



The Lion's Den: Use of Ochre 48,000 Years Ago

Largest study on ochre extraction in Africa reveals the transportation of valuable earth mineral pigments over long distances and confirms the "Lion Cavern" as the world's oldest ochre mine

Tübingen, 10/30/2024. A new study published in the journal "Nature Communications" examines the use of ochre in southern Africa and shows that the earth mineral has been used there as a dye and for ritual purposes for almost 50,000 years. The researchers analyzed 173 samples from 15 Stone Age sites and reconstructed methods of ochre extraction, the use of ochre, and transportation networks, considering local strategies and long-distance exchange. The results point to an intergenerational transmission of knowledge, combined with social exchange and technological learning. Moreover, the team of scientists identified the "Lion Cavern" in Eswatini as the oldest known ochre mining site in the world, dated to around 48,000 years ago.

Paintings of hunting scenes in the prehistoric cave of Lascaux in France, ceremonies and body paintings by Indigenous people worldwide, works of art from medieval times – ochre, a naturally occurring, lightfast earth mineral, has been used by humans as a dye and for ritual purposes since time immemorial. "We can say that ochre is the earliest known pigment used by humans to depict our world," explains the senior author of the study, Dr. Gregor D. Bader from the Senckenberg Centre for Human Evolution and Palaeoenvironment at the University of Tübingen, and he continues, "Our species and other hominins have been using the red, yellow, or sometimes purple earth mineral for at least 500,000 years – and possibly even longer."

In the most comprehensive study to date on the use of ochre in Africa, Bader and an international research team have now investigated how the earth mineral was used south of the Sahara. Based on 173 samples from fifteen Stone Age sites, the researchers reconstructed the regional networks of mineral selection, extraction, transportation, and the use of ochre.

"We were interested in the entire ochre processing chain: From the selection of the mineral from various geological formations, its extraction, the admixture of other substances such as milk, fat,

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Press Images



Ascent to the "Lion Cavern." The world's oldest ochre mine is located in the Malolotja Nature Reserve on the edge of the Ngwenya iron ore massif in Eswatini. Photo: Senckenberg/Bader



On the summit of Sibebe Pluton. The eponymous Sibebe site is located here, where ochre from the "Lion Cavern" was already being used 43,000 years ago. Photo: Senckenberg/Bader



blood, and plant resins as binding agents, to its transportation to the archaeological sites,” explains the scientist from Tübingen, and he continues, “How was the knowledge of ochre extraction passed on? Was there an exchange between different hunter-gatherer groups? And are there regional or temporal differences?”

In the recent study, the scientists from Eswatini, the USA, and Europe show that there existed both local strategies for procuring ochre as well as long-distance transportation of the important mineral via a network of different mineral deposits. The archaeometric investigations at fifteen archaeological sites suggest the presence of a long-standing cultural continuity in the intergenerational transmission of knowledge about ochre extraction and use, including geological conditions or desired physicochemical properties of mineral pigments. These communities of practice did not develop in isolation but were part of a broader system of relationships influenced and mediated by social interactions such as technological learning, seasonal migrations, the exchange of material culture, and symbolic expression, according to the study.

“Our data support the assumption that hunter-gatherers were very mobile in Eswatini during the Stone Age and sometimes traveled long distances to transport ochre pigments,” says Bader. It is remarkable that such traditions continue in Eswatini to the present day. It is known from ethnographic studies, for example, that plant healers travel to collect mineral earth pigments for painting and healing ceremonies. Ochre is also considered an important part of wedding ceremonies – the bride is painted with red ochre and animal fat on the morning of the wedding to signal her new status in the community.

“Our current work impressively demonstrates that researchers from Eswatini take a leading position in the study of Stone Age ochre sources, and that the country holds an immense wealth of this important pigment. Besides breaking down the ochre exchange chain, the study also used optically stimulated luminescence dating to confirm that the ‘Lion Cavern’ in Ngwenya constitutes the oldest known evidence of intensive ochre mining in the world, dating back some 48,000 years. In addition, we can see here some of the oldest evidence of humans actively changing the shape of their environment,” adds Bader in conclusion.



Sampling of the Lion Cavern sediments for measurements using optically stimulated luminescence.
Photo: Senckenberg/Bader



Stone Age “pickaxe.” People mined ochre in the “Lion Cavern” 48,000 years ago using roughly hewn stone tools like these.
Photo: Senckenberg/Bader

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