

The dating and interpretation of Chusang indicates permanent human occupation of the interior of the Tibetan Plateau in the early Holocene

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The nature and timing of a permanent human settlement on the Tibetan Plateau and the accompanying cultural and physiological responses, including genetic high-altitude adaptations, are subject to ongoing debate (1–3). The latest genetic data (based on extensive analysis of the modern Tibetan genome) suggest a main wave of human migration onto the plateau between 15 and 8 ka but genetic traces that hint to an even earlier initial occupation (dating to ~65 ka) have to be considered too (4, 5). The archaeological record against which these genetic data can be compared to remains scant. The few archaeological sites with a chronometric age are all located on the northeastern margin of the plateau and range in date from ~9 to 15 ka. These sites typically are at medium to low elevations (≤ 3300 masl) and are believed to have been short-term, seasonal occupations monitored from lower-elevation base camps (1). It is widely believed that permanent peopling of the interior (higher-elevation zones) of the Tibetan Plateau was only facilitated by an agricultural lifeway at ~3.6 thousand calibrated carbon-14 years before present (2). The climatic and paleoenvironmental constraints on this colonization process are poorly understood (1-3).

Here we report a reanalysis of the chronology and paleoenvironmental significance of the Chusang site, located on the central Tibetan Plateau at an elevation of ~4270 meters above sea level (3). The site is known for its hot springs and extensive hydrothermal carbonate (travertine) formations and also preserves 19 human hand- and footprints on the surface of a fossil travertine sheet. The minimum age of the site is fixed at ~7.4 thousand years (thorium-230/uranium dating), with a maximum age between ~8.20 and 12.67 thousand calibrated carbon-14 years before present based on radiocarbon and OSL single-grain dating. Travel cost modeling and archaeological data suggest that the site was part of an annual, permanent, preagricultural occupation of the central plateau. We suggest that migration onto the plateau during the early Holocene was enabled by the wetter regional climate at that time. These findings challenge (i) current models of the occupation of the Tibetan Plateau and (ii) the original dating of Chusang that - based on OSL multi-grain dating - suggests an age for the imprints of ca. 20 ka.

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