

# **Complex Network Analysis of Global Conflicts**

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# Overview

**Data Source**

**Network Construction**

**Degree Distribution**

**Network Properties**

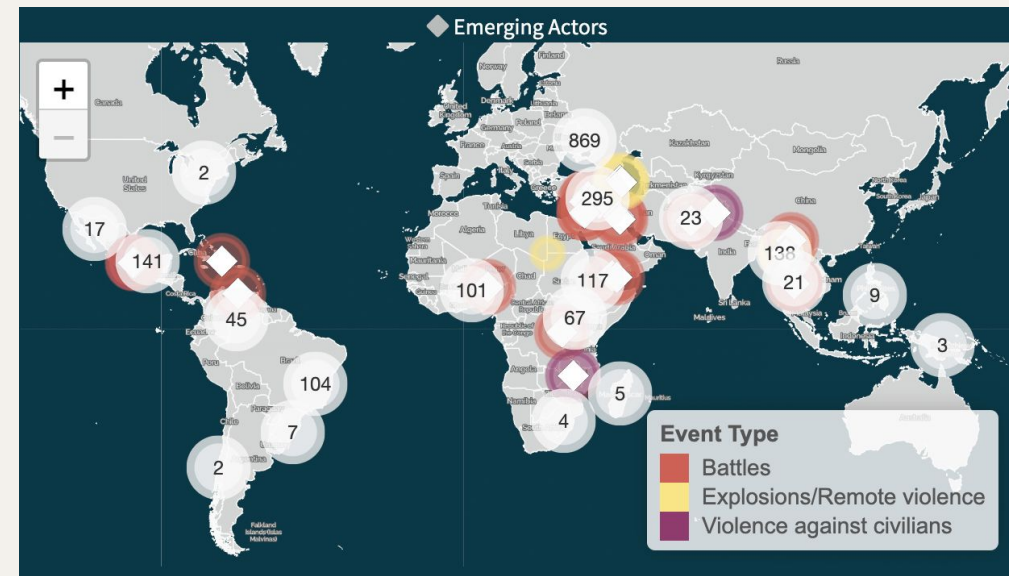
**Visualization**

**K-Core Decomposition**

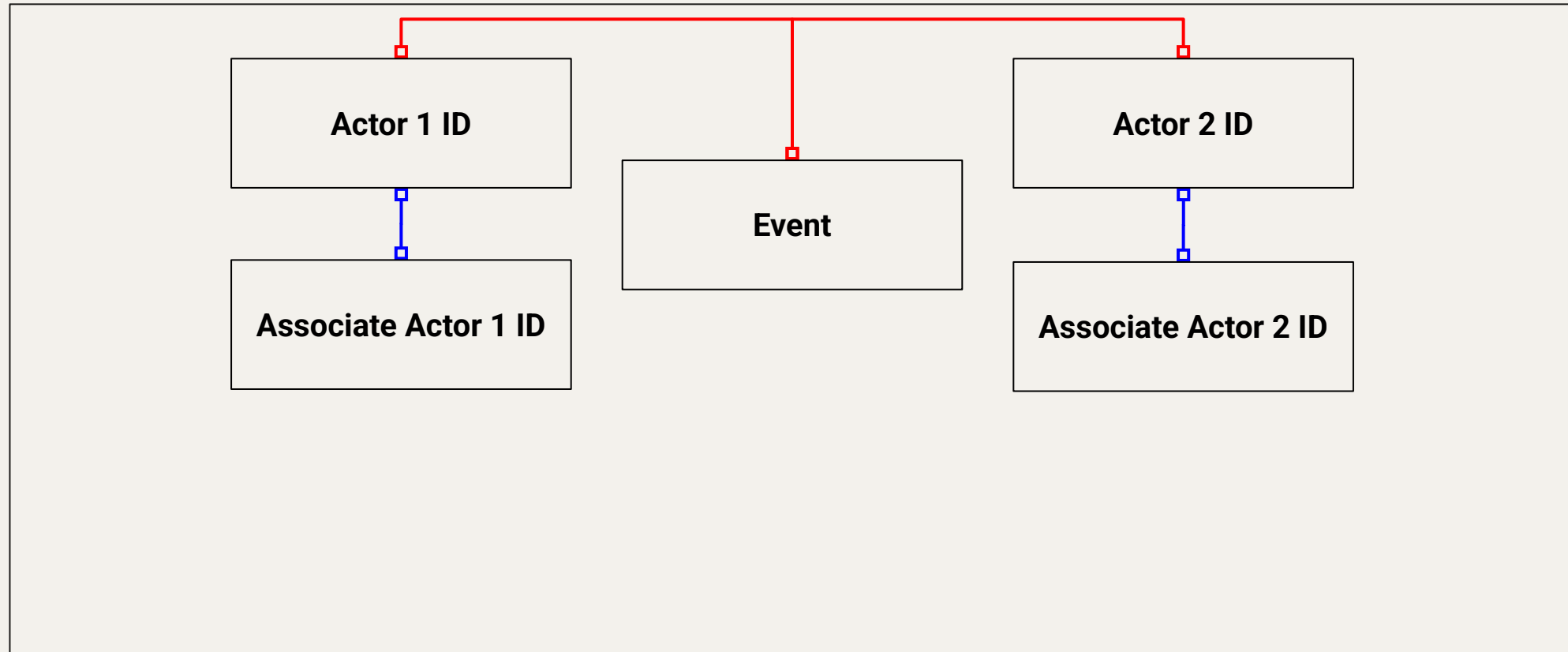
# Primary Data Source

## Armed Conflict Location Event Data

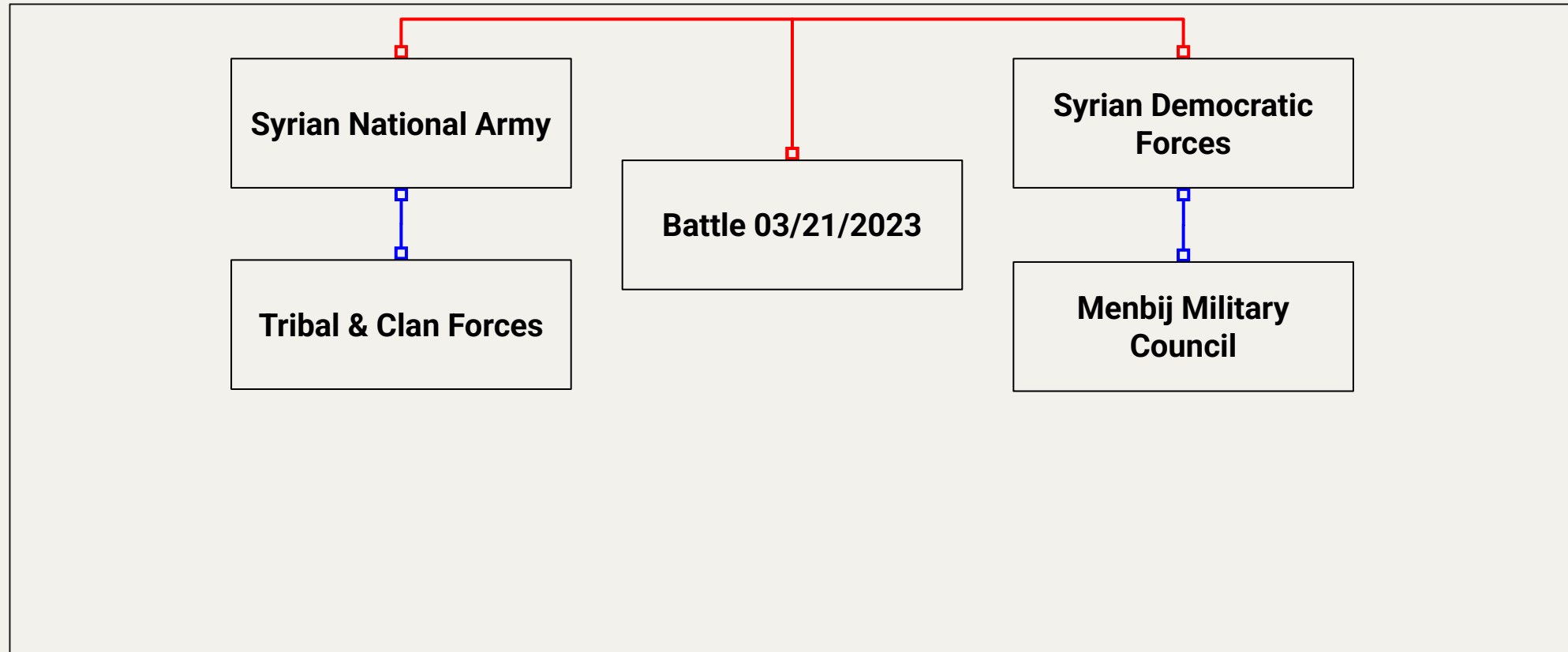
- International, non-aligned, non-profit, living database of global armed conflicts, crises and civil unrest
- Widely used by UN, IMF, WHO, Governments etc
- Each event tagged with actors & assisting actors



# Actors & Associate Actors



# Example



# Constructing Networks

## Middle East Region

- Allies Network: nodes represent actors, edges are created by events in which actors are allied
- Enemies Network: nodes represent actors, edges are created by events in which actors are NOT allied
- Network Size: 7989

## Hypothesis

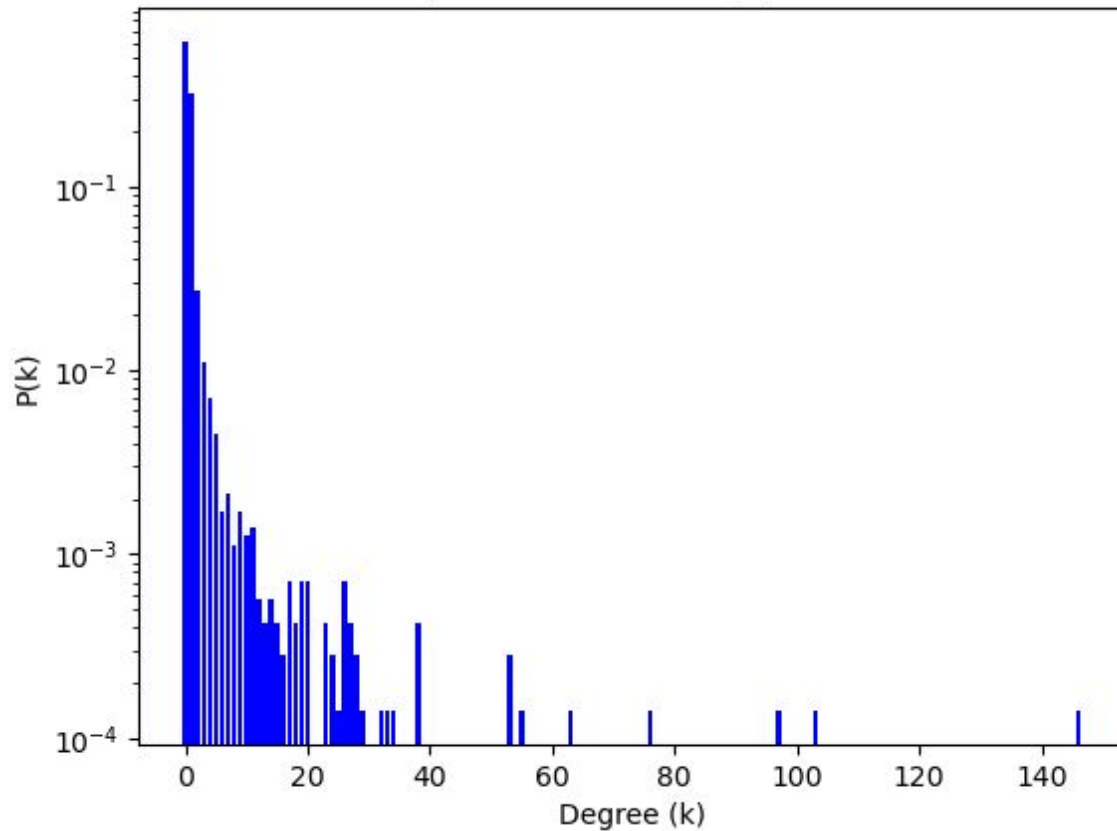
- International Relations – Alliance Theory  
Alliances form bilaterally in response to threats

**How do the network properties of Allies and Enemies in ME conflicts compare?**

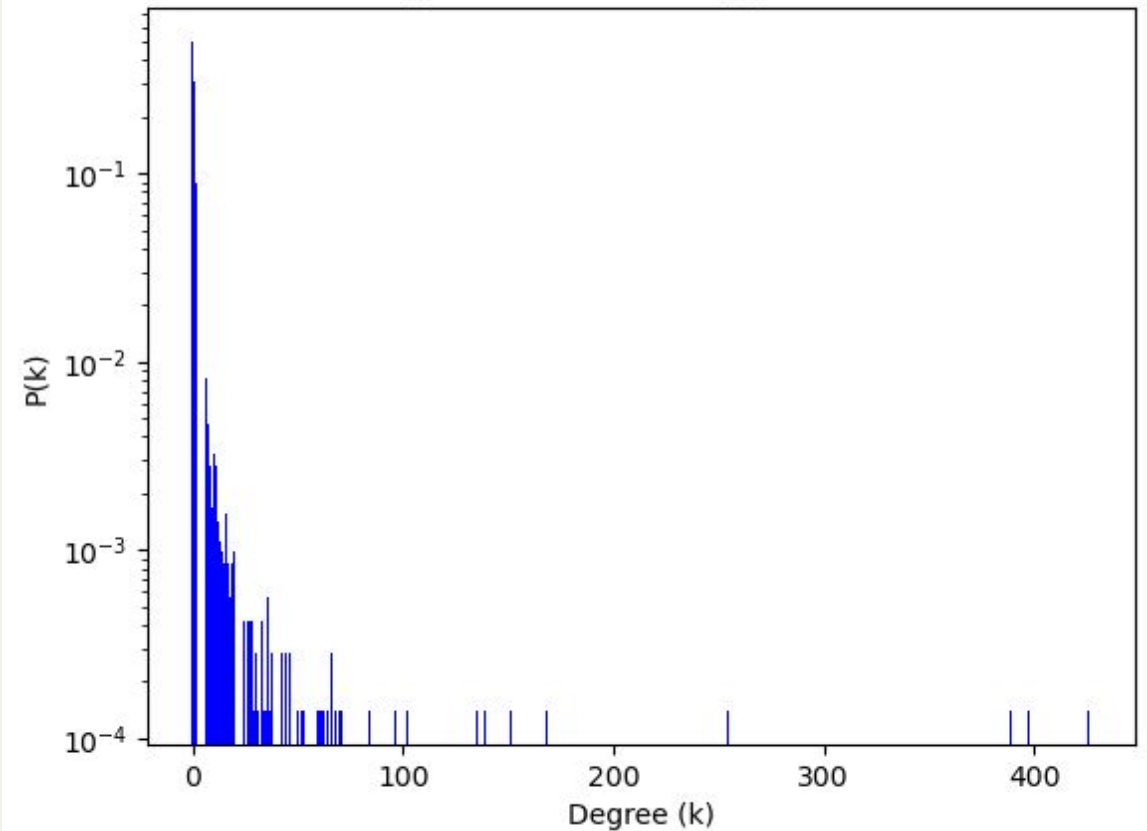


# Degree Distributions

Degree Distribution  $P(k)$ , Allies

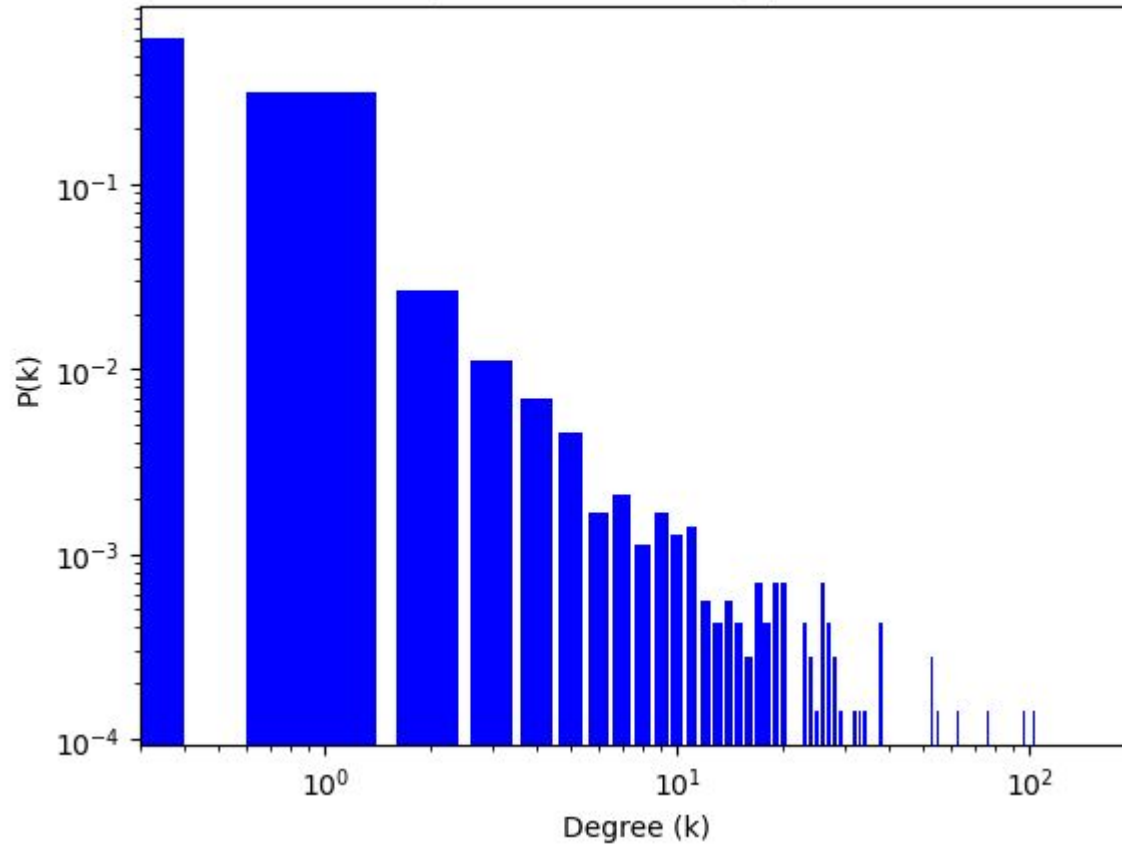


Degree Distribution  $P(k)$ , Enemies

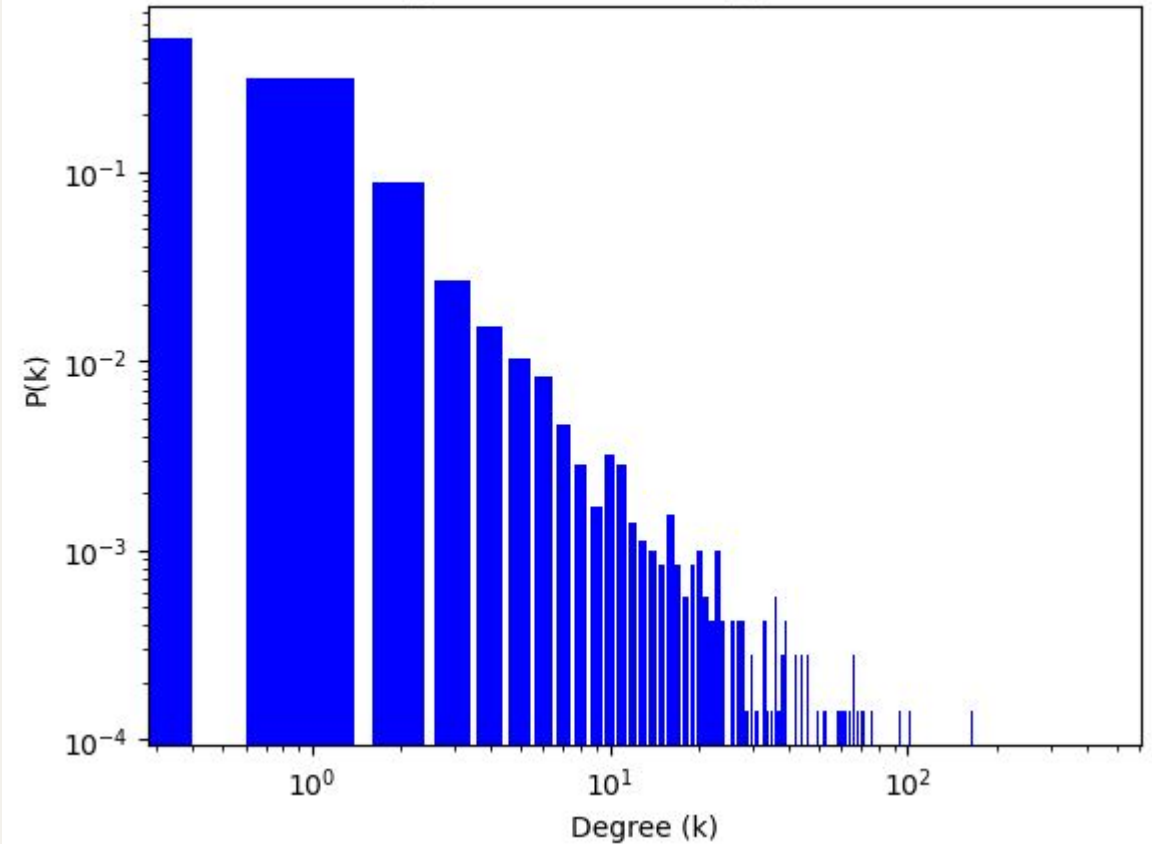


# Log - Log Bar

Degree Distribution  $P(k)$ , Allies



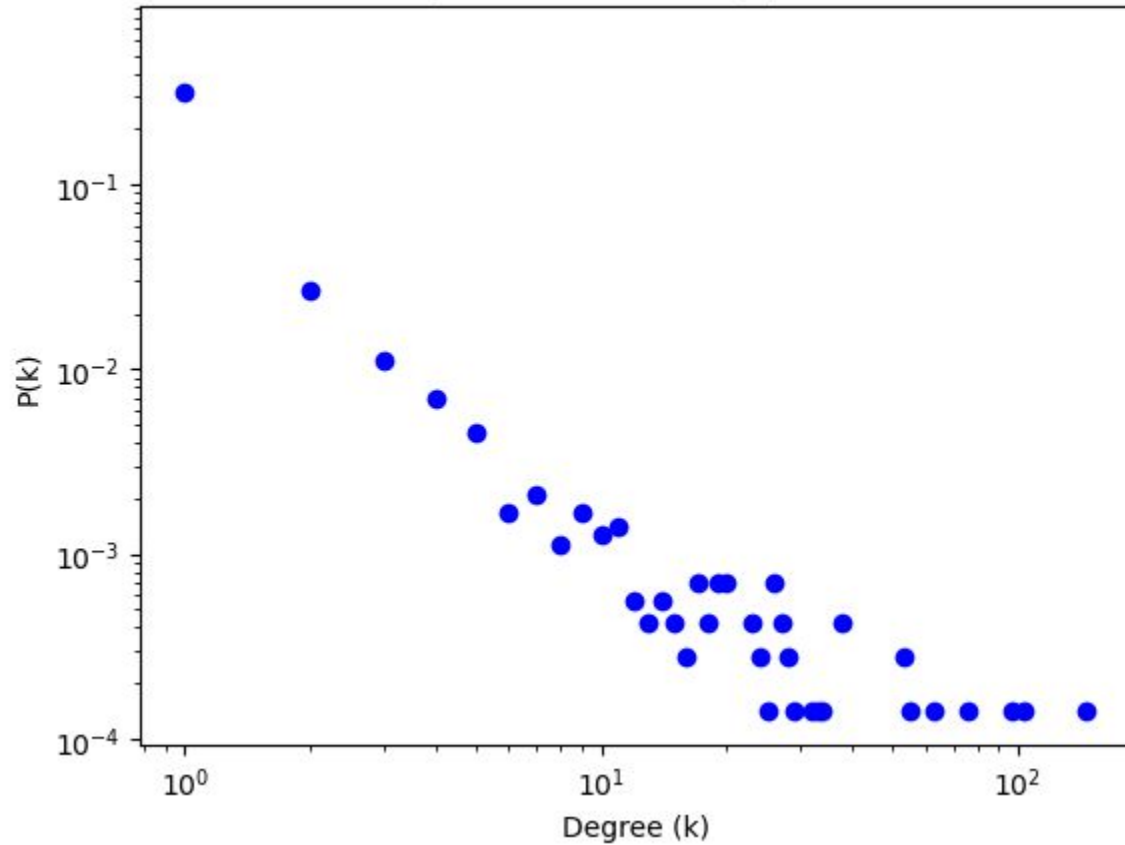
Degree Distribution  $P(k)$ , Enemies



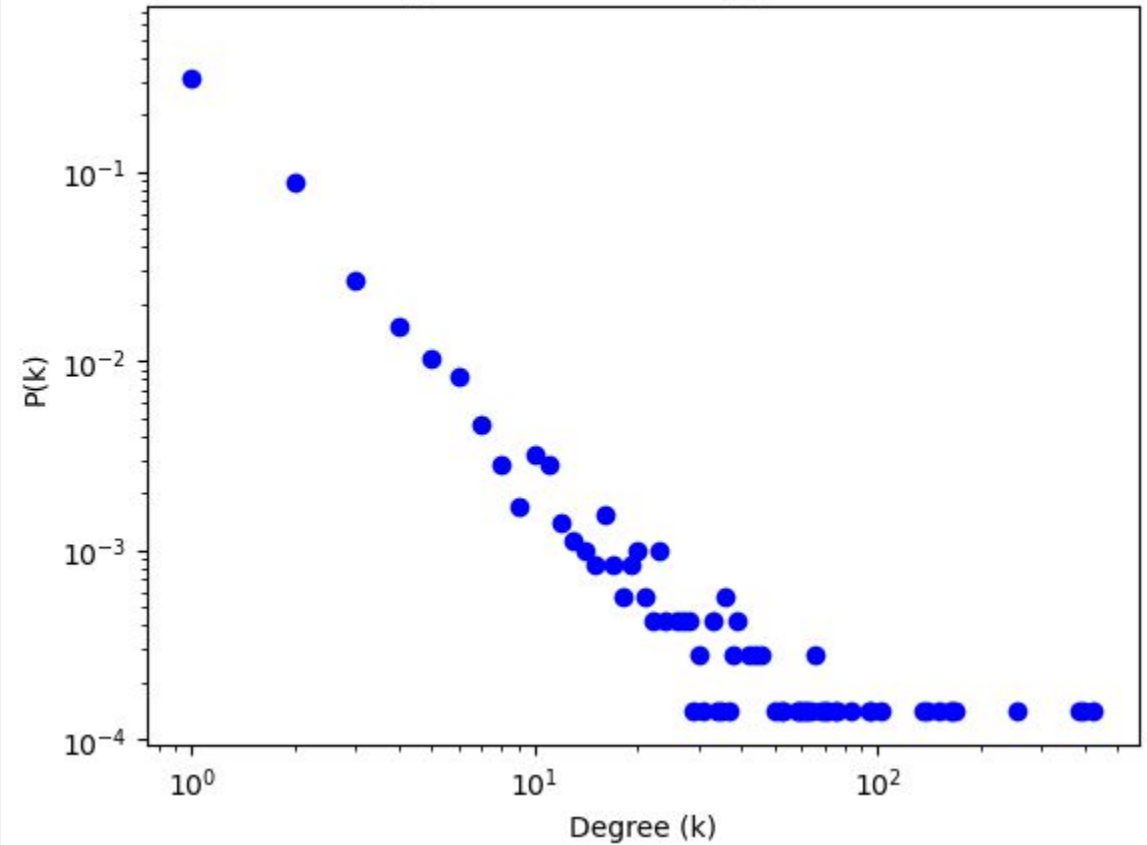


# Log - Log Scatter

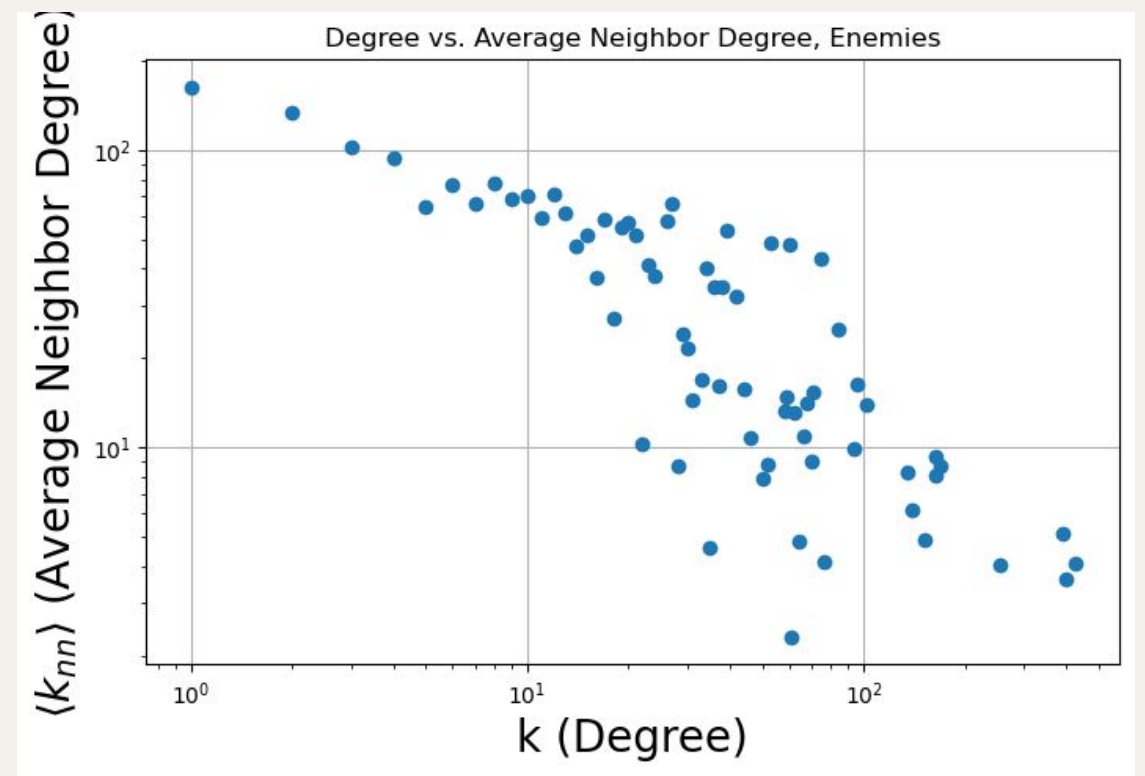
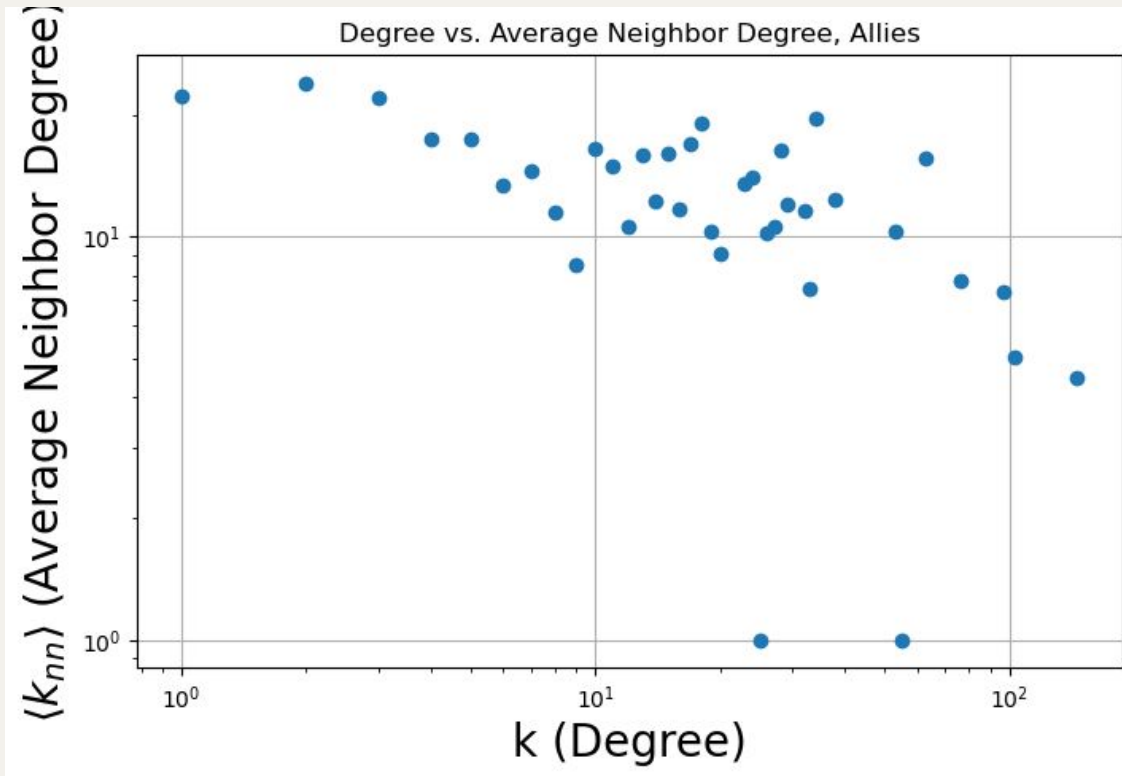
Degree Distribution  $P(k)$ , Allies



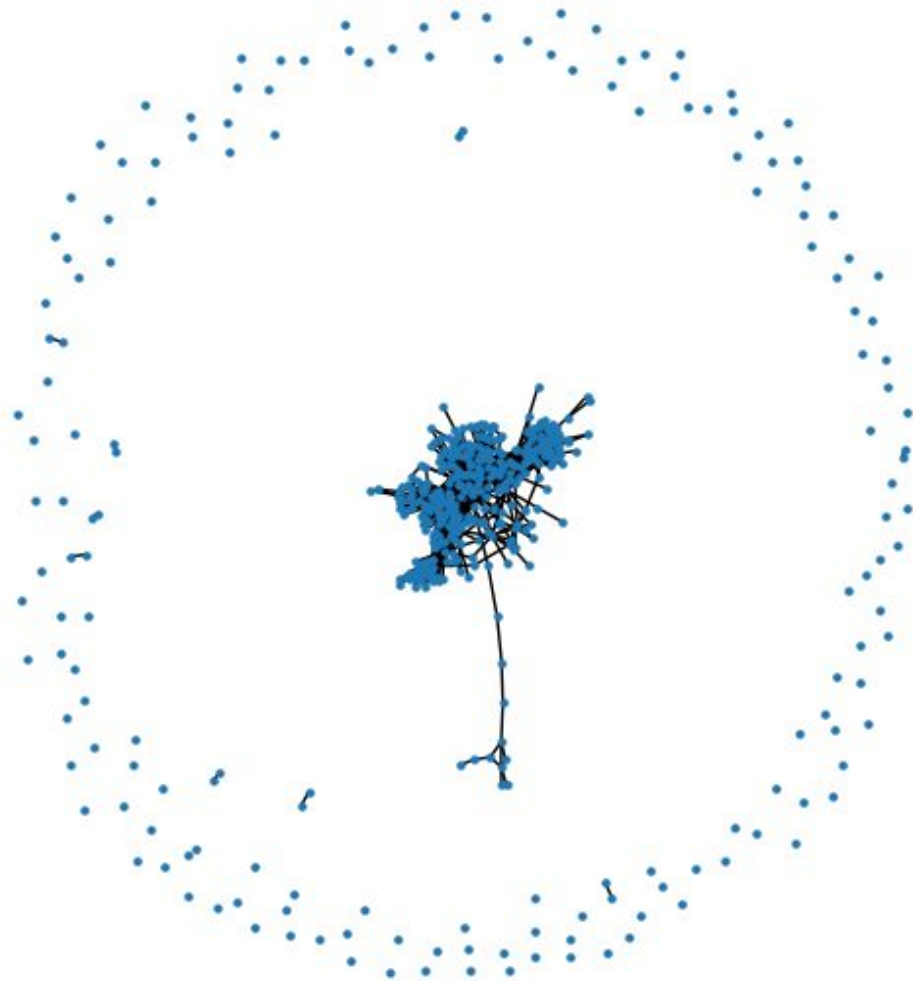
Degree Distribution  $P(k)$ , Enemies



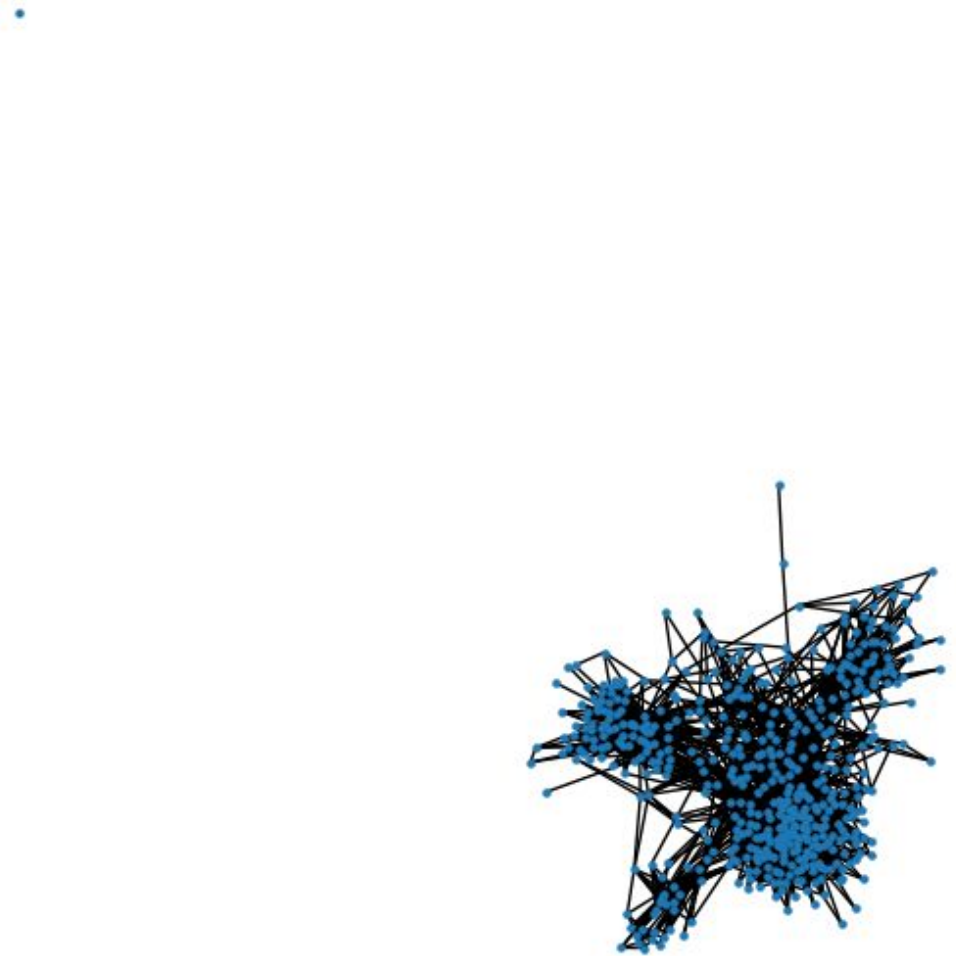
# Average Neighbour Degree



Top 500 most connected nodes in the allies network



Top 500 most connected nodes in the enemies network

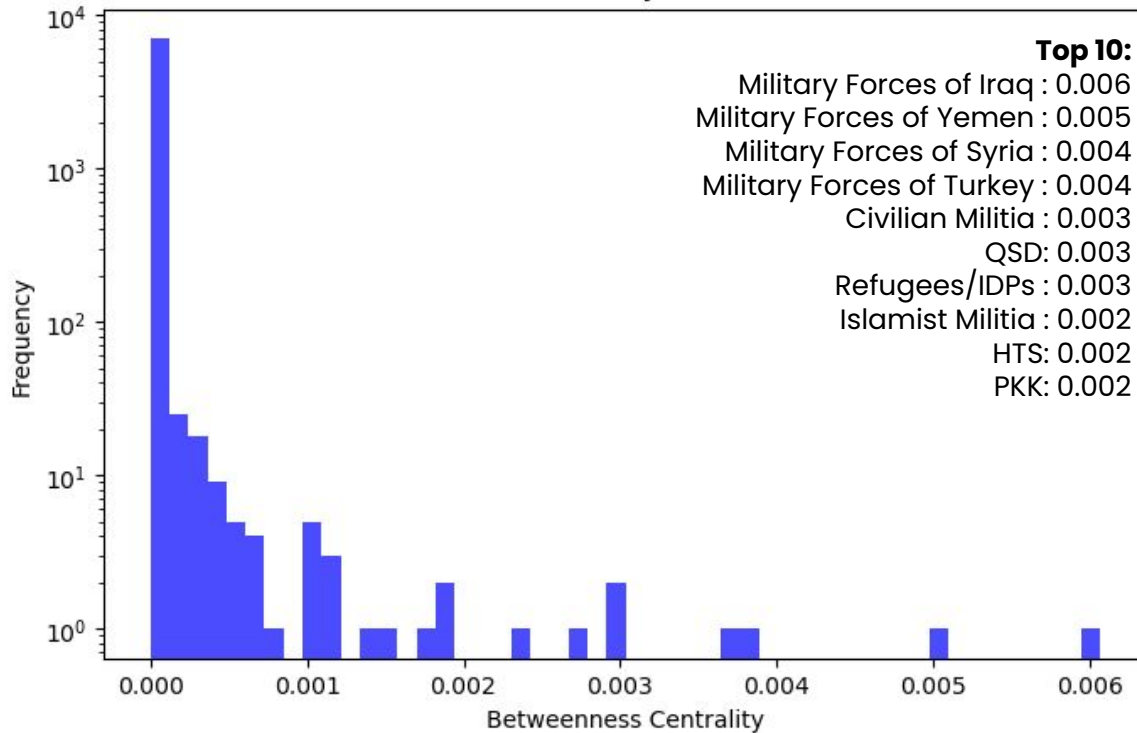


Average Clustering Coefficient: 0.0188

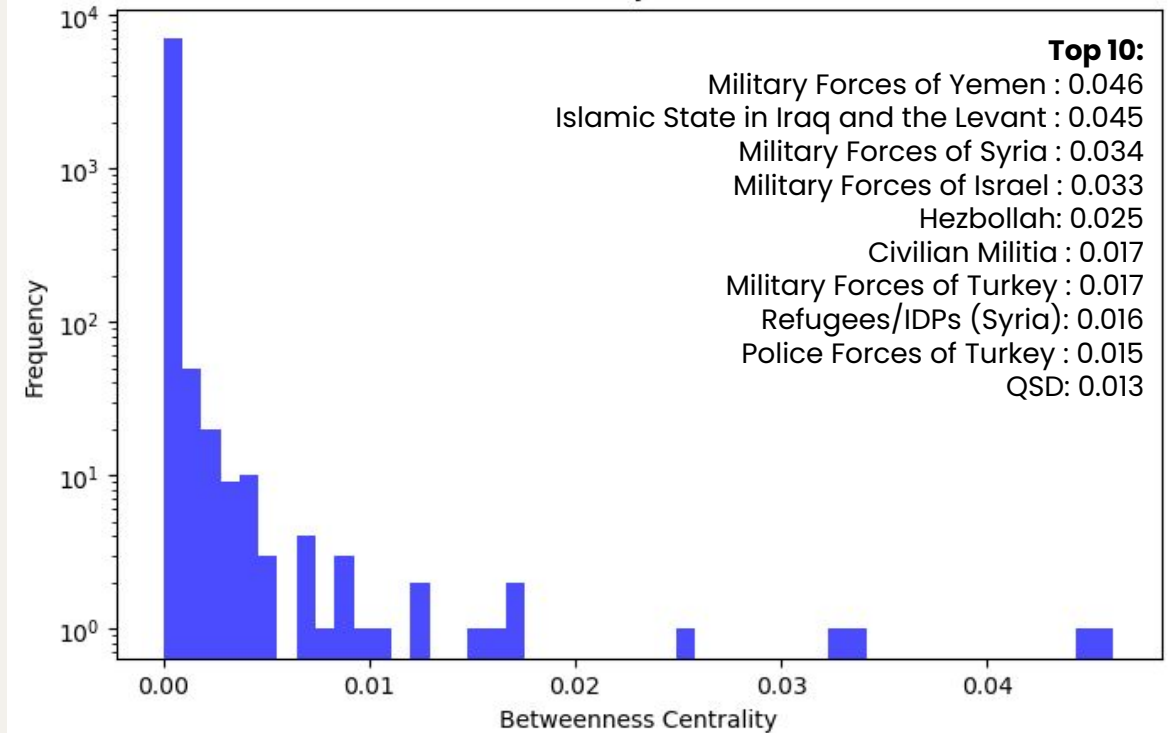
Average Clustering Coefficient: 0.0191

# Betweenness Centrality

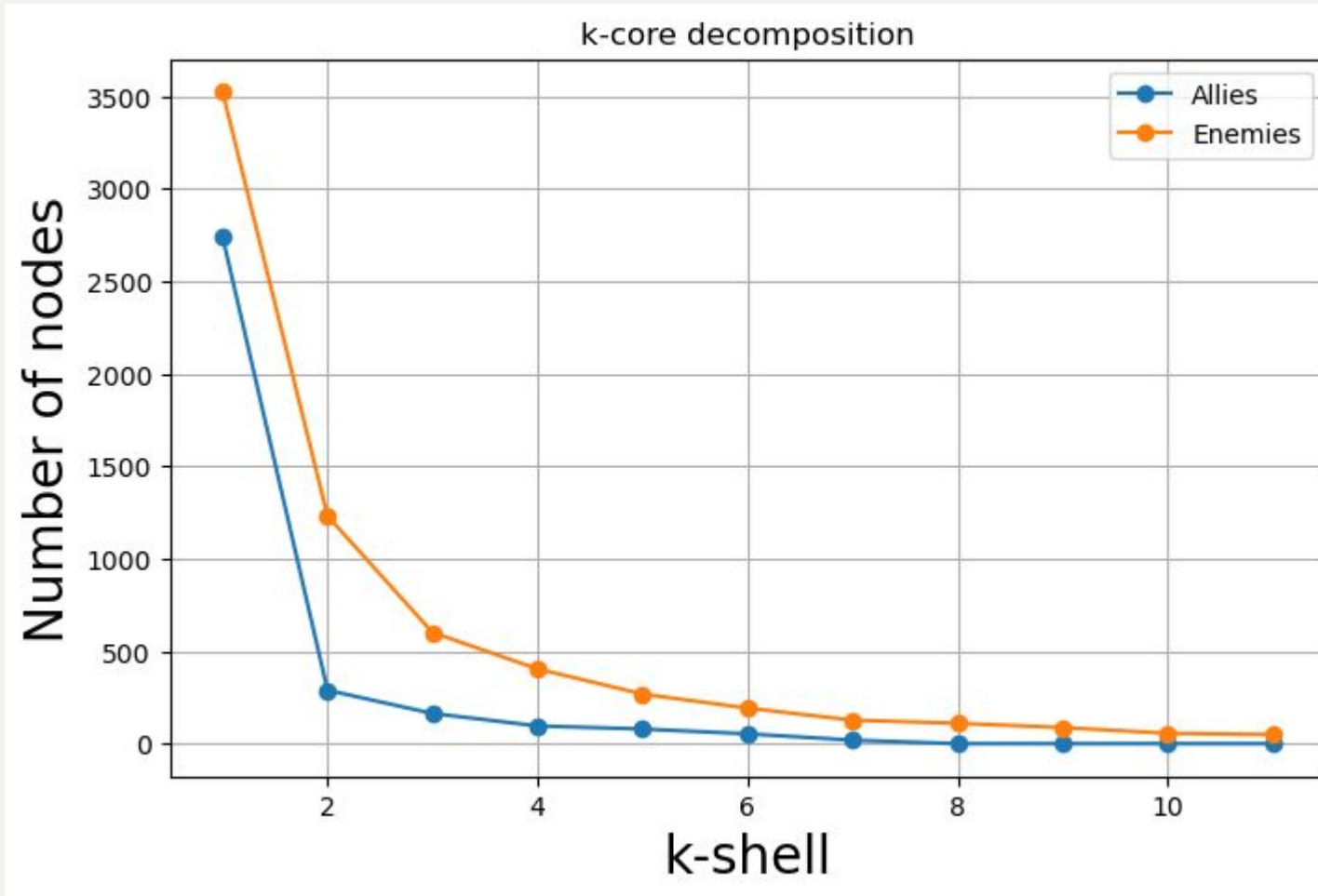
Betweenness Centrality Distribution, Allies



Betweenness Centrality Distribution, Enemies



# K-Shell Decomposition



# Citations

- Packages: Pandas, Numpy, Matplotlib, Networkx, powerlaw, scipy
- ACLED ME Dataset
- Presentation Template: [SlidesMania](#)