

# Visualising conflict using ACLED data:

A visualisation perspective on conflict data across a range of scales

Associated code available here: [https://github.com/antoniosfiala/UCL\\_DV](https://github.com/antoniosfiala/UCL_DV)  
 Website hosted here: [https://antoniosfiala.github.io/UCL\\_DV/](https://antoniosfiala.github.io/UCL_DV/)

## 1 | Document overview

This document outlines, in three sections, the problem with existing means of visualising conflict data (2), the dataset used (3) and subsequent design considerations to alleviate some of the identified shortcomings (4).

## 2 | Visualisation and problem summary

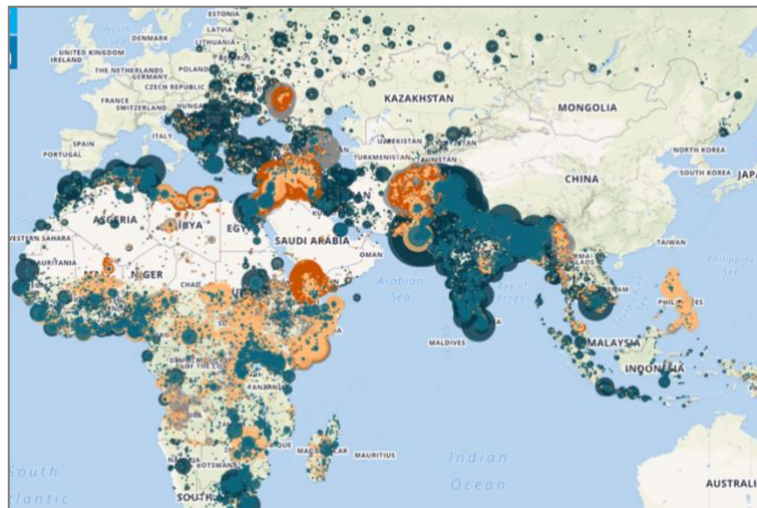
The *Armed Conflict Location & Event Data* (ACLED) database captures, geo-codes and visualises conflict events categorising them in one of six categories (ACLED, 2019; Raleigh et al., 2010).

However, as the below figures demonstrate, its content can be overwhelming/misleading when it comes to the geographical concentration of different types of conflict. This project aims to provide an alternative means of visualisation that takes steps to overcome what could be seen as shortcomings for some users. It is worth noting that ACLED published a redesigned website as this project was being worked on. Some, but not all, suggested shortcomings have been overcome in this process and can be seen in figures 2 and 3.

### 1 | Table 1 | Current ACLED visualisation shortcomings and proposed mitigations

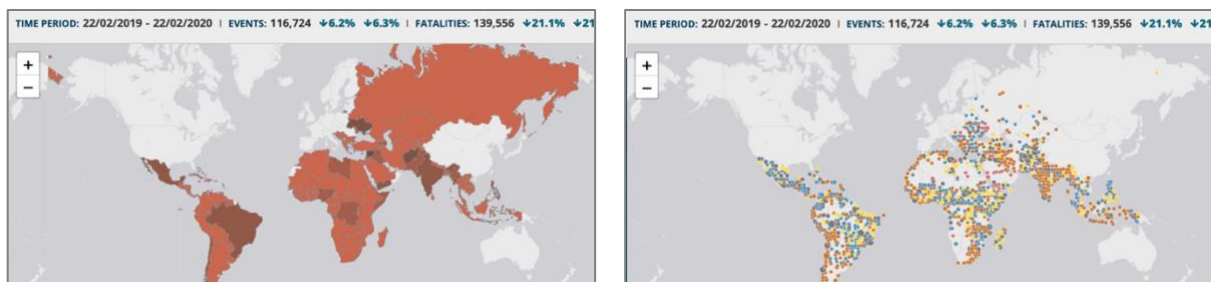
Shortcoming #	Description	Mitigation
1 – Intensity	Proportional circle technique or country-centred heatmap gives impression that larger areas are affected by conflict in contrast to reality on the ground	Use heatmapping techniques at lower zoom levels to help users understand concentration of conflict events and guide them to areas of higher intensity. Furthermore, as a heatmap aggregates its points it helps preserve the sense of locality for the events
2 – Point data	Points obstruct one another at lower zoom levels	Use opacity at zoom levels where points are likely to overlap
3 – Point data	Categorisation of events does not have intuitive visual/colour hierarchy	Select a blue-white-red divergent colour scale and clear legend to help the user understand the likely severity/impact of each category of event
4 – Background layer	All background data is assigned equal importance with the faded grey background	Emphasise elements such as borders, taking advantage of high contrast colours and change the prominence of other features/points of interest at appropriate zoom levels

### 1| Figure 1 | Original ACLED visualisation from 30.01.2020



**Shortcoming 1:** this visualisation presents a view of many parts of the world where entire countries/regions are experiencing protest or violence ... this is misleading as many conflicts are localised (i.e. Syria, Iraq) but the aggregation of data at lower zoom levels presents a misleading picture.

### 1| Figure 2 (a & b) | Revamped ACLED dashboard and global visuals from 01.03.2020

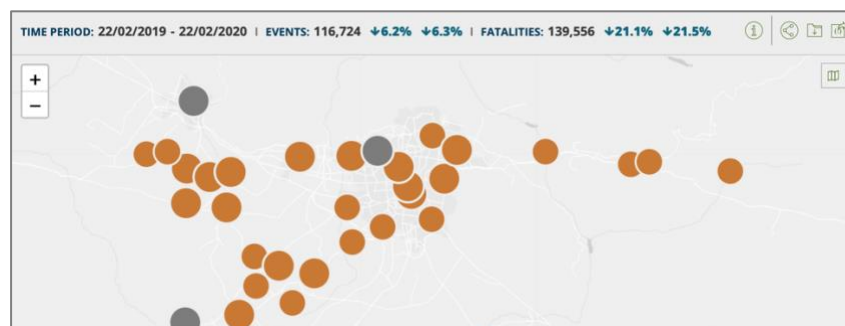


**Description:** Data is presented in one of two ways. First view (left) country heatmap showing intensity between political units which is useful in specific social science context where the precise locality of an event is not important (otherwise it reinforces shortcoming 1).

**Shortcoming 2:** Second view (right) presents a categorical view with proportional circles showcasing the number of events at each point. At lower zoom levels, the overlapping points obstruct each other and view of contextual information such as borders.

**Shortcoming 3:** There is no clear visual hierarchy amongst the categories as to which is most disruptive, although occasionally subjective an alternative colouring system could provide an easier to comprehend view of the situation. While no events are 'desirable' some can be seen as less disruptive/destructive compared to others (i.e. protest vs battle).

### 1| Figure 3 | Revamped ACLED dashboard and local (Tehran) visuals from 01.03.2020



**Description:** At greater zoom levels, the obstruction problem is alleviated, in this case riots can be seen across parts of Tehran.

**Shortcoming 4:** To better understand the spatial environment/context of these events, relevant points of interest and topography could be emphasised, for instance hospitals, urban areas or elevation.

### 3 | Source of data

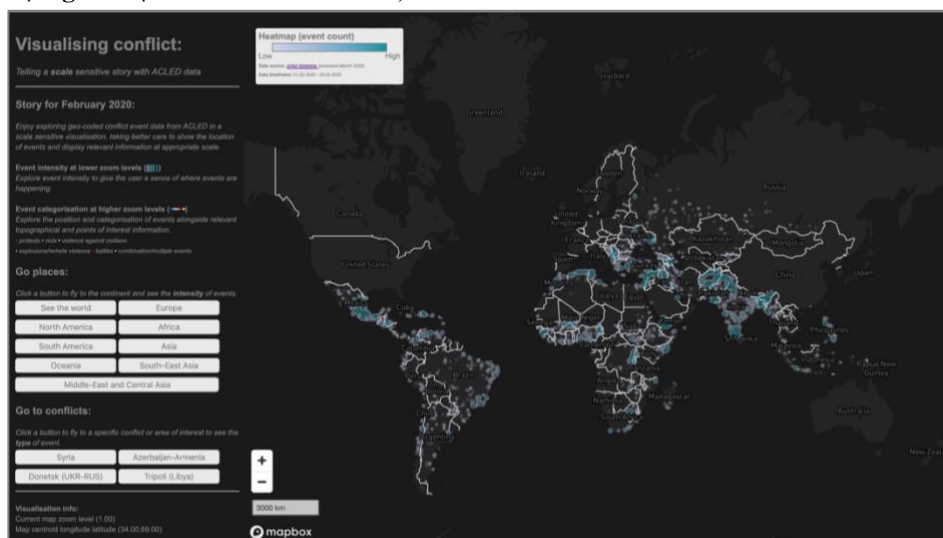
Data was sourced for the month of February 2020 and uploaded as mapbox tile set to boost rendering efficiency (mapbox, n.d.). A possible future extension can include direct API calls (as done in other works) and user determined timeframes.<sup>1</sup> Data was not processed once downloaded from source.

### 4 | Visualisation and interface design and technical approach

The proof of concept design is shown in figures 4.4-4.7. In addition to the visualisation which covers the right hand two thirds of the view, the leftmost third contains a description for the user, specifying the date to which the data pertains, the functionality, the categories of data present and pre-set buttons that can ‘fly’ the map view to pre-determined areas of potential interest. These relate to continents and key geo-political areas such as the Middle-East and South-East Asia. Furthermore, to demonstrate the change in visuals at higher zoom levels, four battleground locations were chosen that the user can equally ‘fly’ to in addition to their manual exploration.

Each of the figures presented corresponds to one of the shortcomings outlined in section 2.

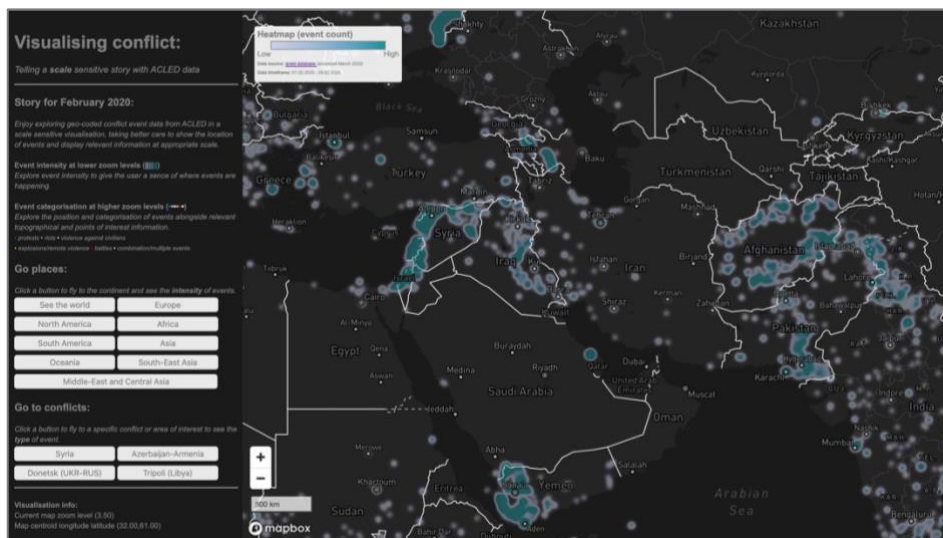
4| Figure 4 | ACLED re-visualised, world view



*Description: The world view addresses shortcoming 1 in that it uses heat rather than size of elements to demonstrate intensity of events. This way one can see that while data is available for large parts of the world, only parts of sub-Saharan Africa are experiencing conflict rather than the vast majority of the land as indicated by figure 1.*

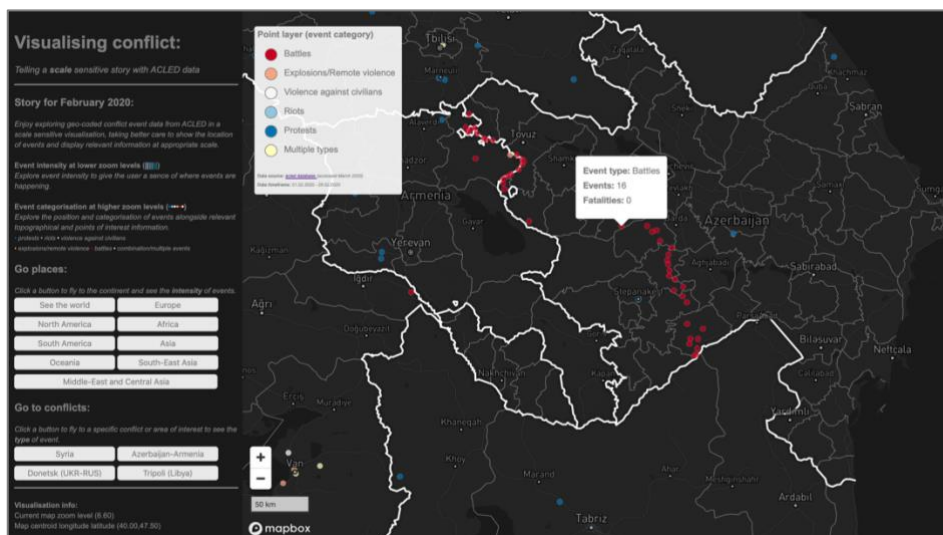
<sup>1</sup> Use of ACLED api in previous works includes: [https://github.com/antoniosfiala/UCL\\_CASA\\_GIS](https://github.com/antoniosfiala/UCL_CASA_GIS)

#### 4| Figure 5 | ACLED re-visualised, regional view



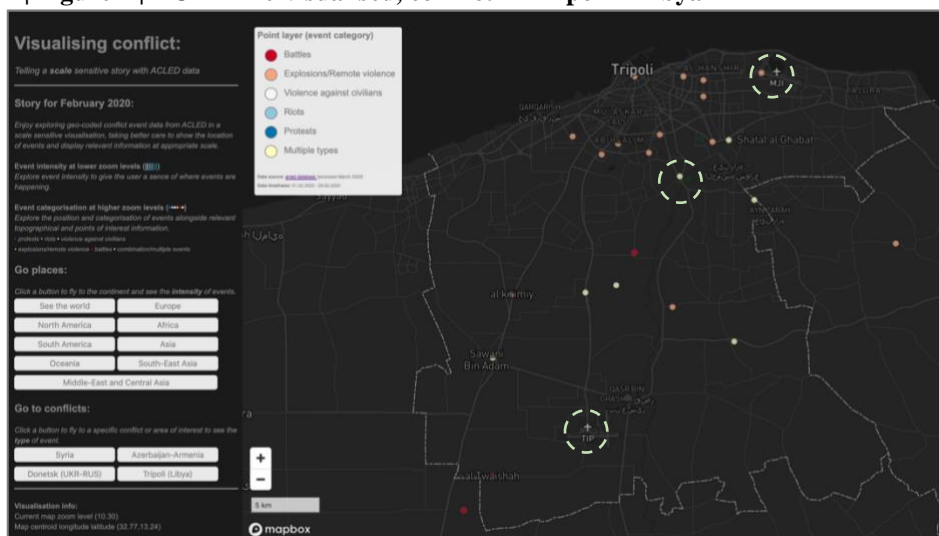
*Description: The regional view continues in the same vein as the world view in using heat to signal points of intense conflict. The heatmap uses opacity to not overshadow key elements such as country borders which are key to understanding conflict containment. Opacity is crucial to deal with visibility of other important elements and will be reused at more detailed scale levels to deal with shortcoming 2.*

#### 4| Figure 6 | ACLED re-visualised, conflict in Armenia/Azerbaijan



*Description: Tackling shortcomings 2 (point abstraction) & 3 (colour hierarchy and categorisation). Opacity is used to overlay points close together. The divergent colour scale from blue to red helps illustrate at a glance which events are those immediately more destructive. In this image, we can clearly see battle lines in red in the clearly marked border regions with sporadic protests in blue. Hovering over a point reveals more information.*

#### 4| Figure 7 | ACLED re-visualised, conflict in Tripoli – Libya



*Description: prominent points of interest (POI) that help contextualise conflict. After zoom level 10, POI such as airports or hospitals (in green) can be seen. From a tactical point of view, understanding their location can help approximate strategic objectives (i.e. capture/disable an airport) or capacity to quickly deal with any fallout such as an explosion occurring near a hospital.*

Additional key user interface and efficiency considerations included:

- Using a mapbox vector tile-set to faster render additional mapping layers (heat and point) for faster rendering (mapbox, n.d.)
- Facilitate user interaction with the map through some pre-set flight paths along the left-hand side control panel
- A clear legend that dynamically changes when the user zooms beyond zoom level 6 and transitions from the heatmap view to the categorical point view
- Hovering or clicking on points will display additional information

All the elements together facilitate a more meaningful, exploratory, experience of conflict data across different scales, automatically adjusting to the assumed needs of a semi-specialist user interested in geo-politics.

| Word count: 426

## Bibliography

- ACLED, 2019. ACLED introduces new event types and sub-event types. ACLED Introd. New Event Types Sub-Event Types. URL <https://acleddata.com/2019/03/14/acled-introduces-new-event-types-and-sub-event-types/> (accessed 3.10.20).
- mapbox, n.d. Tilesets. Tilesets. URL [https://docs.mapbox.com/studio-manual/reference/tilesets/?utm\\_medium=sem&utm\\_source=google&utm\\_campaign=sem%7Cgoogle%7Cbrand%7Cchko-googlesearch-pr01-dynamicsearchcampaign-nb.broad-all-landingpage-search&utm\\_term=brand&utm\\_content=chko-googlesearch-pr01-dynamicsearchcampaign-nb.broad-all-landingpage-search&gclid=Cj0KCQjw3qzzBRDnARIsAECmryow1vZ6nO84gt5E8upiHBkFa0aK01ANdwWsraaEobGTDXiLCM0cEWoaAthiEALw\\_wcB#what-is-a-tileset](https://docs.mapbox.com/studio-manual/reference/tilesets/?utm_medium=sem&utm_source=google&utm_campaign=sem%7Cgoogle%7Cbrand%7Cchko-googlesearch-pr01-dynamicsearchcampaign-nb.broad-all-landingpage-search&utm_term=brand&utm_content=chko-googlesearch-pr01-dynamicsearchcampaign-nb.broad-all-landingpage-search&gclid=Cj0KCQjw3qzzBRDnARIsAECmryow1vZ6nO84gt5E8upiHBkFa0aK01ANdwWsraaEobGTDXiLCM0cEWoaAthiEALw_wcB#what-is-a-tileset) (accessed 3.12.20).
- Raleigh, C., Linke, A., Hegre, H., Karlsen, J., 2010. Introducing ACLED: an armed conflict location and event dataset: special data feature. *J. Peace Res.* 47, 651–660.