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Paleomagnetic Applications in Archaeology: Analysis of Fire-Cracked Rocks at Camano Island Site

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Abstract

Both archaeological and paleomagnetic data (specifically thermal remnant magnetization, or TRM) are being utilized in an effort to determine the temperature of heating for fire-cracked rocks (FCRs) found at a pre-contact site on Camano Island in Island County, WA. If temperatures were high enough to reach the Curie temperatures of any magnetic minerals contained within the rocks, the resulting information may permit inferences as to the fuels used and the purpose of the fires. The Camano Island site is thought to be a later pre-contact Kikiallus site, containing shell debris and human remains in addition to the FCRs. Samples show three distinct responses: 1) changes of direction at low temperature, 2) no change of direction (suggesting either that the FCRs were never altered, or alteration occurred at higher temperatures than testing), or 3) erratic results that cannot be easily analyzed.

Research Methods

Sample cores were extracted with a hand-held drill and diamond-tipped attachment. These cores were then heated in defined temperature steps using the thermal demagnetization oven. In between temperature steps, the intensity and direction of magnetization was determined using the spinner magnetometer.

Analysis

In order to determine if magnetization direction changes had occurred, each core’s thermal demagnetization steps were plotted in Zijderveld diagrams and on stereonets. Not all cores showed directional changes, but some had promising initial results. More investigation may result in other samples with similar clearly defined results.

Continuing Work

Further study will include additional core samples along with in-depth comparisons between cores. If multiple samples are found to have changed their magnetic directionality at the same temperature, then comparison of that temperature with the existing literature on FCR magnetism could help determine what sorts of fuels were used in the fire, which in turn could indicate the use of the fires and the site as a whole.

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