Gallina Temperature Monitoring Experiment

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Purpose

• Gallina ruins are located both in valley bottoms and on ridge tops

• Ridge locations have been conjectured to serve either defensive purposes or signaling.

• Cañada Ojitos is known to locals as a particularly cold location. Could temperature differences be large enough to provide an alternative conjecture for the ridge locations?
Approach

- Maxim Semiconductor “Thermochron” can record up to 2048 observations at a programmable interval of 1-255 minutes.

- 10 locations were selected by consensus by Elaine Gorham, Mike Bremer, Candie Borduin, and Nancy Cella. Locations were both on ridges and valley bottoms, and generally were associated with actual Gallina ruins.
Approach

• Readings were taken every 3 hours, starting at 12PM MDT. (Times were NOT shifted at the end of daylight savings time.)

• Sensors were placed in early November and retrieved in April and May.
Site Map

Name is followed by elevation in feet
Results

• Comparison of valley bottom temperatures:
  – Canada Ojitos Low site and House data were quite comparable. Only Canada Ojitos is used for clarity.
  – Llaves Valley is represented by the Huerfano site.
Discussion

• The Canada Ojitos valley reputation is well-earned. The lows are distinctly lower, and the highs are higher.

• Spring Canyon and the Llaves Valley are very comparable. Winter highs in Spring Canyon are lower, probably because of shading in the narrow canyon.
Ridge Top Comparison

• The three sensors on the ridge to the east of Canada Ojitos had very similar readings. Only one is plotted for clarity.

• The readings at the cliff house and the ridge above the cliff house were very similar except for some spurious readings on the ridge. The cliff house readings will be used for clarity.
Discussion

• The ridge to the east of Canada Ojitos had slightly higher highs and lower lows, though not significantly.
• This is more surprising than the differences observed in the valley bottoms, which have significantly different topography.
Within site comparisons
Discussion

• Lower site has significantly colder overnight temperatures and generally similar, though occasionally significantly higher daytime temperatures.
Nogales cliff house sites
Discussion

• While the Nogales locations are generally warmer than the Canada Ojitos locations, they display a similar pattern of significantly colder overnight lows in the valley bottom.

• Daytime highs are similar, though higher in the valley in mid-winter.
Daily High/Low for Huerfano and Hacha Ridge Sites

Huerfano High
Huerfano Low
Hacha Ridge High
Hacha Ridge Low

Date

°F

Discussion

• The two sites show very little difference, probably accounted for by the similarity in elevation and the broadness of the Llaves valley.
General Discussion

• While valley bottoms were expected to be lower, the differences were larger than anticipated.
• Micro-climatic differences were significant, even over the small distances between recording sites.
• The valley/ridge differences were comparable in the different micro-climatic regions.
• The first couple of hundred feet from the valley bottom seem to make most of the difference.
Additional thoughts

• The magnitude of the temperature differences suggests that ridge-top sites might have been chosen as refuge from the cold.

• The abundance of ridge-top sites lessens the value of the signaling conjecture.

• A search for evidence of seasonal use of ridge vs. valley sites (winter high, summer low) might lend strength to resolving defensive use versus temperature driven use.