# PG-ABM: An Agent-based Model of Politogenesis

## Abstract

Politogenesis concerns about how and why polities are originated. In this study we first discuss a formal theory of politogenesis, and then propose a model (agent-based simulation) to help us explore how the most primitive socially complex polities, i.e. chiefdoms, can emerge from simple non-complex societies.

## Introduction

Members of simple, non-complex societies are socially unranked (egalitarian), do not have centralized managements, and their social relations are primarily based on kin-relations. On the other hand, in chiefdoms (i.e. the simplest complex societies) political and economic power is exercised by a single person (chief) who is supported by a group of persons where each rules local communities. Therefore, chiefdoms are socially ranked, have a specialized management, and the social relations are non-kinship based.

The core questions in the politogenesis are three:

* How the requirements are met (potential attained) for a simple society to start evolving into an initial social complexity?
* What are the characteristics of these requirements (elements of the potential)?
* Under what circumstances can the potential be realized (and hence the initial social complexity is emerged)?

The goal of our model is to help us answering these questions.

## Literature Review

### Social Theories of Politogenesis

Most of the social complexity theories are to explain the endurance, sustainability or collapse of societies (chiefdoms, states or empires) while leaving out the initial emergence of the early polities, i.e. chiefdoms (Cioffi-Revilla 2014). We first see the discussion on the origins of polities in the social contract theory of Rousseau (Rousseau 1762). Some other narrative and formal social theories of politogenesis have also been introduced since then. In this study we build an agent based simulation model on Cioffi’s formal theory (Cioffi-Revilla 2014).

### Social Simulations related to Politogenesis

Reviewing a list of simulations such as Anasazi model, Southwestern Pueblo societies, Aspero chiefdom, etc.

## Cioffi’s Formal Theory

This study is primarily based on Cioffi’s Formal Theory. Cioffi in his article introduces nine requirements for a simple society to become chiefdom (Cioffi-Revilla 2014). In the next chapter we describe and synthesize these requirements, and later discuss how to model them in our simulation:

* Kinship knowledge
* Communicative ability
* Normative sociality
* Social identification ability
* Environmental knowledge
* Knowledge of normal vs. rare events
* Food procurement ability
* Homicidal ability
* Collective action ability

### Definitions and Concepts

#### Kinship knowledge

Definition goes here…

## Model Description

*The event-based causal structure of Cioffi’s theory captures the ontology of politogenesis in a way that is closer to agent simulation than the systems dynamics of differential equation-based systems.*

*The environment consists of a biophysical landscape inhabited by a kin-based society. The initial agent rules are based exclusively on knowledge and skills such as those specified by conditions 1–9. Situational changes activate agent decision-making and produce decisions, behaviors, and emergent patterns that generate politogenesis.*

*Theory can be employed to predict precise locations for politogenesis, based on prior causal potentials, and can be tested: Locations with highest potentials should coincide with the four politogenic regions known from archaeology (the Levant, China, Peru, Mesoamerica) as well as related areas that may not have generated states until relatively recent times but did generate chiefdoms (e.g., North America, Amazonia, subsaharan Africa, south Asia, and Europe).*

### Assumptions

## Model Outline

### Agents

#### Attributes of Agents

### Environment

#### Attributes of Environment

## Conclusion

## References

Cioffi-Revilla, Claudio  
 2014 A Formal Theory of Politogenesis: Towards an Agent Simulation of Social Complexity Origins. SSRN Scholarly Paper, ID 2429322. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=2429322, accessed November 6, 2014.

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