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Evidence of human occupation in Mexico around the Last Glacial Maximum

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The initial colonization of the Americas remains a highly debated topic[1], and the exact timing of the first arrivals is unknown. The earliest archaeological record of Mexico—which holds a key geographical position in the Americas—is poorly known and understudied. Historically, the region has remained on the periphery of research focused on the first American populations[2]. However, recent investigations provide reliable evidence of a human presence in the northwest region of Mexico[3,4], the Chiapas Highlands[5], Central Mexico[6] and the Caribbean coast[7–9] during the Late Pleistocene and Early Holocene epochs. Here we present results of recent excavations at Chiquihuite Cave—a high-altitude site in central-northern Mexico—that corroborate previous findings in the Americas[10–17]of cultural evidence that dates to the Last Glacial Maximum (26,500–19,000 years ago)[18], and which push back dates for human dispersal to the region possibly as early as 33,000–31,000 years ago. The site yielded about 1,900 stone artefacts within a 3-m-deep stratified sequence, revealing a previously unknown lithic industry that underwent only minor changes over millennia. More than 50 radiocarbon and luminescence dates provide chronological control, and genetic, palaeoenvironmental and chemical data document the changing environments in which the occupants lived. Our results provide new evidence for the antiquity of humans in the Americas, illustrate the cultural diversity of the earliest dispersal groups (which predate those of the Clovis culture) and open new directions of research.

The archaeological site of Chiquihuite Cave is located in the Astillero Mountains, Zacatecas, at 2,740 m above mean sea level and about 1,000 m above the valley floor (Extended Data Fig. 1a–c). The cave was formed by dissolution and the roof collapse of nearly vertical (dip overturned; 80° southwest, strike 320°) Jurassic limestone, deformed during the Laramide orogeny of the Late Cretaceous and early Palaeogene periods. It has 2 interconnecting chambers, each of which is more than 50 m wide and about 15 m high, and contains speleothems (Fig. 1a). The inclined floor has accumulated roof-fall blocks and debris flow deposits that entered through the mouth of the cave, sealing it by the terminal Pleistocene epoch (Extended Data Fig. 1d, e, h). The cave is currently active, with continued speleothem growth and water drip that intensifies during the rainy season.

In 2012, materials found in a first test pit (excavation designated X-11) inside the main chamber suggested a human presence dating to or before the Last Glacial Maximum (LGM)[2,19] (between about 26,000

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