

Experimental Study for Detecting Morphological Effects of Thermal Alteration on Obsidian Artifacts and Quantitative Examination in an Obsidian Assemblage

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In order to detect the effects of thermally altered obsidian on lithic assemblage, prominent morphological characteristics of obsidian artifacts, which include crazing and breakages, were classified in examining a Meboshigawa 2 assemblage at a late upper Paleolithic site in Hokkaido, northern Japan.

Observations made using a light microscope discerned six prominent morphological characteristics: *crazing like a fingerprint*, *squamous crazing*, *tiny cracks*, *vesiculation*, *breakage with flat surface*, and *breakage with irregular surface*. All specimens could fall into one of 33 categories in terms of the sets of the above characteristics. The frequency of relationships between these characteristics in each specimen

indicated that some of them may have significant impact on their formation.

Only *tiny cracks* and *breakage with irregular surface* were compatible with the results of laboratory experiments, and formation of those *tiny cracks* is constrained by temperature and duration of heating. Hence, *tiny cracks* on the surfaces of obsidian artifacts should be criteria for detecting thermal alteration of obsidian.

Based on the ratio of tiny cracks in the assemblage, I propose implications for manufacturing context, using and discarding the context of obsidian artifacts in terms of the relationship between the process of lithic assemblage formation and the use of fire.