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Citation	Current Research in the Pleistocene, 27, 46-48
Issue Date	2010
Doc URL	https://hdl.handle.net/2115/49098
Type	journal article
File Information	CRP2010.pdf

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On the Spatial Distribution of Hearths in the Last Glacial Maximum Occupation of Kawanishi C, Hokkaido

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➤ **Keywords**: hearths, Last Glacial Maximum, Hokkaido

In this paper we report on the Last Glacial Maximum (LGM) human occupation at the Kawanishi C site and propose two alternative hypotheses to explain space use based on arrangement of the evident hearth features. Kawanishi C is an open-air site located on the Tokachi Plain, southeastern Hokkaido (Japan) (42° 52′ 50″ N, 143° 11′ 00″ E, ca. 70 m.a.s.l.) (Obihiro Board of Education 1998). The site is situated on the middle "Kamisatsunai I" terrace on the left bank of the Urikai River, a confluence of the Satsunai River, which is part of the Tokachi Plain drainage to the north. To mitigate the impact of housing construction and an associated road, 3090 m^2 was excavated in 1996 and 1997, directed by M. Kitazawa, the principal archaeologist of the Obihiro Board of Education. Although a small assemblage with microblades (n = 172) was discovered in a loam deposit above the En-a tephra (dated to ca. 17,000–15,000 RCYBP), the majority of lithic artifacts and pigments consisting of red (hematite) and black (magnetite) (n ≈ 18,000) were in separate beds between the En-a tephra and the Spfa-1 tephra (ca. 45–40 ka). AMS dates on charcoal from H-1 and H-4 were 21,420 ± 190 RCYBP (Beta-107731) and 21,800 ± 90 RCYBP (Beta-106506), respectively, corresponding to the LGM. Since the highly acid Pleistocene loam sediments decompose organic remains, the assemblage mainly consists of blade tools (i.e., scrapers and burins) and flakes from their edge resharpening. No projectiles were found. Among the clusters, the heavy-duty tools (i.e., choppers, anvils) are almost equally found, while light processing tools (i.e., endscrapers, sidescrapers, burins, and perforators) and blades occur more frequently in Cluster 4 (n = 58) than the others.

Four hearths (labeled H1 to H4 in Figure 1 from west to east), identified as burnt sediments, were located within five lithic concentrations (labeled 1 to 5 in Figure 1) at an elevation of 70.2 m.a.s.l. The nearest neighbor index (NNI), applied to the distribution of hearths on the surface, does not show complete spatial randomness (NNI = 2.7188, z = 6.5765, $p < 0.0001$). Since the NNI is >1, the hearth locations are regularly distributed. This nonrandom spatial patterning provides two alternative hypotheses to explain formation processes at the site: First, the LGM foragers at Kawanishi C kept regular distances between the

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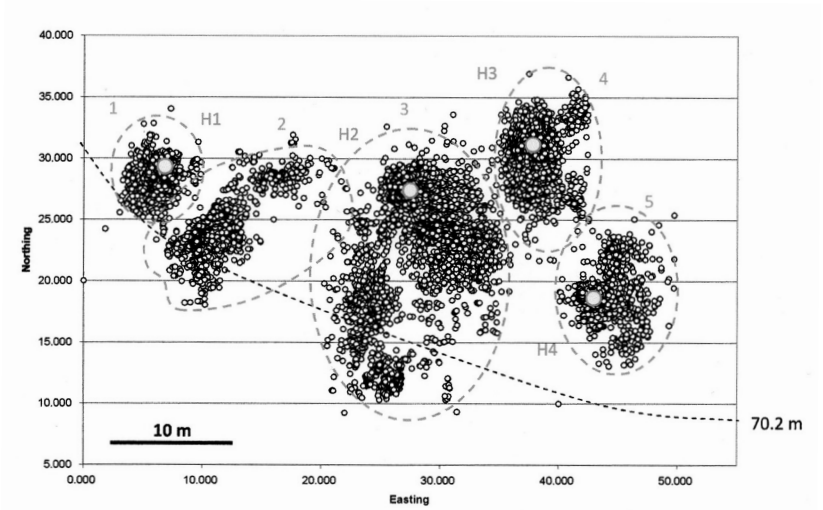

Figure 1. Clusters of artifacts with locations of hearths at Kawanishi C.

major activity areas around the hearths. Second, each hearth was left during a separate occupation event. If the former is the case, it was likely an aggregation site (e.g., Conkey 1980; Hofman 1994; Robinson et al. 2009; Wills and Windes 1989). If the latter is the case, the site was a palimpsest and the evenly spaced hearths were merely a contingent product of different occupations; foraging parties built hearths during different occupations, avoiding visible cultural remains of previous inhabitants. To evaluate which of these scenarios is the case, it is necessary to perform a more thorough investigation of formation processes of the artifact concentrations at Kawanishi C. While hearths are evenly spaced, most of the hearths (H1, H2, and H4) are not located at the centers of artifact clusters. This may imply that activities were performed both around and away from hearths or that the extent of natural disturbances varied. An examination of the relationships among the clusters with and without hearths will further illuminate the alternative scenarios of occupation history. An elucidation of human occupation history at LGM sites in Hokkaido will provide insights into the kinds of adaptive strategies (e.g., fission-fusion, mobility, stone tool reductions) and social structures (e.g., group size, division of labor) of Upper Paleolithic foragers who could have been a founding Asian population of the first Americans.

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