A new proposed data-driven index to monitor conflicts

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Monitoring for global instability I

Two approaches – *Sundberg and Melander (2013)*

- individual diplomatic and political knowledge

- data science and technology

The two approaches are not mutually exclusive!

First approach:
policymakers and stakeholders rely on their diplomatic network and news gathering.

Monitoring for global instability II

Second approach:
data collection and analysis

Requirements:
- open source
- accessibility
- reliability (human-supervised)
- constantly updated

Monitoring for global instability III

Data-driven approach: ACLED (Armed Conflict Location and Event Data) – *Raleigh et al. (2023)*

Largely adopted for studies in the wars or conflict context — *Hegre et al. (2012); Halkia et al. (2020)*

- **6 main classes**: Battles, Protests, Riots, Explosions/Remote violence, Violence against civilians, and Strategic developments.
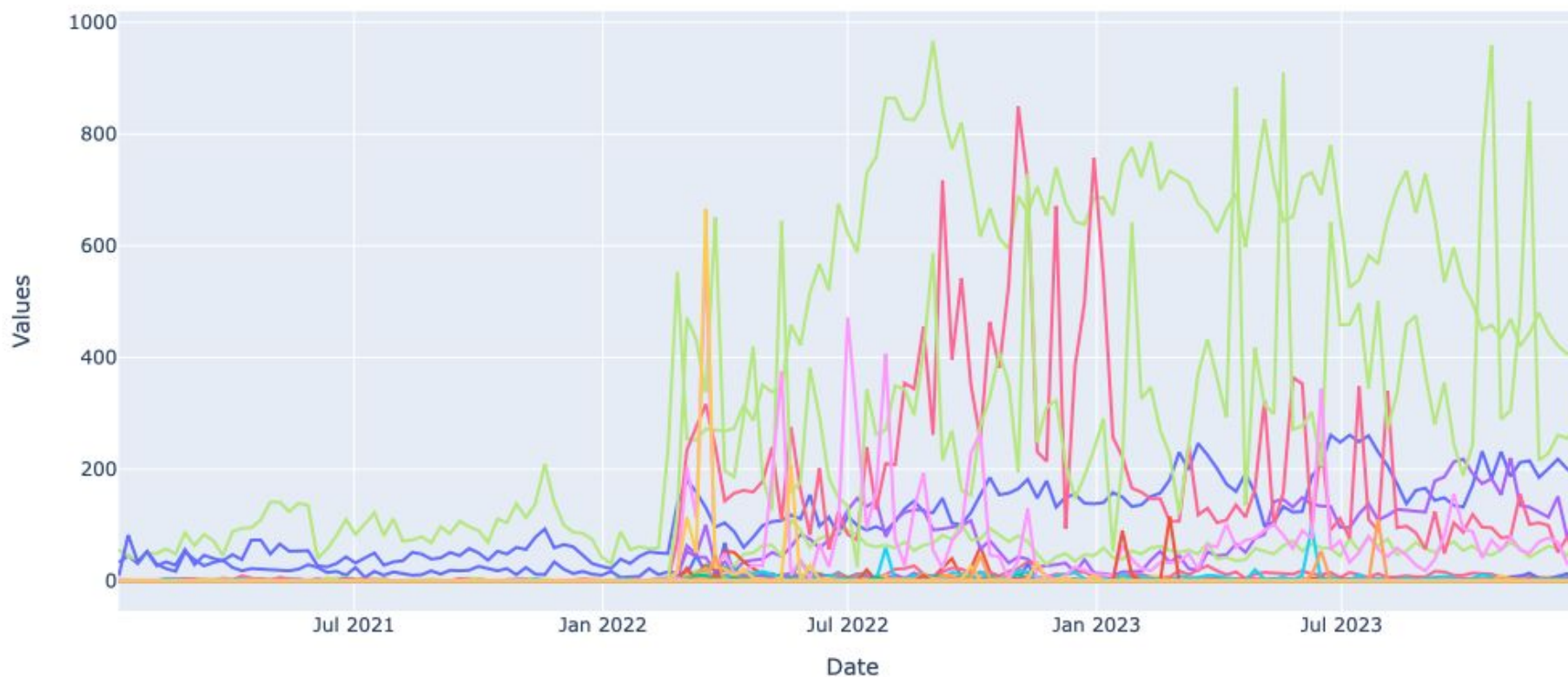
- These are further divided into **25 sub-events.**

ACLED

Monitoring for global instability IV

ACLED Data Over Time

Monitoring for global instability V
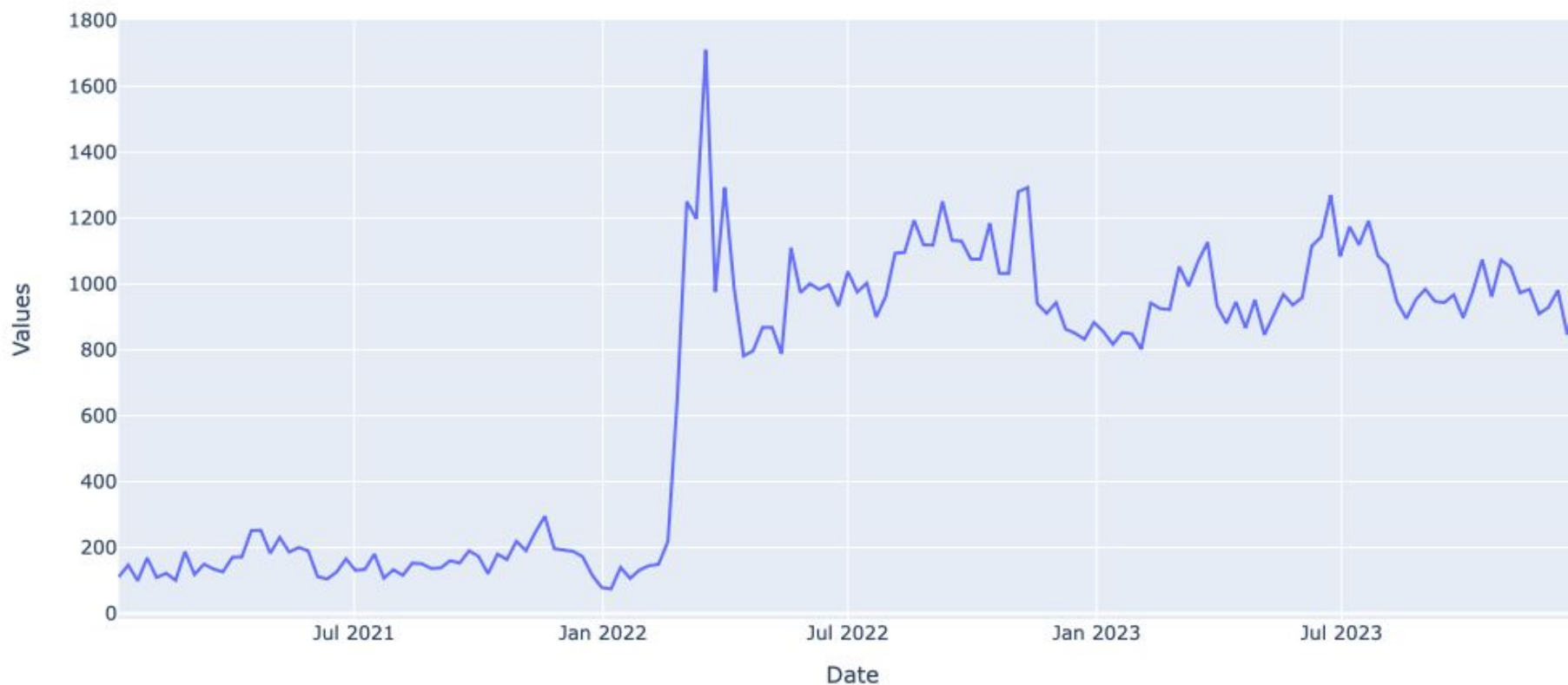

ACLED Data Over Time
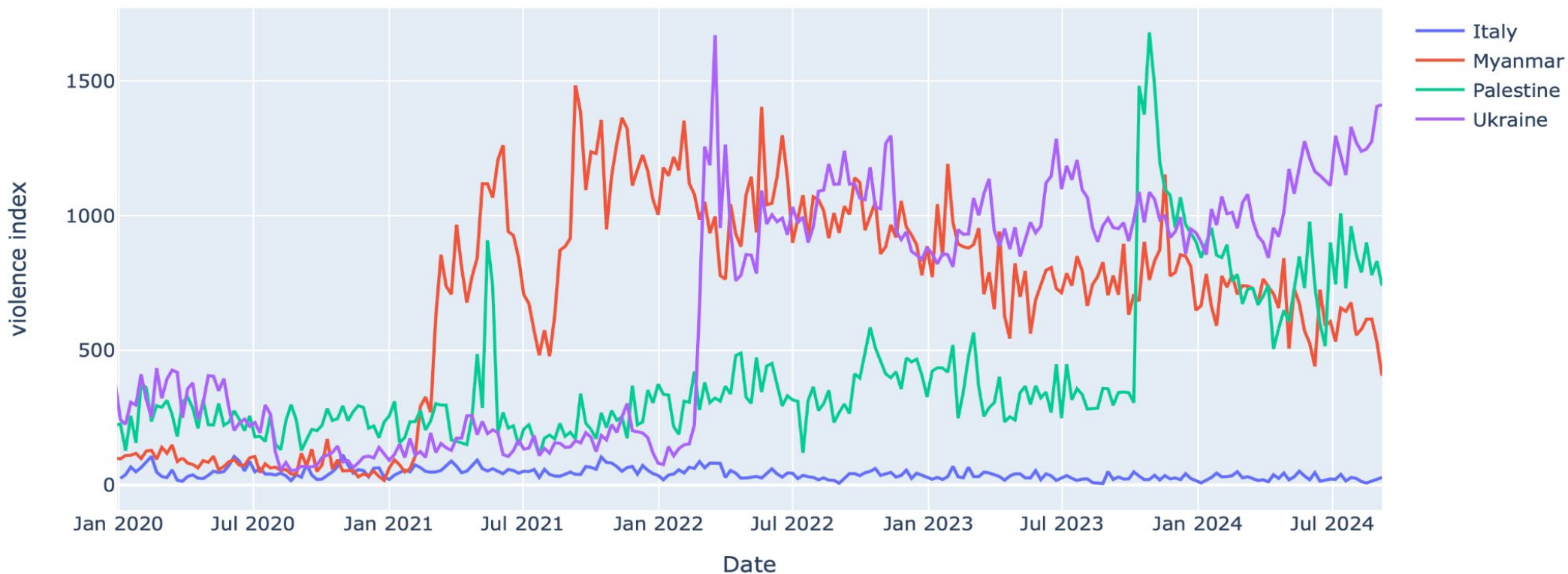
Monitoring for global instability V

Goal: an index to monitor different intensities of violence on a temporal and geographic level.

Data I

Dataset of armed conflicts, civil wars, and violent demonstrations

A new ad hoc dataset defined through web scraping techniques.

Each historical event is marked by the following information:
- **Precise location:** identifies the geographic extent of the event
- **Type:** armed conflicts, civil wars or violent demonstrations;
- **Start date, End date:** start and end date (*present* if still in progress);
- **Description:** brief description of the historical event.

Data II

Israel–Hamas War

Precise Location: Gaza Strip and Israel
Type: Armed Conflict
Start Date: 07/10/2023
End Date: Present
Description: A war that began with a surprise attack by Hamas on Israel, followed by a massive Israeli bombing campaign and invasion of Gaza. The conflict has resulted in significant civilian casualties, extensive destruction in Gaza, and global calls for a ceasefire. The war has also led to regional and international tensions, including accusations of genocide against Israel.

Data III

Focus: temporal progression of ACLED variables, grouped:
- on a weekly basis
- by sub-event
- by fatalities per sub-event

country	event_date	Armed clash	Air/drone strike	...
Afghanistan	2017-01-06	155	13	...
Afghanistan	2017-01-13	140	10	...
...	...	...	...	...

Methods I

Data normalization using **Min-Max** method — *Mazziotta and Pareto (2020), OECD (2008).*

$$y_{i,j,k} = \frac{x_{i,j,k} - \min(x_j)}{\max(x_j) - \min(x_j)},$$

where *i* represents the countries, *j* denotes the variables, and *k* indicates the weeks.
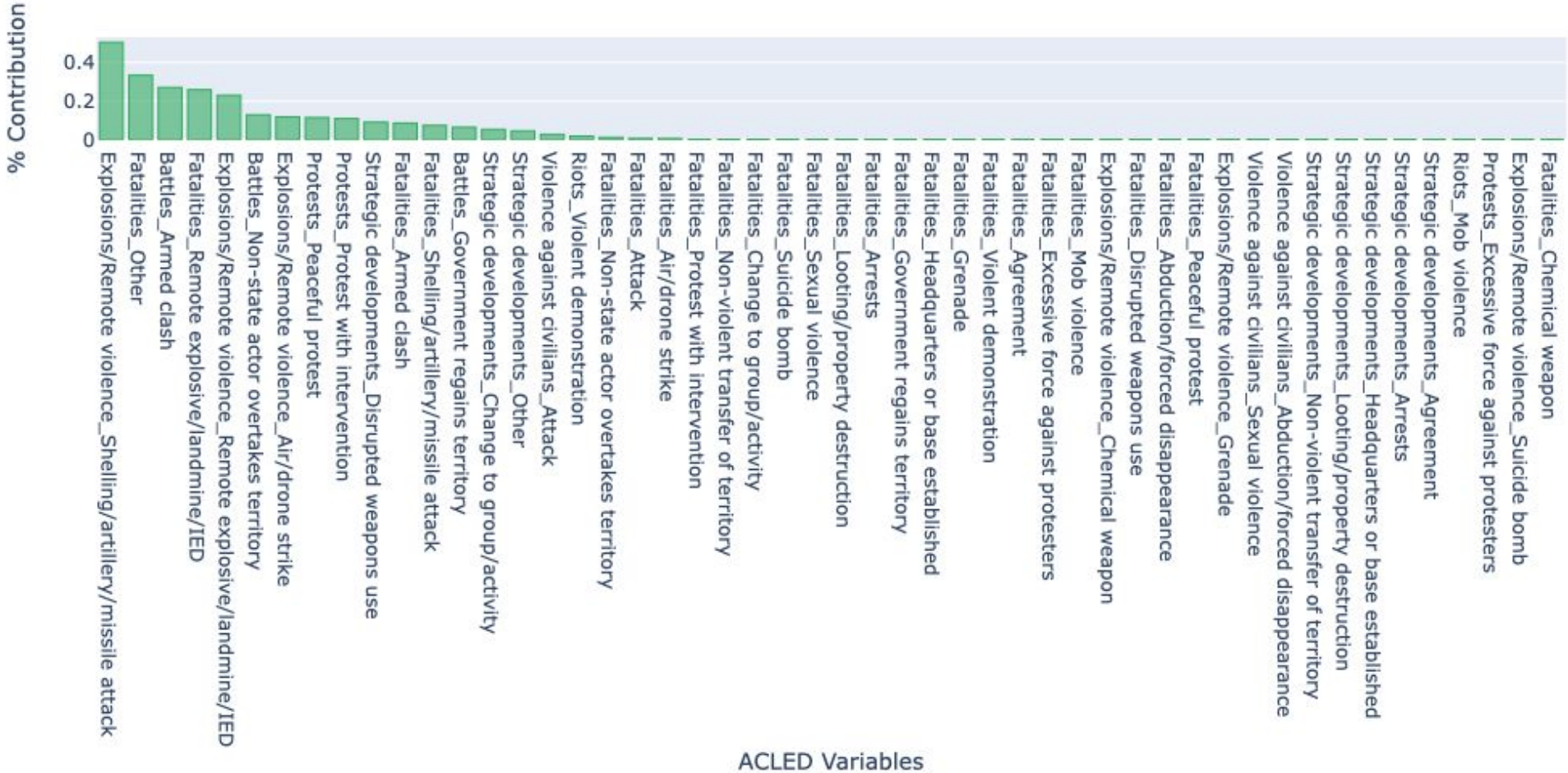
Methods III

Figure: the contributions of each variable w.r.t the Russian invasion of Ukraine.
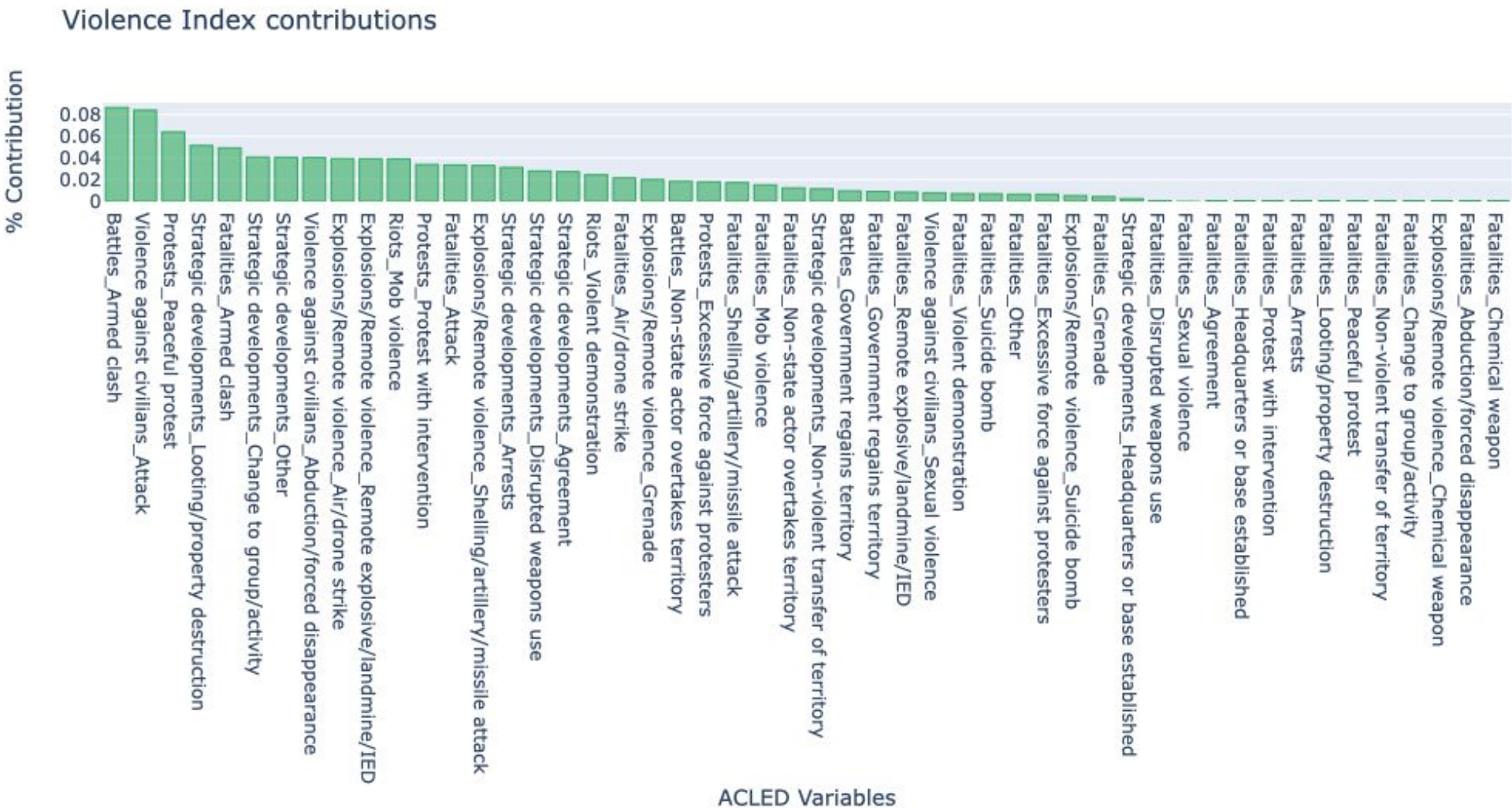
Methods III

Figure: the final contributions of each variable

Methods V

Summation of weekly contributions to obtain the VI, reflecting the intensity of unrest events.

$$VI_{i,j} = av_{i,j}^{(1)} \times cav^{(1)} + av_{i,j}^{(2)} \times cav^{(2)} + ... + av_{i,j}^{(n)} \times cav^{(n)} \times 1000$$

where: $av^{(n)}$ is the n-th re-scaled ACLED variable, $cav^{(n)}$ is the n-th weighted contribution w.r.t. $av^{(n)}$, i is the i-th week, j is the j-th country, and n is the total number of ACLED variables.

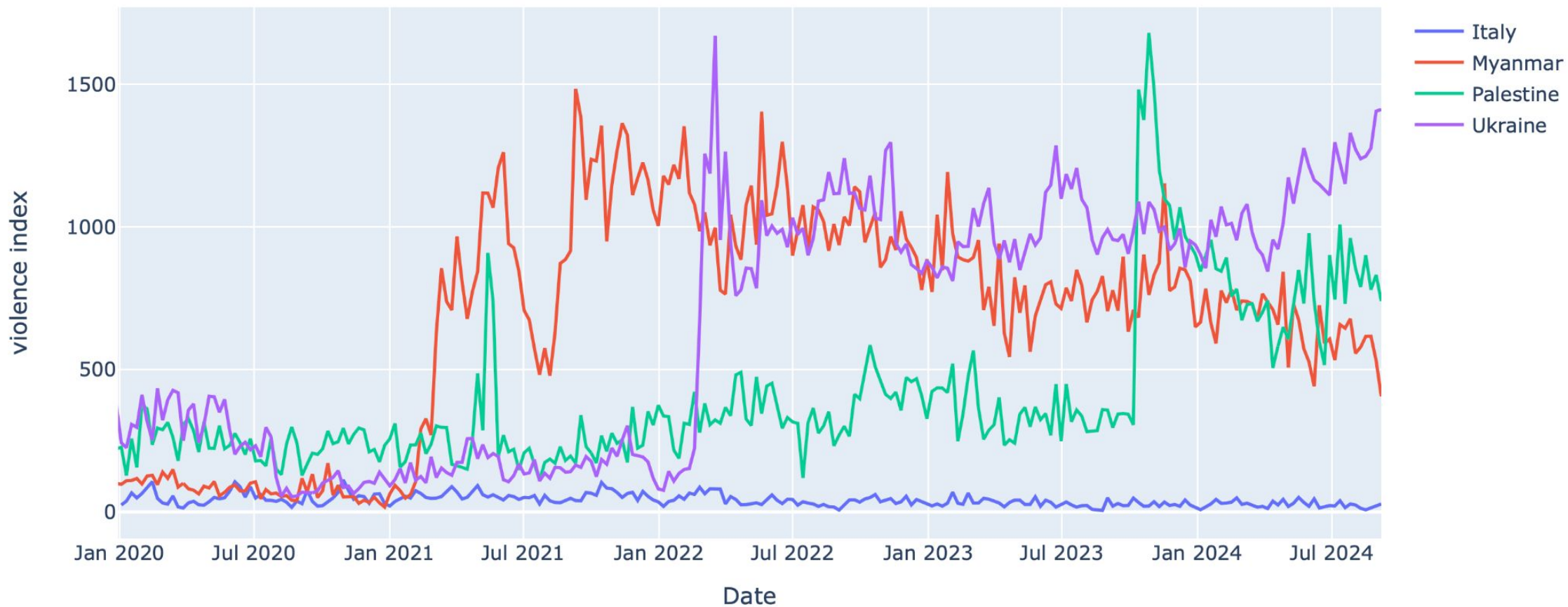# Results

Conclusion

- The VI peaks during periods of war or armed conflict, reflecting intensified events.
- The methodology provides a quantitative portrayal of unrest events.
- It identifies the variables with the most significant impact during critical periods.

Index customization and modularization

- choosing a different geographical area (city, province, ...)
- by choosing a different time window (daily, weekly, monthly, yearly, ...)

Next steps

- weighting with TF-IDF score
- more complex aggregation models

The end.