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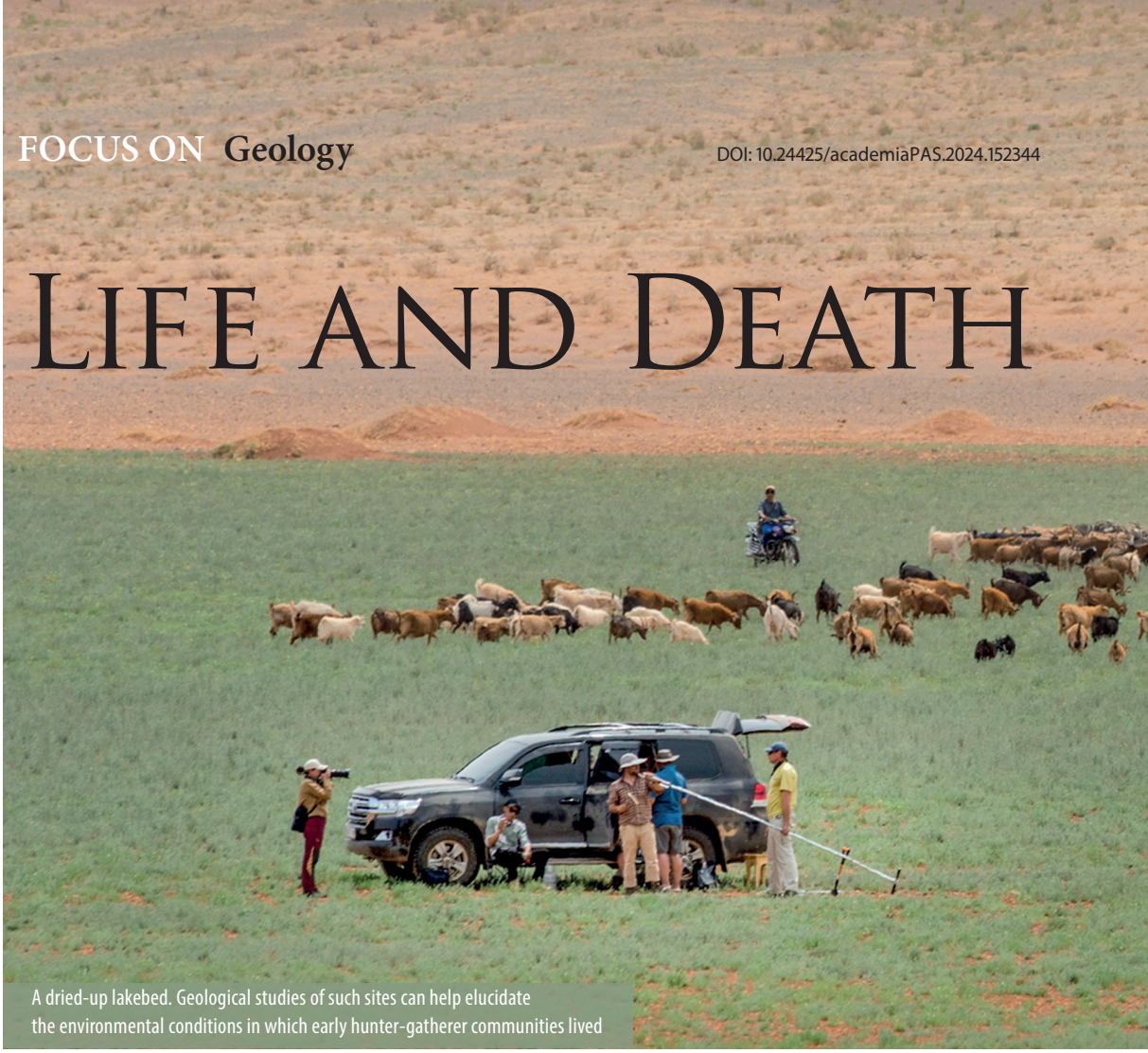
Life and Death



A dried-up lakebed. Geological studies of such sites can help elucidate the environmental conditions in which early hunter-gatherer communities lived

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Climate change greatly impacted the lives of Paleolithic hunter-gatherer societies on the edge of the Gobi Desert and Gobi Altai, and is also affecting the nomadic groups now living there.

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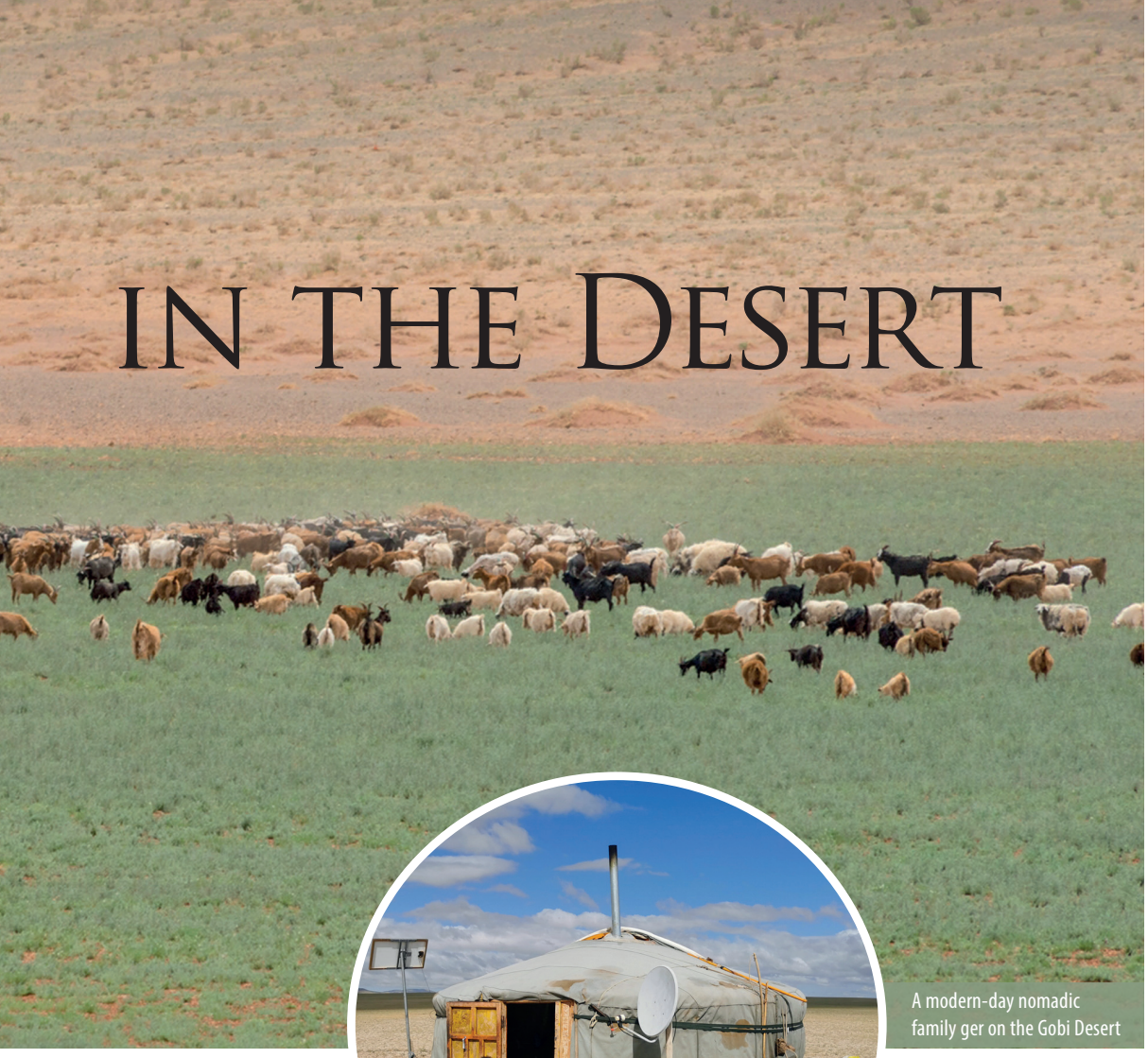
Central Asia, including Mongolia, is a particularly intriguing area for archeological research, due to the traces left behind by hunter-gatherer communities from the Pleistocene and early Holocene. These communities lived in a dynamic environment shaped by both short- and long-term climate change, with their survival strategies closely tied to the availability of food and raw materials for tool-making. Human activity in desert-steppe and arid regions was, and still is, largely centered

IN THE DESERT



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A modern-day nomadic family ger on the Gobi Desert

around water sources, which has led to the development of specific survival techniques and often dictated the mobility of these groups. Therefore, accurately reconstructing paleoenvironmental conditions through geological research (including sedimentological, geochemical, and tectonic studies) is essential for drawing reliable archaeological conclusions.

The Mongolian plateau, especially at the border of the Gobi Desert and the Gobi Altai, is considered a marginal landscape that is highly sensitive to the intensification of modern climate change. Since the 1950s, significant desertification and the shrinking of lakes have been observed, particularly affecting the Valley of the Gobi Lakes and areas south of the Gobi Altai. These changes have had a direct impact on contemporary nomadic groups, whose way of life depends heavily on livestock grazing.

Constant change

Since 2021, the Polish-Mongolian archaeological expedition has been conducting research in the southern part of the Arts Bogd mountain range (eastern Gobi Altai Mountains) and along the northeastern edge of the Shereegeen Gashoon basin.

Recent findings suggest that during the Pleistocene and early Holocene this area, covering 600 km², may have supported up to a dozen water bodies of various sizes. These water bodies formed due to geological and geomorphological conditions that shaped valley networks and deflation basins (depressions created by long-term erosion of rock material), which filled with water during wetter periods. While some of these water bodies were interconnected, most were isolated basins. Optical Stimulated Luminescence (OSL) dating of sediments has confirmed the presence of lakes dating back approximately 140,000 years, well before the onset of the last ice age.

The research also reveals that the region's current dry, continental climate is not a new phenomenon. Fossil records of the ancient lakes show fluctuations in water levels and extents, influenced by both global climate changes and local weather patterns. Some of these lakes were shallow, seasonally drying bodies known as *playas*. Fossil evidence also points to wind-blown deposits that filled in the dried-up lakes. A similar process continues today. The basins are partly covered by aeolian sands and hummocky dunes. During wetter periods, linked to stronger summer monsoons

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Sudden sandstorms can quickly obscure the landscape

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Photo 1
An arid, continental climate helps preserve bones and archaeological artifacts

Photo 2
A modern mammal bone resting on the Gobi pavement – a type of surface covered with wind-eroded stones known as *deflation pavement*

Photo 3
In the desert, death is an inseparable part of life

in Asia, heavy runoff from nearby mountain ranges changed the sediment composition. Fossil records from these times include deposits from seasonal rivers that transported material, creating alluvial fans in the shallow basins.

These factors significantly affected the shoreline dynamics and, consequently, the location of human settlements. Numerous Upper Paleolithic archaeological sites in the area are indicative of both short-term and long-term human presence. Settling groups in this region effectively utilized the available raw materials to create tools, working with siliceous rocks like chert, jasper, and chalcedony, as well as basalt and quartzite lenses extracted from phyllite outcrops. Additionally, the discovery of stone artifacts far from their original sources highlights the significant mobility of these prehistoric groups, despite the area's challenging terrain. Tools have been found as far as 36 km from the likely sources of the raw material used. The variety of sites and artifacts discovered suggests that favorable conditions for life existed during the Mesolithic and Neolithic periods, primarily due to the access to water and stone resources.

Climatic optimum

The significant lateral variability of lake, fluvial, and aeolian sediments within the basins makes it challeng-

RAFAŁ SIKORA (7)

ing to estimate dry periods. In some locations within these basins, their seasonal nature is evident. Some artifacts have been, and still are, vulnerable to redeposition due to intensified fluvial or aeolian processes, reflecting changes in the environment. The peak of human presence near the lakes occurred during the early Holocene (which began around 11,700 years ago). During this period, increased humidity led to rising lake water levels. Data from the literature also suggests that a warm and humid climate persisted in the eastern part of the Gobi Desert well into the middle Holocene. The activity of early humans in this region is therefore linked to the so-called Holocene Climatic Optimum. According to various sources, this period lasted in Mongolia from about 8,500 to 6,000 years ago, while in the deserts of northeastern China, it spanned from around 12,000 to 6,600 years ago. Climate factor correlations for the Gobi, conducted by Chinese and German scientists, revealed that in the late Holocene (around 4,000 years ago), the region began to experience a drying trend, with declining lake water levels, increased evaporation, and more intense aeolian processes.

Today, there is a noticeable reduction (up to 30%) in the surface area of lakes within the Mongolian plateau. Over the last 50 years, this process has accelerated, with some lakes completely disappearing. Areas once inhabited by hunter-gatherer groups were later settled by nomadic peoples during the Bronze Age (around 3,400 years ago), who relied on livestock grazing for their livelihoods. As a result, the ongoing desertification of this region poses a serious threat to the survival of these pastoral communities. The accompanying processes of salt and gypsum evaporation further limit the already sparse vegetation of the steppe-desert landscape.

Despite cultural and societal changes, water and climate factors continue to play a crucial role in sustaining human presence in these areas. Deep wells have become vital for modern nomadic herders, providing a reliable water source for their livestock. It is also worth noting that the ongoing socio-economic changes, leading to increased migration to urban centers, pose an additional threat to nomadic culture. This trend, combined with unfavorable climatic shifts, could eventually lead to the complete abandonment of these regions and the end of the continuous human presence there, after thousands of years.

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Photo 4
Cave in the Khutul Usny Agui valley within the Arts Bogd massif. A site documented by the Polish-Mongolian expedition as a place of early human habitation

Photo 5
The bed of a seasonal river. During dry periods, it becomes filled with aeolian (wind-blown) deposits

Photo 6
Deep wells are essential for watering Bactrian camels

Further reading:

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