The Effect of Holocene Eruptions on Prehistoric Habitations in The Islands of Four Mountains, Alaska

To determine the effect of volcanic eruptions, we have to construct detailed chronology.

- Useful tephras in Holocene tephra stratigraphy
- Detailed age determination for two tephras using radiocarbon dates of peat
- The CR-02 tephra intercalated with cultural layers
- Distribution and possible source of the CR-02 tephra
Aleut Archaeological site CR-02 (AMK-0003) on SE coast of Carlisle
The CR-02 tephra in cultural layers in CR-02 Unit 3, SE Carlisle Island. It is not disturbed in the section.
Depositional structure of “c” member of CR-02 (micro-bedding) implies that the lapilli layer deposited with rainy condition. Charcoal horizons between each members imply time intervals.

The CR02 tephra at CR02 archaeological site (Unit 3)
Soil and tephra complexes during the Holocene Period near the CR-02 (AMK-0003) site, southeastern foot of Carlisle volcano.

This site is located on edge of volcanic fan of SE Carlisle.
Correlation between natural and archaeological sites

(natural outcrop)
Sandy layers are intercalated with member of the CR-02 tephra. The facts may indicate time interval between each member. And this is consistent with an existence of charcoal fragments between members.
Peat and debris-flows on lava flow near CR-03
=> This place is isolated from slope of Carlisle.
Peat section near CR-03 site. Peat provides reliable age for tephra. Fine vitric ash and CR-02 tephra are ca. 2 and 1 cal kBP, respectively.
### Result of AMS radiocarbon dating

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Material</th>
<th>$^{14}$C date (BP)</th>
<th>$\delta^{13}$C (‰)</th>
<th>Calibrated age range (cal BP)</th>
<th>Lab. No. (IAAA-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33-34</td>
<td>Peat</td>
<td>895 ± 25</td>
<td>-25.9</td>
<td>738 - 833 (58) 845 - 908 (42)</td>
<td>160136</td>
</tr>
<tr>
<td>34-35</td>
<td>Peat</td>
<td>1150 ± 25</td>
<td>-26.4</td>
<td>979 - 1097 (76.8) 1101 - 1148 (15.6) 1158 - 1173 (7.6)</td>
<td>160137</td>
</tr>
<tr>
<td>62-63</td>
<td>Peat</td>
<td>2030 ± 25</td>
<td>-27.8</td>
<td>1899 - 1914 (3.1) 1918 - 2056 (96.9)</td>
<td>160138</td>
</tr>
<tr>
<td>81-82</td>
<td>Peat</td>
<td>2540 ± 25</td>
<td>-26.0</td>
<td>2499 - 2593 (35.1) 2614 - 2635 (11.1) 2692 - 2747 (53.8)</td>
<td>160139</td>
</tr>
<tr>
<td>143-44</td>
<td>Peat</td>
<td>4240 ± 25</td>
<td>-25.6</td>
<td>4661 - 4666 (0.9) 4708 - 4755 (19.6) 4812 - 4858 (79.5)</td>
<td>160140</td>
</tr>
<tr>
<td>210-11</td>
<td>Charcoal</td>
<td>6030 ± 30</td>
<td>-24.8</td>
<td>6787 - 6954 (100)</td>
<td>160141</td>
</tr>
</tbody>
</table>
Probability distribution of calibrated years ranges. Values indicate sedimentation rate in mm/yr. It is noted that “depth” does not include thickness of tephra layers.
For reconstruction of archaeological chronology around this area, we have to pay attention not only to the marine reservoir effect.

They are slightly older than dates from the CR-03.

1045 ± 20 BP (UCIAMS-153681)
1925 ± 20 BP (UCIAMS-153681)
2990 ± 20 BP (UCIAMS-153681)
Distribution of the CR02-c implies that possible source is northwest foot of Cleveland (★).
Chemical characteristics of glass shards indicate “Cleveland origin”

Only member “a” is out of a series.
The CR-02 tephra (ca. 1 cal kBP) and ca. 2 cal kBP fine vitric ash are useful tools for determining the effect of volcanic eruptions on prehistoric habitations.

Distribution of the CR-02 tephra indicates prehistoric village CR-02 might be affected by this eruption.

However, people might continue activity around there. We have to check time lag more carefully.