Comparing Networks of Regime Transitions in Ancient Greece

Volker Schneider[1] and Moses Boudourides [2]

[1]University of Konstanz
[2]Northwestern University

ECPR General Conference 2025, 26–29 August,
Aristotle University of Thessaloniki

Contents

Research Topic and its Epistemological Anchoring

Political regime transitions as **"big structures and large processes"** in a broad **comparative perspective** (Tilly, 1984).

Analysis is anchored and influenced by four **epistemological orientations**

- **Macro-historical sociology** (Tilly, Mann): causal process tracing and structural transformation.
- **Cliometrics** (Fogel, North): econometric analysis and historical data quantification
- **Cliodynamcis** (Goldstone, Turchin): dynamic modeling, feedback loops, and systemic transitions
- **SNA and Network Science:** concepts and procedures for modeling transitions in discrete state spaces. Regime changes are modeled as **directed graphs** with regimes as **nodes**, and transitions as **edges**.

Motivation: Revisiting Political Development via Network Analysis

- Over the past decades, numerous countries have experienced a **renewed trend** toward **autocracy**, challenging the long-standing assumption of a global democratic trajectory.
- Even in long-established democracies — such as the United States, with its 250-year constitutional tradition — scholars observe growing signs of **autocratization**.
- These reversals echo the core questions raised in the **political development** debates of the 1960s and 1970s, when scholars like Huntington, Moore, and others sought to identify historical patterns of regime transformation.
- Re-examining these frameworks in combination with **relational methods** and in dialogue with **classical political philosophy** opens up new analytical perspectives on the dynamics and direction of political change (Schneider, 2024).

Fundamental Patterns of Political Development

- Debates on regime transitions evoke the **foundational question** »Is there order in this "big structures" and "large processes" ?«
- Since antiquity, political thinkers have proposed four basic models to interpret political development:
  - **Progress**: Advancement toward higher-order systems (e.g. enlightenment, modernization, democratization, etc.)
  - **Decay**: Degeneration from an original or ideal state model (e.g., Plato's sequences of decline)
  - **Cycle**: Recurrent sequences of regime types (e.g., Polybius' *anacyclosis*)
  - **Randomness**: Unpredictable and directionless shifts due to shocks or critical junctures.
- This presentation demostrates that **network analysis** can reveal **structural patterns across historical transition processes** — thus contributing to a centuries-old debate with a new methodological tool box.

Political Development in Ancient Greece

- **The Origins of Comparative Politics** can be traced back to Herodotus' *Persian Debate* (monarchy, oligarchy, democracy) and Aristotle's regime typology (*Politeia*). Both mark the birth of comparative political theory (Finley, 1985).
- **Foundational Theories of Political Development** can be found in Plato's *Republic*, which outlines a theory of political evolution and cyclical decay — from aristocracy to tyranny. A forerunner of modern political development models.
- **Ancient greece was a laboratory of regime types** where city-states (poleis) experimented with monarchy, oligarchy, tyranny, democracy, and mixed forms — offering rich variation in regime transitions.
- Modern ancient history research has provided coded data sets (Hansen and Nielsen 2004) containing **empirical longitudinal data documenting regime changes** in around 200 poleis over several centuries (e.g. from 800BC to 350BC).

Political Development and Philosophy

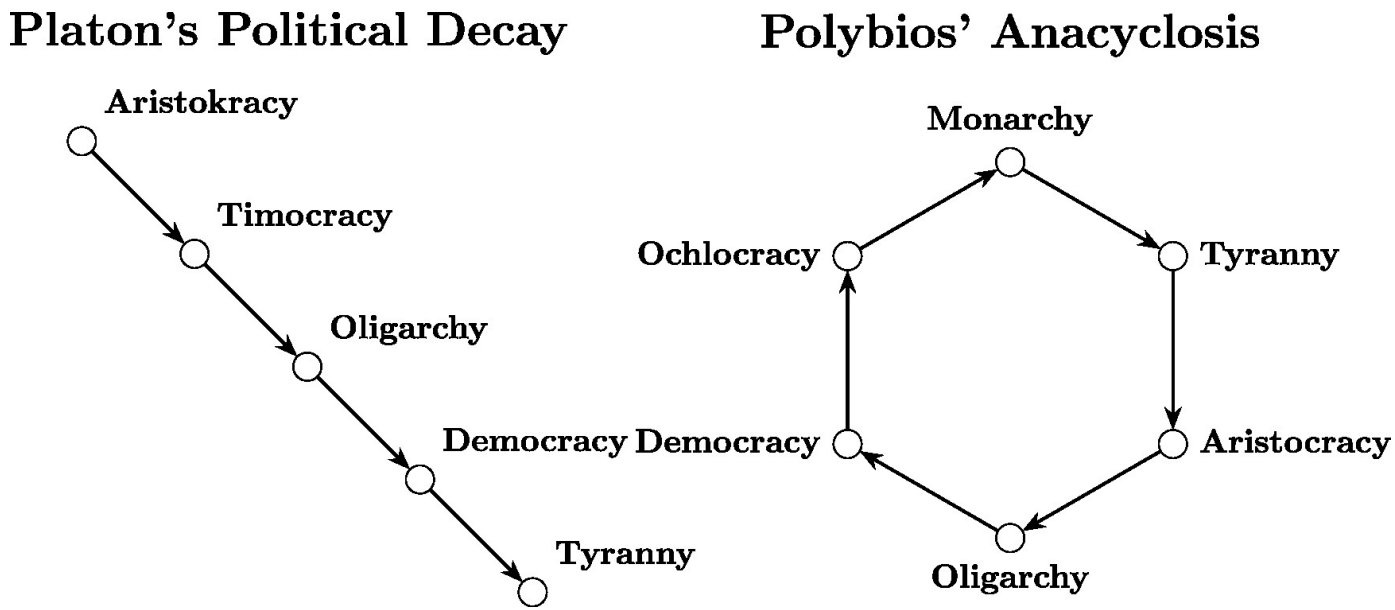
- City states undergo developmental transitions which **Plato** generalized as a process of political decay, which he wanted to end with the **rule of philosophers**.
- **Aristotle** developed a 2 x 3 typology where rule can be good or corrupt, and be exercised by one, few, or many.

Number of Rulers	Good Rule	Corrupt Rule
one	*Monarchy*	*Tyranny*
few	*Aristocracy*	*Oligarchy*
many	*Polity*	*Democracy*

- A systematic formulation of recurring regime sequences was developed by **Polybius**, whose theory of *anacyclosis* (cycle of regimes) strongly influenced **Cicero** and **Machiavelli**. Both found arguments in it for the **republic as a mixed form of government that promised stability**.

Political Development as Transition Paths

- Ancient **greek philosophers** conceived governmental regimes as unstable. Recurrent regime transitions can be represented as graphs with regimes as **nodes** and transitions as **edges**.
- In this perspective, **Plato's** idea suggests a **linear process of decline**.
- **Polybios** conceived of cyclical development, similar to Euler's circuit (Podes, 1991).



Forms of Government in Ancient Greece

- Greek ancient political development can be depicted **empirically**.
- Data are based on **Hansen and Nielsen, 2004,** who compiled extensive information on more than 200 archaic Greek city-states, including **regime types**.
- Only **48 poleis show** $\geq$ **2** transitions.
- Major regime types include Democracy (DE), Oligarchy (OL), Tyranny (TY), and Monarchy (MO)
- Example of **Syrakousai** in Hansen and Nielsen's data with many transitions between OL, TY and DE:

Syrakousai	Ol. C8s–C6; Tyr. C6; Ol. C6l; Dem. C5e; Tyr. 485–466; Dem. 466–406; Tyr. 406–344; Dem. 344–?; Ol. ?–316

A Closer Look on Syrakusai's Time Data

Transitions and their varying degrees of precision

- Ol.C8s → Oligarchy the **second half of the 8th century** BC
- Tyr.C6 → Tyranny in the **6th century** BC
- Ol.C6l → Oligarchy in the **late 6th century** BC
- Dem.C5e → Democracy in the **early 5th century** BC
- Tyr. 485–466 → exact **yearly data**
- Dem. 344–? → **missing data**

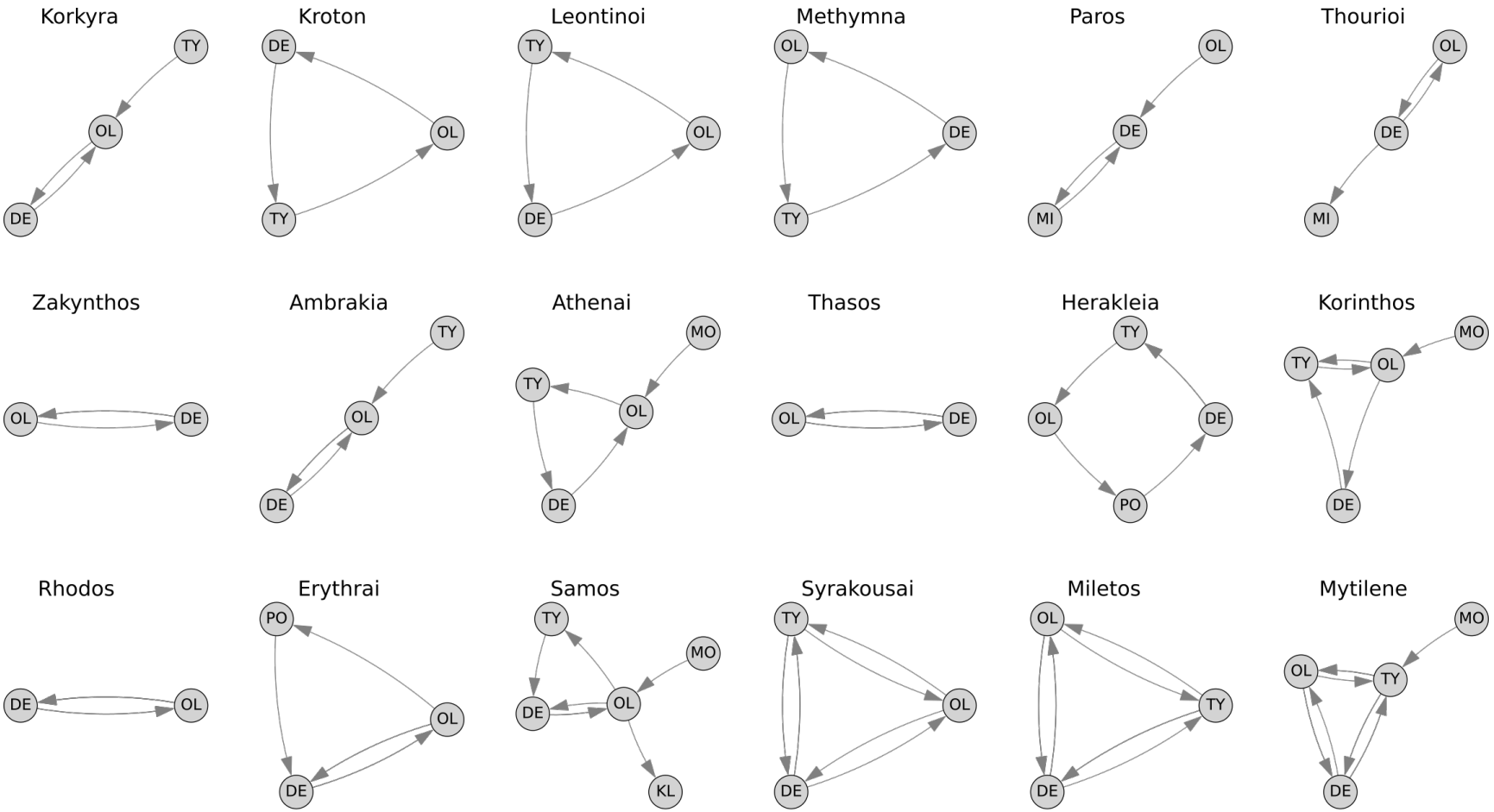
Implication: **In a first step, we therefore analyze the transitions without timestamps! In a further step, we attempt to refine the data for a limited number of poleis using AI-supported case studies.**

Relational Perspectives of the Greek Developments

- Trajectories of regime transitions may be **visualized with network layouts**
- Transitions and trajectories may be categorized as **cycles**, **decay or progress.**
- The **structural similarity of trajectories** may be visualized as **MDS and hierachically nested clusters** (based on distance measures)

- Further and more **in-depth analyses** (e.g. Markov processes) are currently being conducted (see Boudourides/Schneider, forthcoming DGnet Congress in Oct 2025 in Bayreuth, Germany)

Visualizations of Regime Transitions in 18 Poleis (Kamada-Kawai Layout)



Monarchy (MO) Oligarchy (OL), Democracy (DE), Tyranny (TY), Polity (PO), Mixed (MI), and Kleruchy (KL)

Counts and Classifications

- 26 Poleis had 2 transitions; 14 had 3 or 4; only 8 had 5 and more, with the maximum of 11.
- Aggregated Transitions of all 48 Poleis in a Matrix

	DE	MO	OL	TY	XX
DE	0	0	**33**	13	2
MO	0	0	5	2	0
OL	**40**	0	0	14	3
TY	20	0	15	0	1
XX	3	0	1	1	0

XX = Polity (PO), Mixed (MI), and Kleruchy (KL)

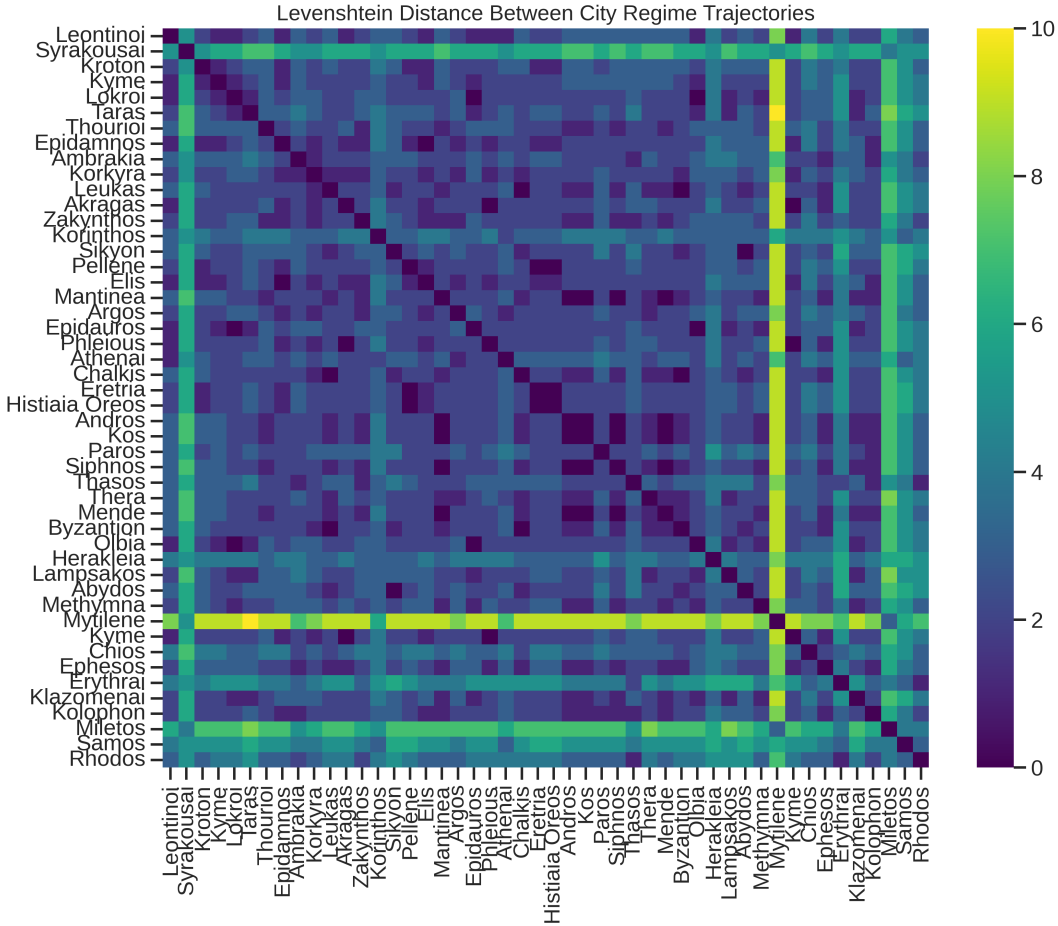
Most Transitions took place between democracy and oligarchy! $\rightarrow$ cf. Aristotle's polity thesis

- Patterns of trajectories
  - Cylic 17: e.g. OL $\rightarrow$ TY $\rightarrow$ DE $\rightarrow$ OL
  - Decay 7 : e.g. DE $\rightarrow$ OL $\rightarrow$ DE $\rightarrow$ OL
  - Progress 24: e.g. OL $\rightarrow$ TY $\rightarrow$ DE

Sequence Clustering

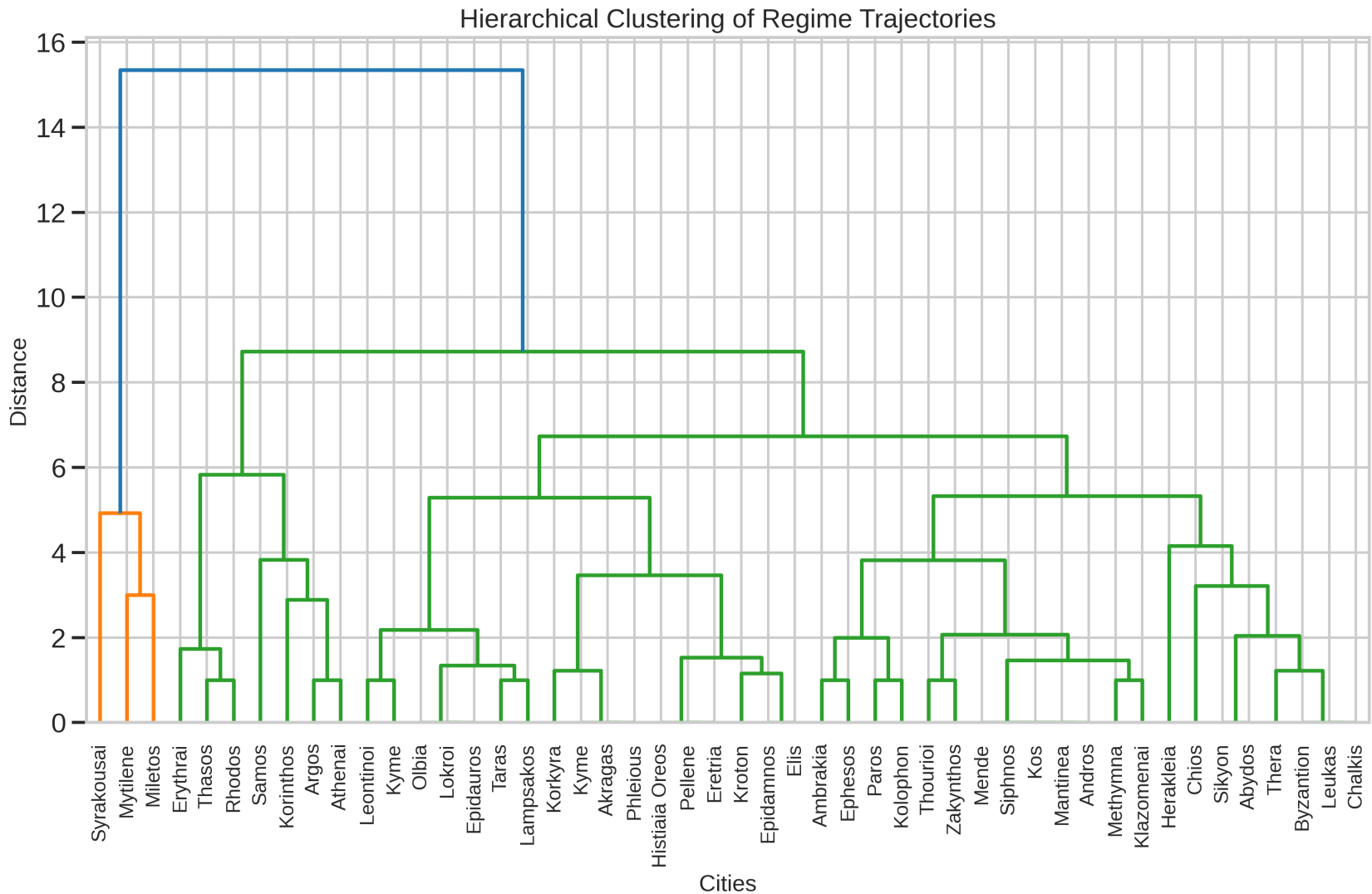
- **Sequence analysis** is a methodology for analyzing categorical sequence data to identify patterns, similarities, and groupings.
- We use sequence clustering to group cities with **similar political development trajectories**, revealing common patterns of regime change across different poleis.
- Distance calculation is based on **sequence encoding** where each regime sequence is encoded as a string. We use the first letter of each regime as a code (e.g., "MOTDO" for MO $\rightarrow$ OL $\rightarrow$ TY $\rightarrow$ DE $\rightarrow$ OL)
- We calculate the **Levenshtein distances** between all pairs of encoded sequences which measures the minimum number of single-character edits (insertions, deletions, or substitutions) required to change one sequence into another.

Comparing 48 PoleisTrajectories based on Levenshtein Distances

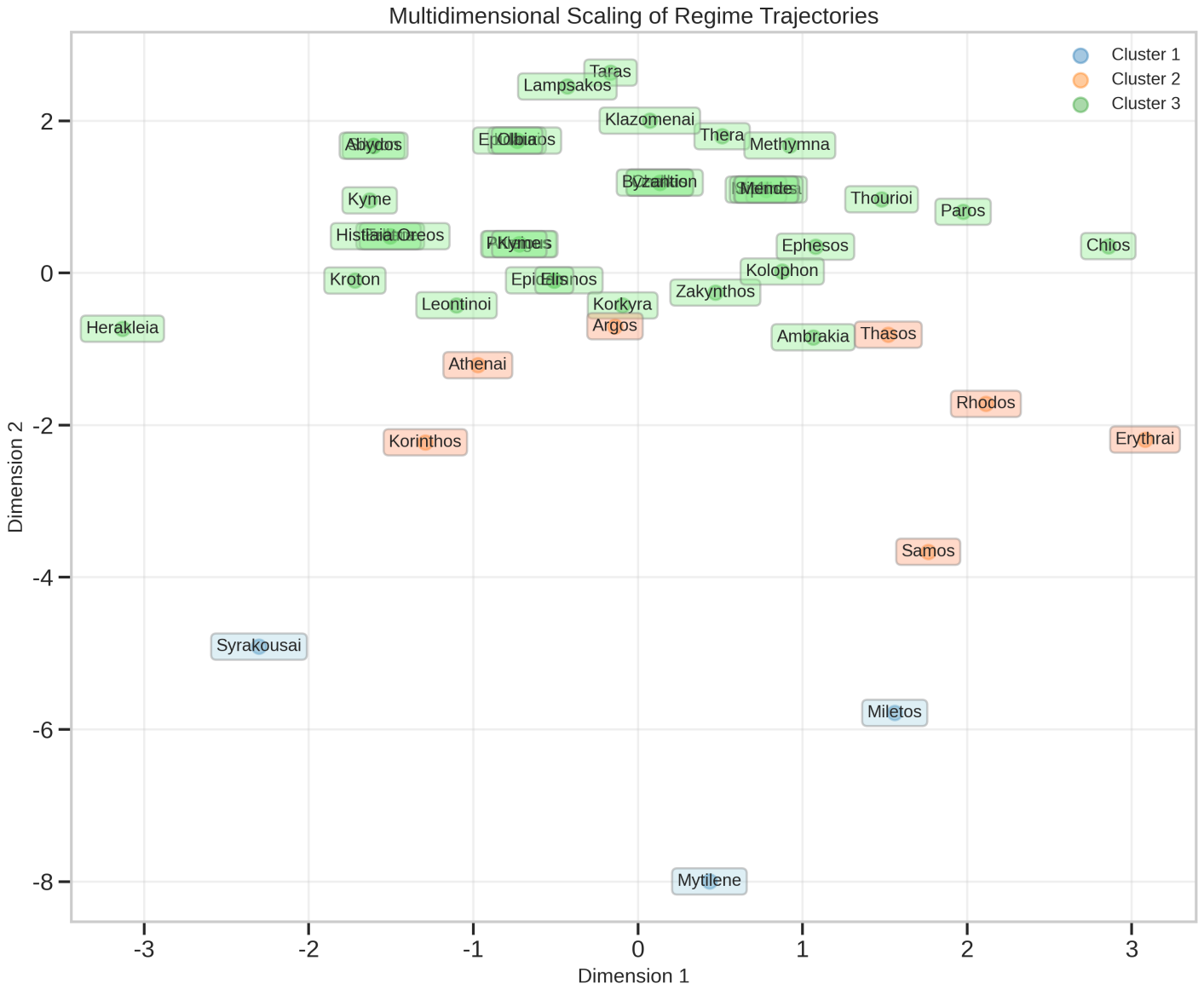


Node's distances correspond (approximately) to the dissimilarity of the trajectories measured as **Levenshtein distances**

Clustering of poleis trajectories based on Ward's hierarchical clustering



MDS and Clustering of 48 Poleis Trajectories



Conclusion and Outlook

1. Applying network analysis to this previously underexplored network type opens up **new perspectives for studying long-term political processes**—complementing traditional time-series approaches.

2. This approach creates interfaces with **evolutionary and complexity theory**. The aim is to deepen our understanding of developmental dynamics in complex political systems and to contribute a new perspective to debates on *Political Development* and *Transitology*.

3. The transition network approach can be combined with other methods in a mixed-methods approach. From a qualitative perspective, it can be combined with **process tracing**; from a quantitative perspective, it can be combined with **REMs or TERGMs**, depending on the size of the data sets.

References

- Finley, Moses I. (1985). *Democracy Ancient and Modern*. London: The Hogarth Press.
- Hansen, Mogens Herman and Thomas Heine Nielsen (2004). *An Inventory of Archaic and Classical Poleis*. Oxford: Oxford Universitv Press.
- Podes, Stephan (1991). “Polybios’ Anakyklosis-Lehre, Diskrete Zustandssysteme und das Problem der Mischverfassung”. In: *Klio* 73.73, pp. 382–390. (Visited on 11/20/2023).
- Schneider, Volker (2024). *Advanced Introduction to Political Networks*. Cheltenham, UK: Elgar.
- Tilly, Charles (1984). *Big structures, large processes, huge comparisons*. New York: Russell Sage Foundation.