical and geochemical analyses