

Developing Cross-Comparative Frameworks for Land Use Histories. Northwestern Kea in Context

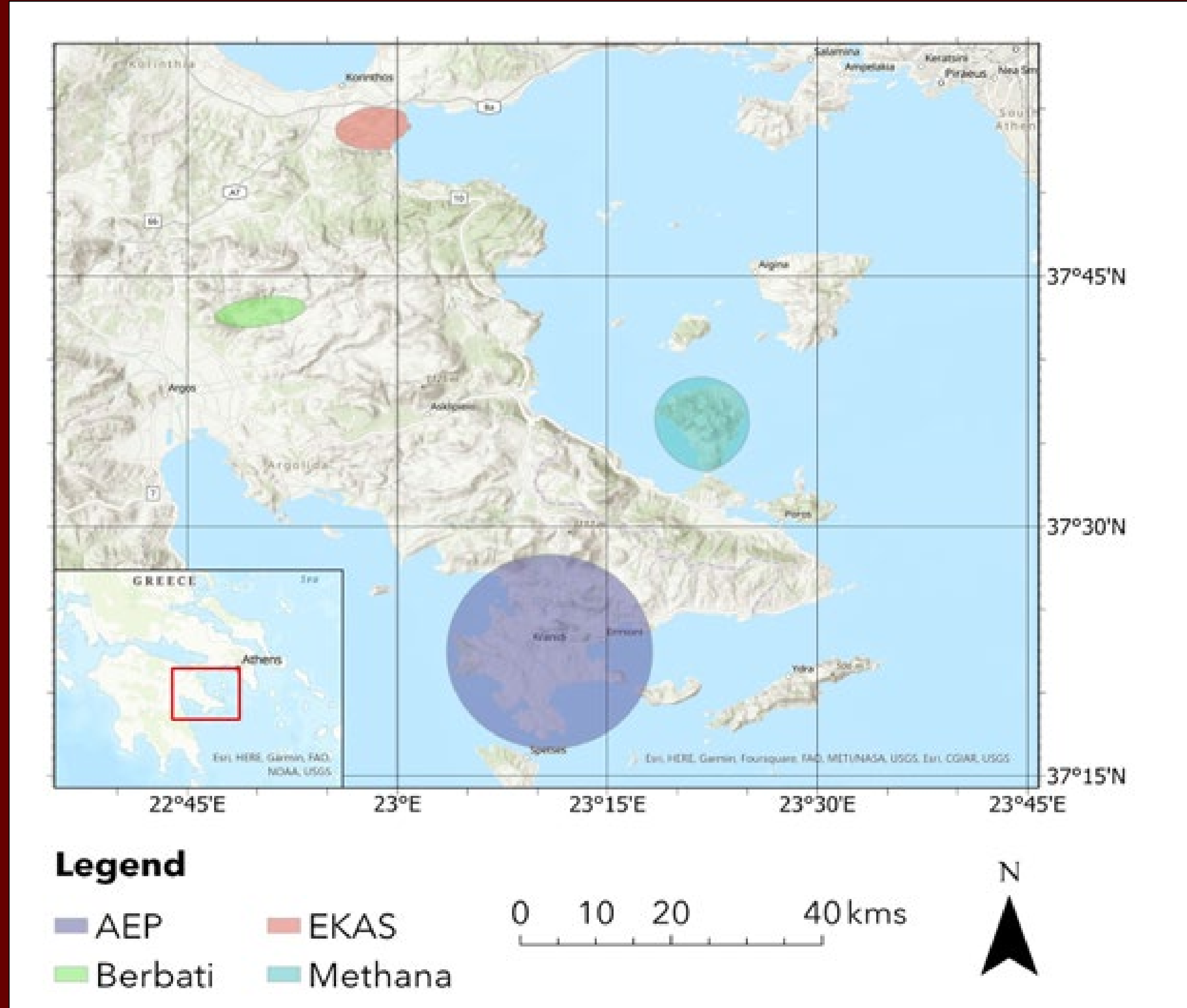
Charleston Burton

Abstract

Regional survey is a principal technique for investigating long-term land use and social change. In an effort to uncover broader, interregional patterns and historical narratives, studies have attempted to combine datasets from smaller regional surveys. However, these efforts are often problematic due to the variety of collection methods used within each region. In addition, these approaches typically focus on changes in the quantity of activity over time, often not exploring other factors, such as continuity and abandonment, in the cross-comparative analyses.

Recently, an approach that considers deviations in data collection methods and normalizes patterns across regions has been proposed. In testing the viability of this approach, survey data from four projects in the northeastern Peloponnese were analyzed using aoristic sum functions, placing them within the framework of the Adaptive Cycle for assessing regional and cross-regional patterns of social change.

The landscape history of northwestern Kea, as provided by the survey under the combined direction of Cherry, Davis and Mantzourani, was integrated within this system. The study provides an opportunity to observe long-term history in a cross-comparative format and an opportunity to evaluate the method with an example spatially distant from the initial test cases.



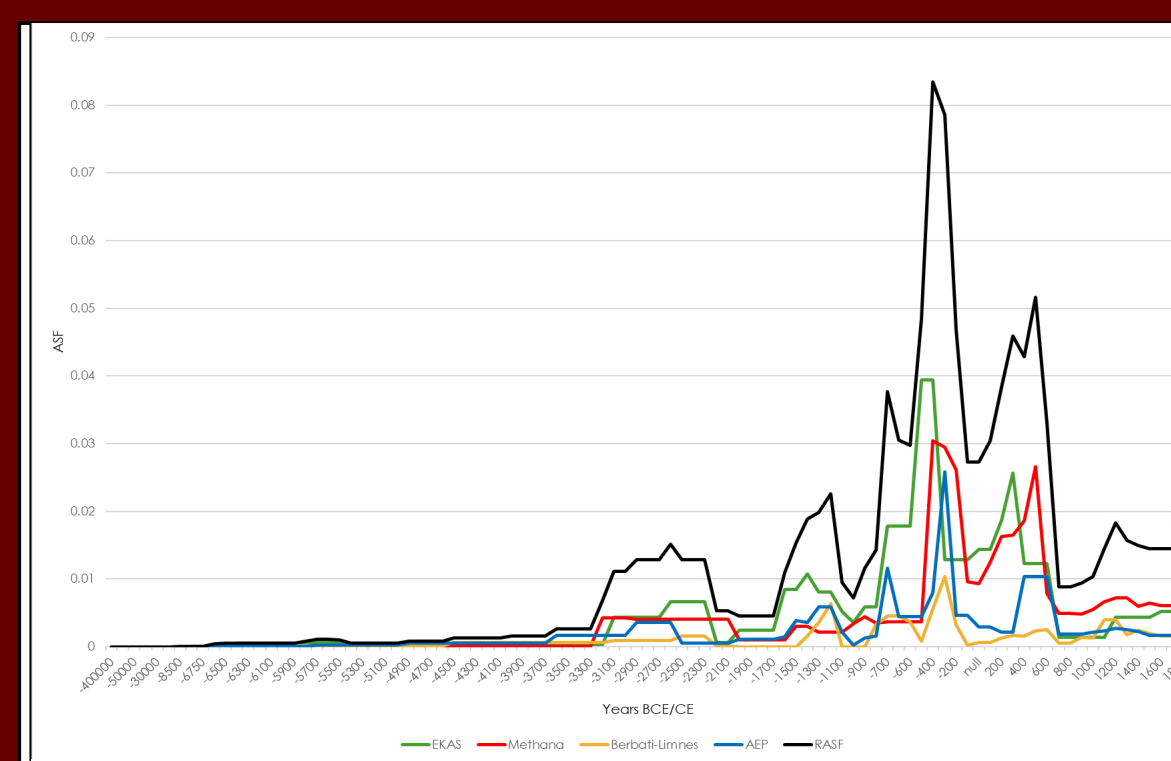
Approximate locations of the four northeastern Peloponnese survey projects integrated. Adapted from Newhard, et al. (2015: Figure 3).

Prior Research: The Northeastern Peloponnese

Newhard et al. developed and tested this exact framework by aggregating data from four legacy regional survey projects (2025). These projects, conducted between the 1970s and the early 2000s, used varying intensive pedestrian survey techniques creating inconsistent datasets brought on by differences in periodization and data collection practices. By applying aoristic sum functions (ASFs) individually to each project's data and normalizing by survey area, a comparative framework was created to explore patterns of continuation, expansion and abandonment. The resulting patterns were then interpreted through Adaptive Cycle patterns.

Key results of their work included:

- Recurrent "boom-and-bust" cycles aligned with broader Mediterranean trends (e.g. releases around 2500-2100 BCE [EHL-III transition] and 1100 BCE [LBA-EIA]).
- Regional variability
- Observations of macroregional trends while preserving local idiosyncrasies



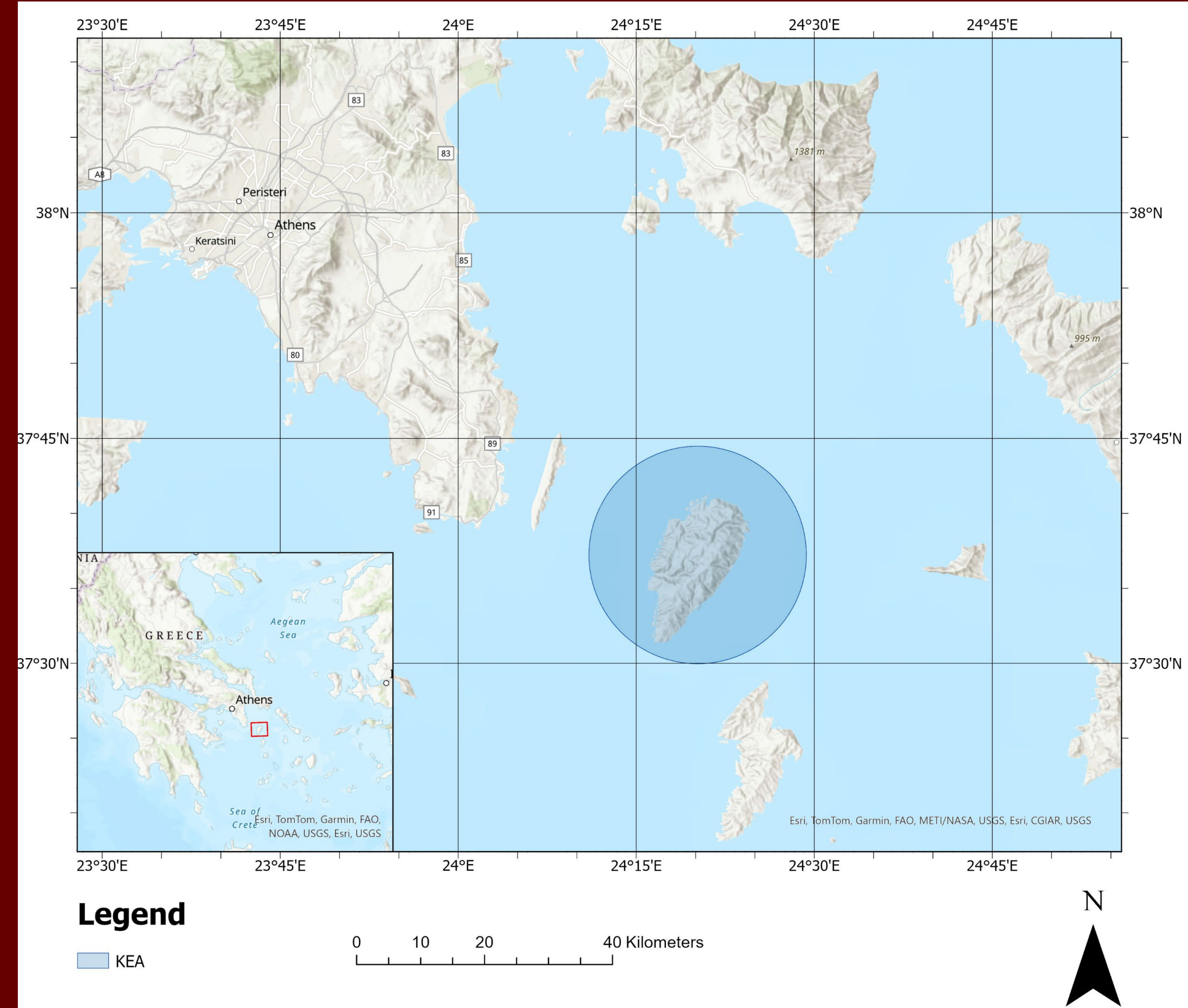
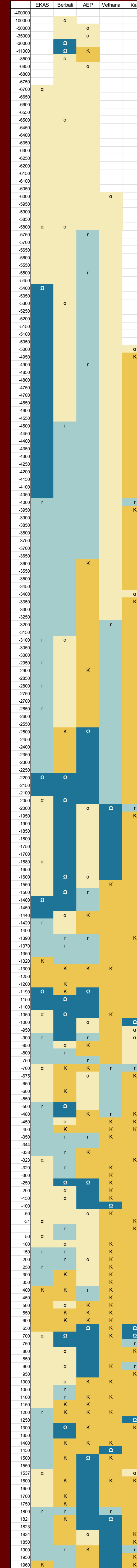
Graph showing the fluctuations in aoristic sum values over time for the four surveys. Adapted from Newhard et al. (2025: Figure 9)

The Aoristic Sum Function (ASF) was used to standardize the measurement of abandonment, expansion, and continuity by systematically distributing chronological uncertainty across defined temporal intervals. Each archaeological unit (e.g., the sites listed above) is assigned a date range, which is then divided proportionally across the time range it spans; this process allows phases of site use to be represented probabilistically. These values are aggregated to produce continuous temporal curve, rather than a series of discrete occupation points.

The graph shows the four landscape surveys distributed across their time ranges using the Aoristic Sum Function.

	α	r	K	Ω
Abandonment	Medium to High	Low	Low to Medium	High
Expansion	Medium to High	Medium to High	Low to Medium	Low
Continuity	Low	Medium to High	Medium to High	Low to Medium
Potential	0	1	0	-1

This table outlines how key settlement each of the Adaptive Cycle processes (α , r, K, Ω) are characterized by different combinations of Abandonment, Expansion, Continuity, and Potential. Periods of growth and conservation tend to emphasize expansion and continuity, while collapse is dominated by abandonment. The reorganization phase reflects a transitional state, where both abandonment and expansion occur at moderate to high levels. The "potential" values further clarifies the directional momentum of each phase, highlighting growth (r = 1), stability (K = 0), reorganization (α = 0), and decline (Ω = -1) within the cycle.



Approximate location of Kea survey project as conducted in Cherry, et al 1991.

Northwestern Kea Legacy Data Overview

The foundation for our analysis comes from the 1983–1984 survey of northwestern Kea (Cherry, Davis, and Mantzourani, 1991). This intensive pedestrian survey systematically walked the northwest corner of the island, recording surface artifacts dated from the earliest prehistoric settlements to modern farming installations and villages. The project thus captured shifts in settlement intensity, agricultural use, and periods of abandonment.

Cherry et al. suggested that the trends on Kea were broadly interrelated with mainland settlement dynamics. As an "experimental" landscape, habitation on Kea was understood as responsive to trade routes. As such it was subject to periods of exploitation and other activities of the greater Greek mainland, whereas at other periods a light level of habitation was observed. Within this framework, long-term occupation from the Neolithic through the modern period was interpreted as part of a larger, interconnected regional system.

Conclusions

The results of our analysis add nuance to the initial interpretations of Cherry et al. Investigated via the lens of the Adaptive Cycle, Kea displays long periods of the conservation (K) phase, punctuated by periods of reorganization (Ω) or reorganization (α). This is in agreement with the landscape history originally proposed by Cherry et al., which consisted of distinct periods of exploitation followed by less intensive yet consistent activity.

When examining land use histories of Kea in concert with those of the northeastern Peloponnese via the lens of the Adaptive Cycle, Kea shows a lack of correlation with the mainland patterns. Rather than mirroring mainland fluctuations in occupational intensity, Kea exhibits a pattern that is comparatively independent. The regional histories from the northeastern Peloponnese present several phases of the Adaptive Cycle – even if they are not always happening at the same time. Conversely, the information from Kea suggests long periods of conservation. The one patterns that displayed the greatest similarity to that of Kea was derived from the Methana Survey. As a peninsula and, of the regions explored in the northeastern Peloponnese the most isolated, one could suggest that the Methana region expressed similar physical and social conditions as Kea.

Implementation of the Adaptive Cycle as per Newhard et al. (2025) was successful in identifying broad patterns across the mainland survey project datasets. The results of this study indicates that the approach has wider applicability for cross-comparative approaches for understanding long-term human and landscape histories.

As such, the method of applying the Adaptive Cycle succeeded in two distinct ways. First it was able to successfully standardize a legacy dataset and place it in comparison with other regional surveys. Second, it exposed the extent to which Kea operated as an outlier to mainland landscape histories. Third, the study was able to provide this cross-comparative assessment while keeping intact the local landscape narrative as developed by Cherry et al.

Proposed Future Steps

Future work could apply these practices to the larger Aegean landscape. Comparing the data represented in Kea with other legacy data landscape surveys of island landscapes could prove to be a fruitful expedition for future comparative analyses of legacy data in this geographic region.

Contextualizing Kea

Newhard et al. (2025) provides a template for comparing regional survey data. Their work was offered as a test case using datasets from surveys in close proximity as a way to provide a certain control over the process. One of the questions left from that study was the extent to which the process could be used on datasets that expressed widely divergent land use histories. The Kea landscape, as described by Cherry et al. (1991), provided a different landscape and settlement history, allowing a possible contrast to the findings from the original study.

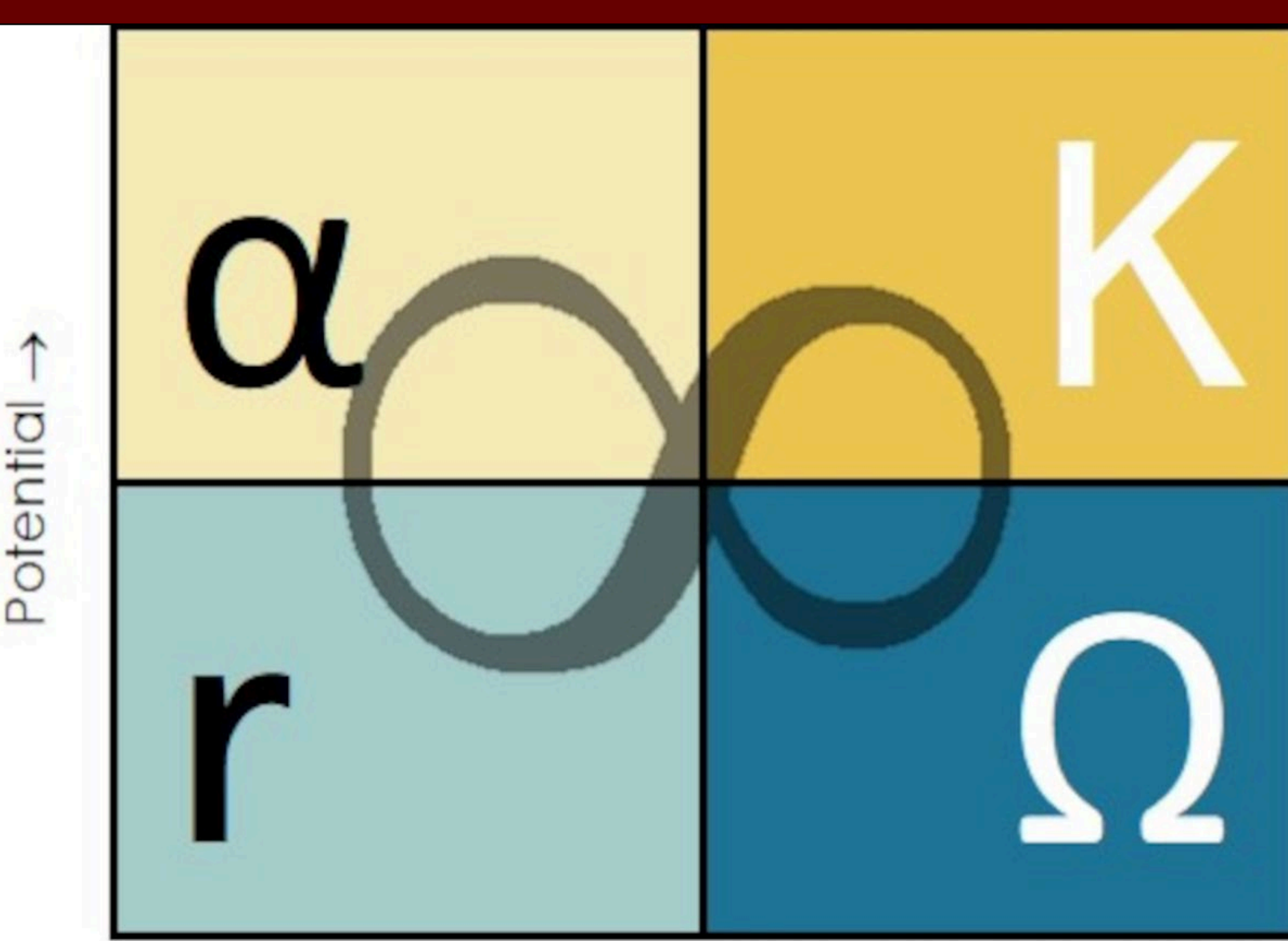
Taking the Kea legacy collection, we applied the same normalization process used in the Peloponnese: converting the raw artifact counts into aoristic sum functions, calculating values for abandonment, expansion and continuity across periods, and mapping the results onto the four phases of the Adaptive Cycle. This allowed us to place the landscape history of Kea side-by-side with the northeastern Peloponnese data.

Bibliography

- Bryan, H., Campbell, K., Jansen, E, and M. Titzler. 2023. "Regional Land Use Patterns in the Northeastern Peloponnese: Developing a Cross-Comparative Framework." College of Charleston EXPO. Charleston SC.
- Haley Bryan, Kelsey Campbell, Emma Jansen, Matthew Titzler Cherry, J.F., J.L. Davis, and E. Mantzourani, eds. 1991. *Landscape Archaeology as Long-Term History: Northern Keos in the Cycladic Islands from Earliest Settlement until Modern Times*. Monumenta archaeologica 16. Los Angeles: UCLA Institute of Archaeology.
- Holling, C.S., and L.H. Gunderson. 2002. "Resilience and Adaptive Cycles." In *Panarchy: Understanding Transformations in Human and Natural Systems*, edited by Lance H. Gunderson and C. S. Holling, 25-62. London: Island Press.
- Jameson, M.H., C.N. Runnels, and T.H. van Andel, eds. 1994. *A Greek Countryside: The Southern Argolid from Prehistory to the Present Day*. Stanford: Stanford University Press.
- Mee, C., and H. Forbes, eds. 1997. *A Rough and Rocky Place: The Landscape and Settlement History of the Methana Peninsula, Greece*. Liverpool Monographs in Archaeology and Oriental Studies. Liverpool: Liverpool University Press.
- Newhard, J., T. Tong, A. Lombardi, H. Bryan, K. Campbell, E. Jansen, and M. Titzler. 2025. "A Cross-Comparative Framework to Explore Land Use Histories of the Northeastern Peloponnese, Greece." *Heritage* 8 (8) (July 25):298. doi:10.3390/heritage8080298.
- Pettegrew, D.K. 2024. *Corinthian Countrysides: Linked Open Data and Analysis from the Eastern Korinthia Archaeological Survey*. Grand Forks, ND: University of North Dakota Digital Press. https://thedigitalpress.org/wp-content/uploads/2024/08/ekas_final_digital-L.pdf.
- Wells, B., ed. 1996. *The Berbati-Limnes Archaeological Survey, 1988-1990*. Jonsered: Paul Åströms Förlag.

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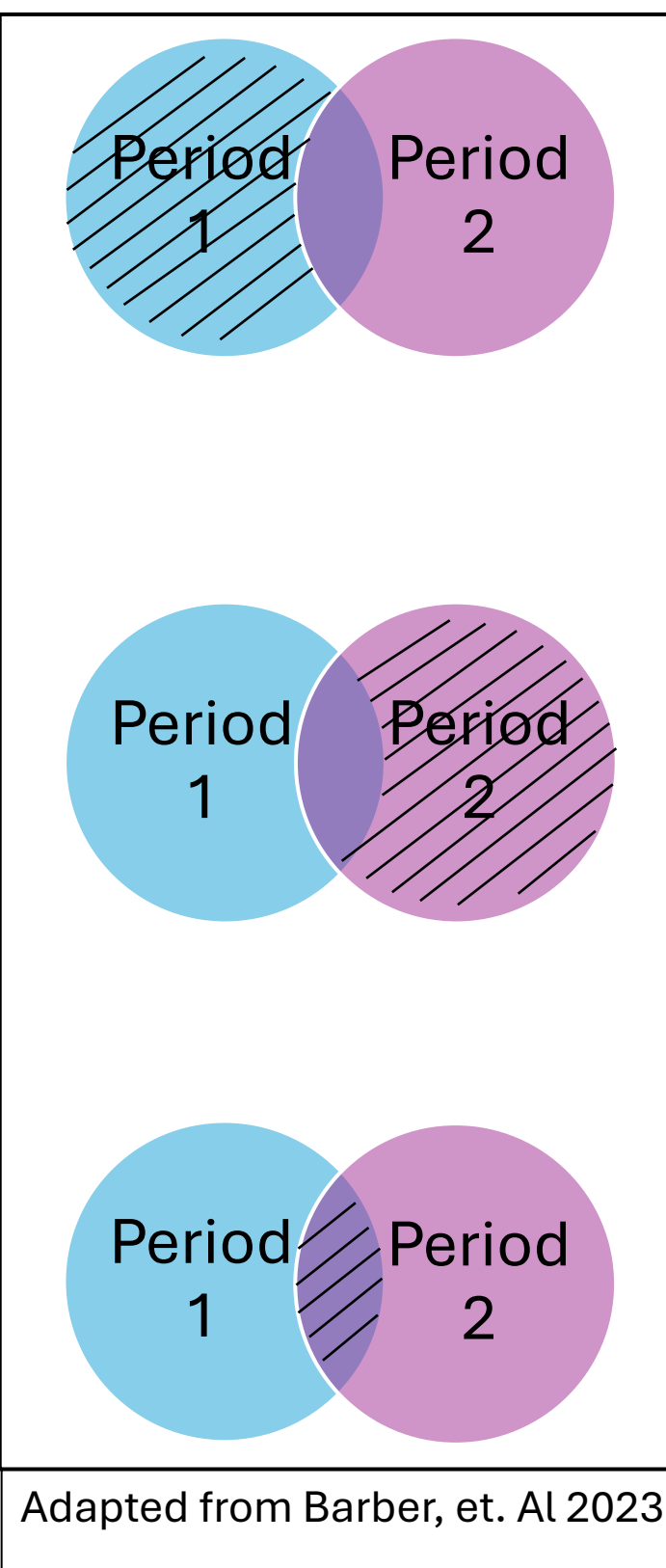


The Adaptive Cycle. Derived from Holling and Gunderson [33].

The Adaptive Cycle show four phases of development characterized by moving in a continual loop. This cycle is used to analyze how socio-environmental systems fluctuate between phases.

- α (organization): Societies are developing socio-economic systems.
- r (expansion): Socio-economic systems have become successful, leading to increased presence in the landscape.
- K (conservation): The system is in stasis with established social structures the reify the status quo.
- Ω (reorganization): The system is no longer operable, leading to decreased presence in the landscape.

The shifts between these phases can be expressed as measurements of abandonment, expansion, and continuation.



- Abandonment** → Ω (collapse): When sites are deserted (due to environmental stress, conflict, economic shifts, etc.), it reflects a breakdown of the previous system.
- New sites** → α (organization) → r (exploitation): The founding of new settlements shows reorganization (α), followed by expansion and development (r) as people adapt to new conditions.
- Continuation** → K (conservation): Sites that persist over several periods and accumulated material culture suggest a period of stasis.

Adapted from Barber, et. Al 2023