

KDD 2013 Workshop on Interactive Data Exploration and
Analytics

Storygraphs: Extracting patterns from spatio-temporal data

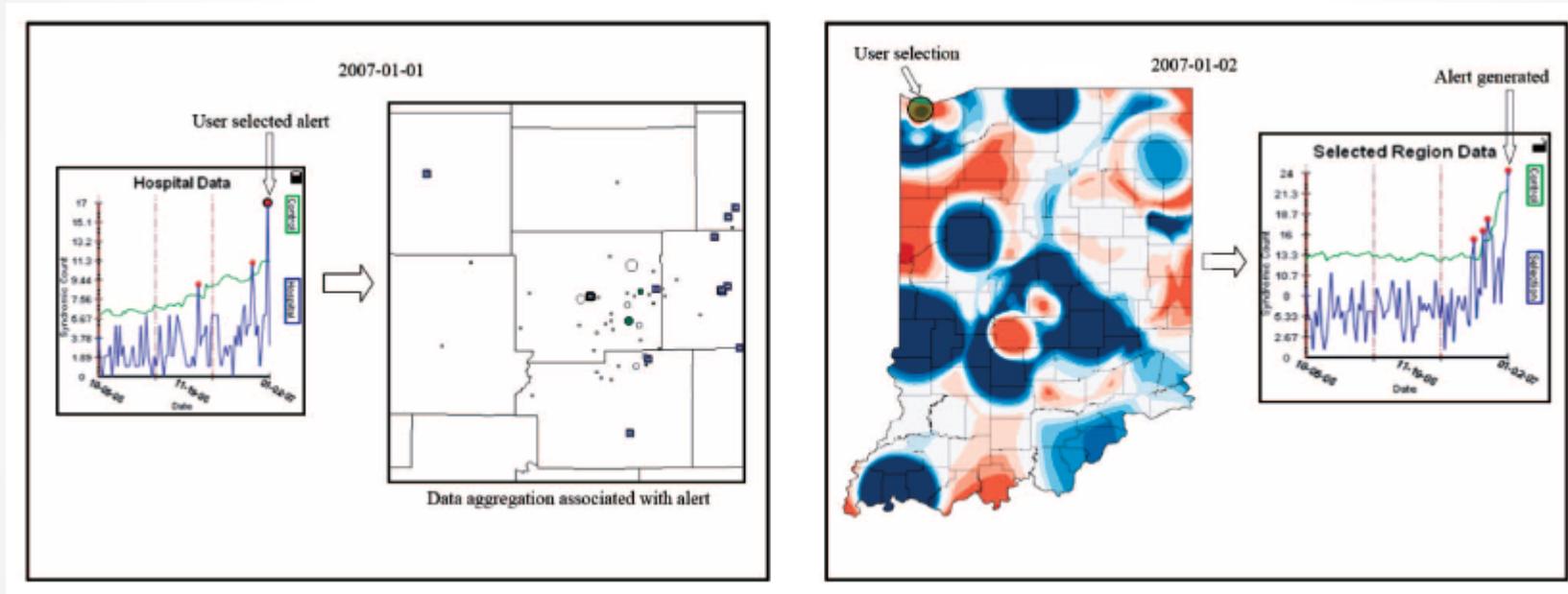
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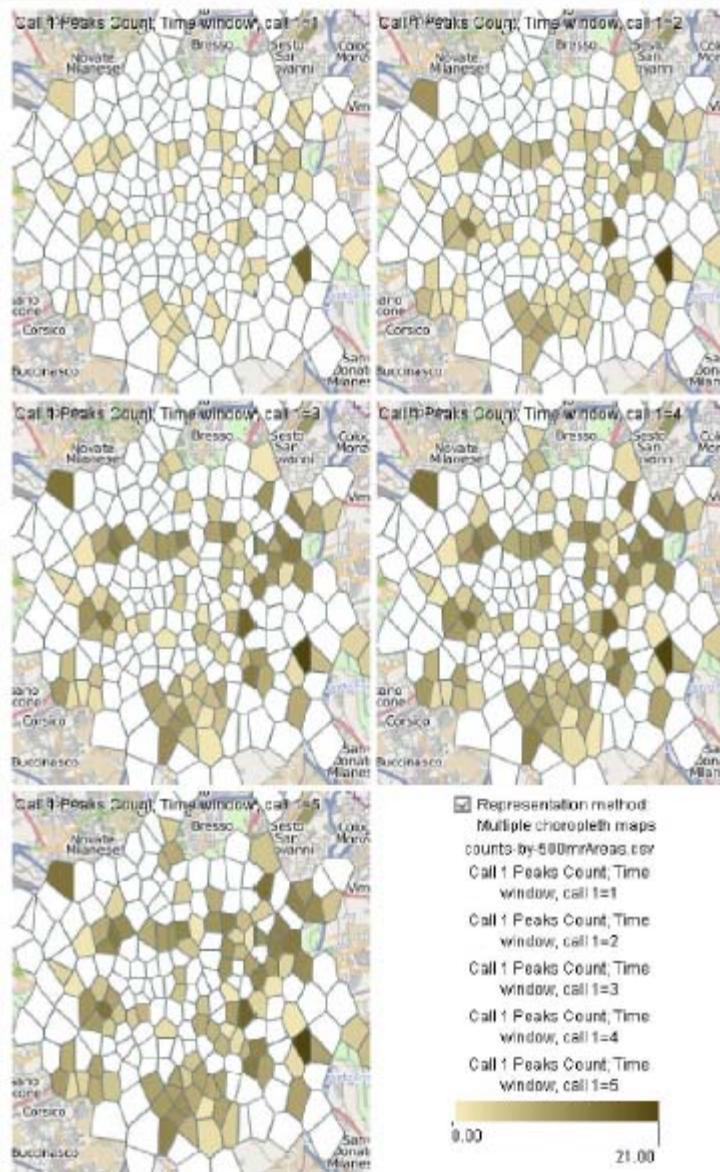
Motivation

- To develop a visualization technique that integrates the four main components of a narrative.
 - Characters
 - Time
 - Location
 - Surroundings
- Unsatisfied with previous works that often display these information in separate views
- Originally inspired by the needs in the study of human rights violations

Previous work

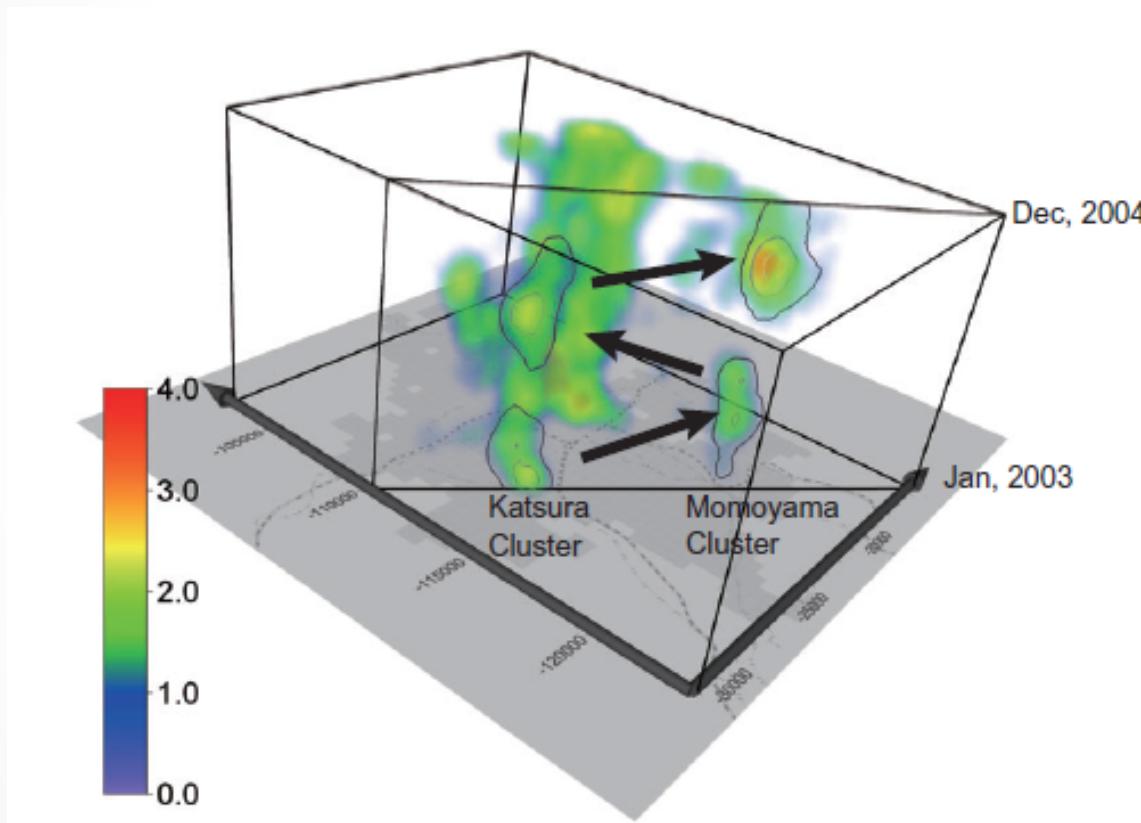


Maciejewski, et al. IEEE TVCG, 16(2), 2010



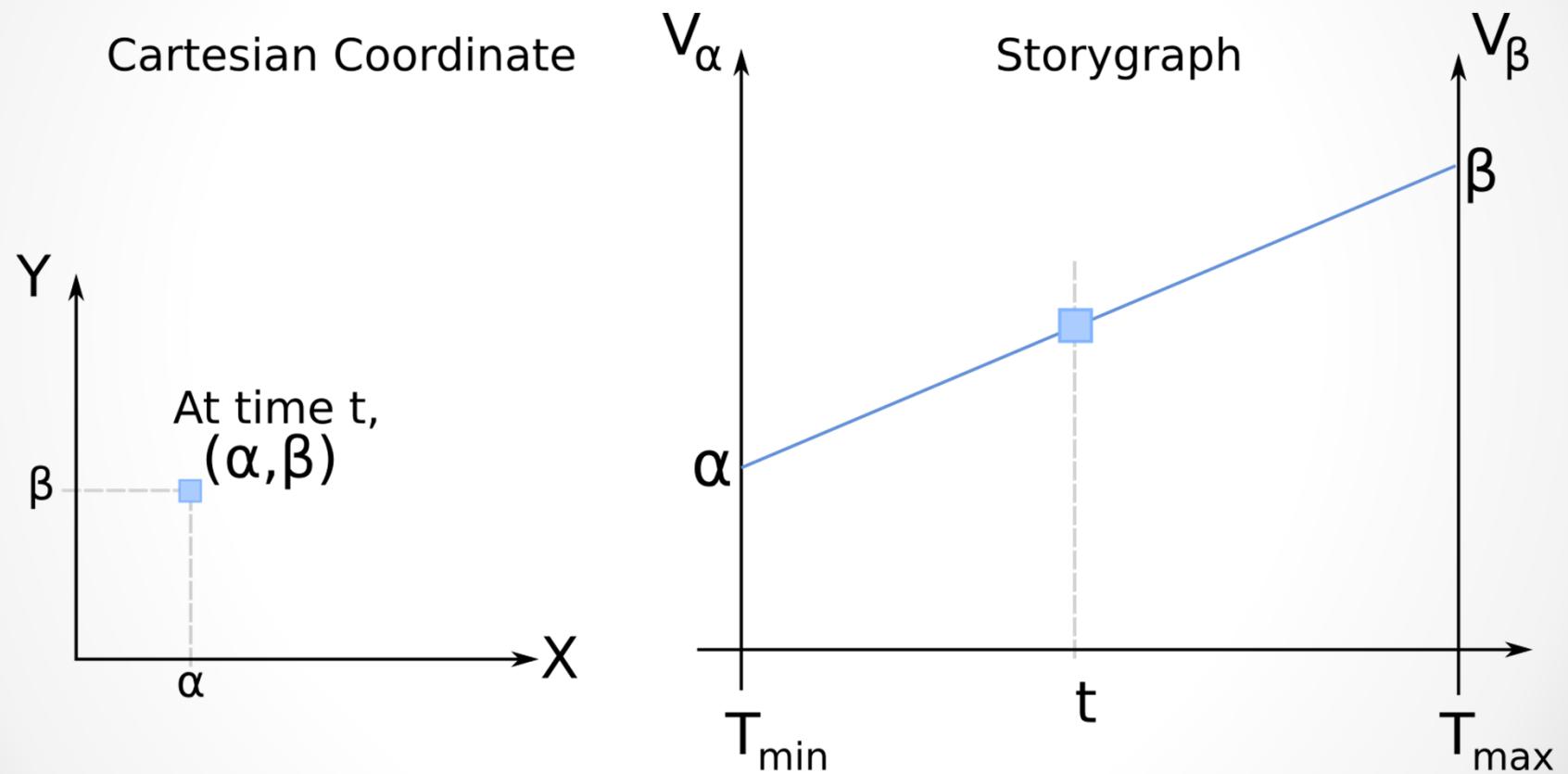
- Andrienko, et al. IEEE TVCG, 18(5), 2012
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Previous work

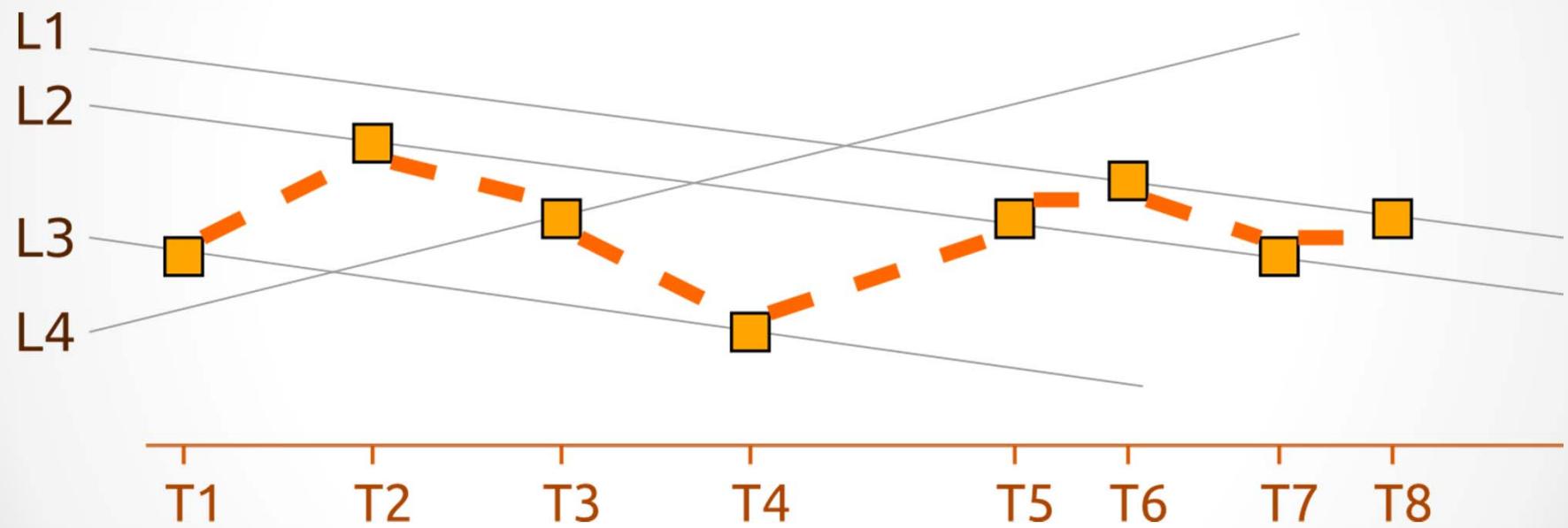


- Nakaya and Yano, Transactions in GIS, 14(3), 2010

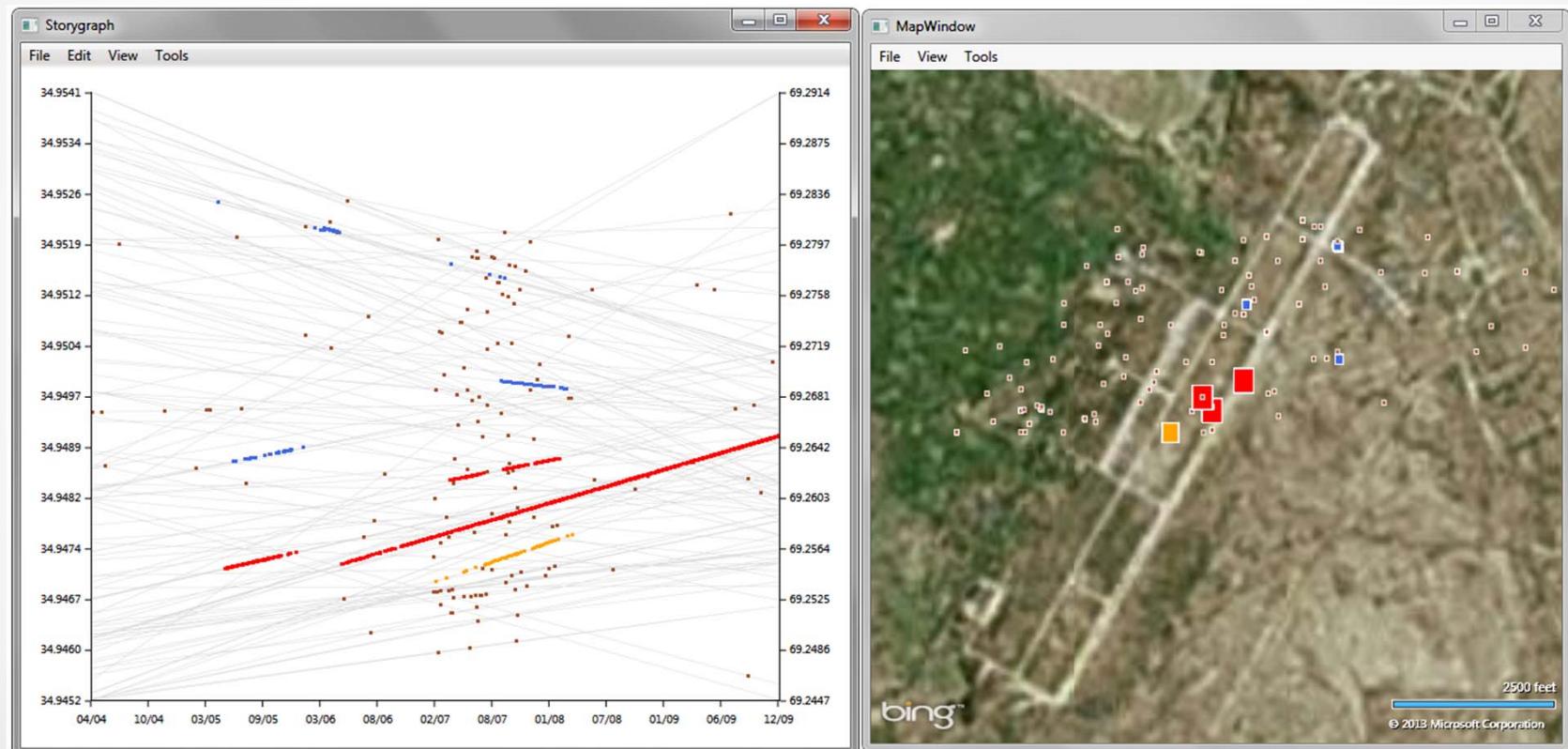
Storygraphs



Storyline



Synchronized map



User interactions

- Filters
- Clustering
- Query
- Show/hide location lines
- Details on demand
- File selection
-

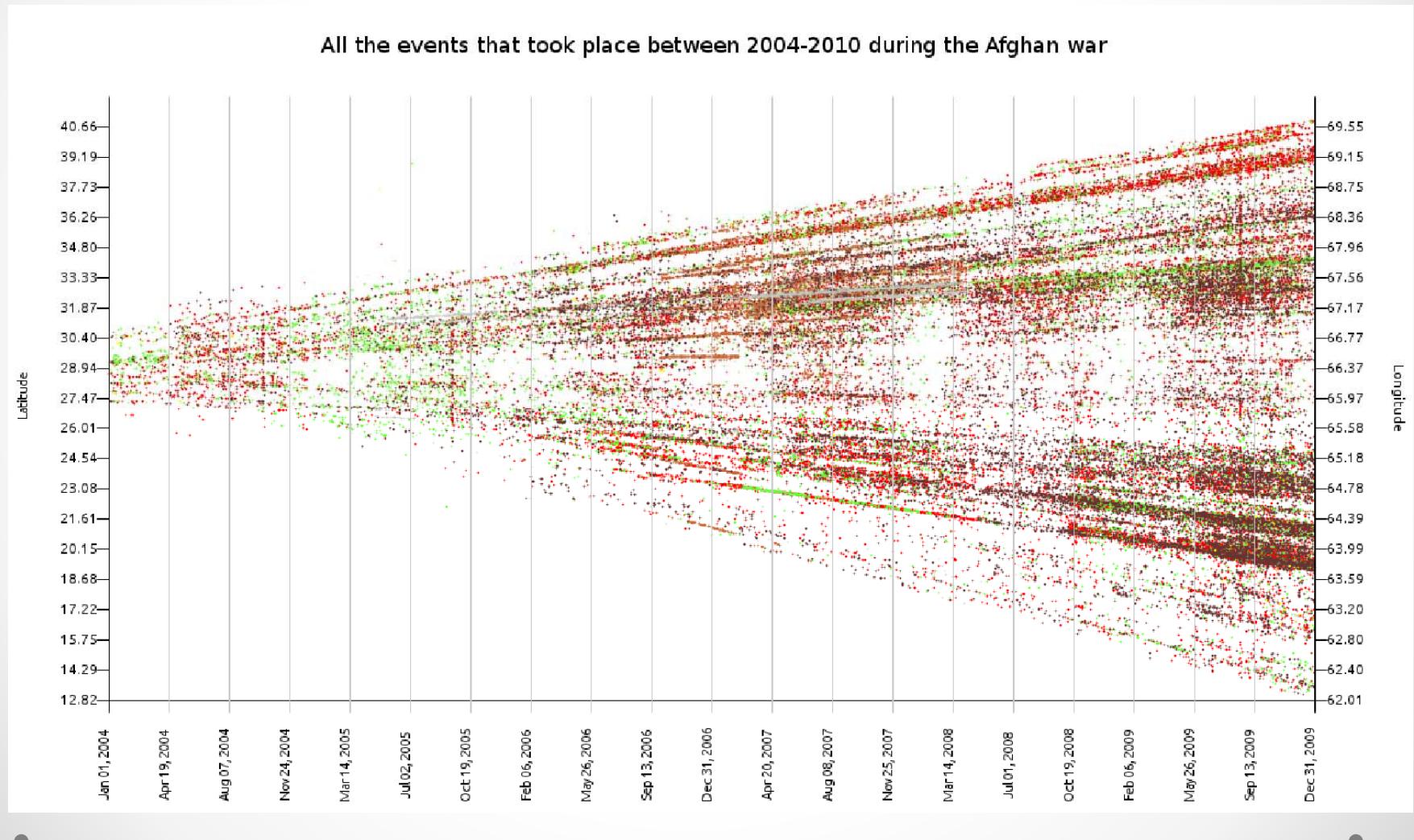
Case study: Afghan War Log

- Over 76K US military war logs from Afghanistan
- Covers the period from early 2004 to late 2009
- Published by Wikileaks in 2010
- Highly organized and standardized data with specific time and geolocations

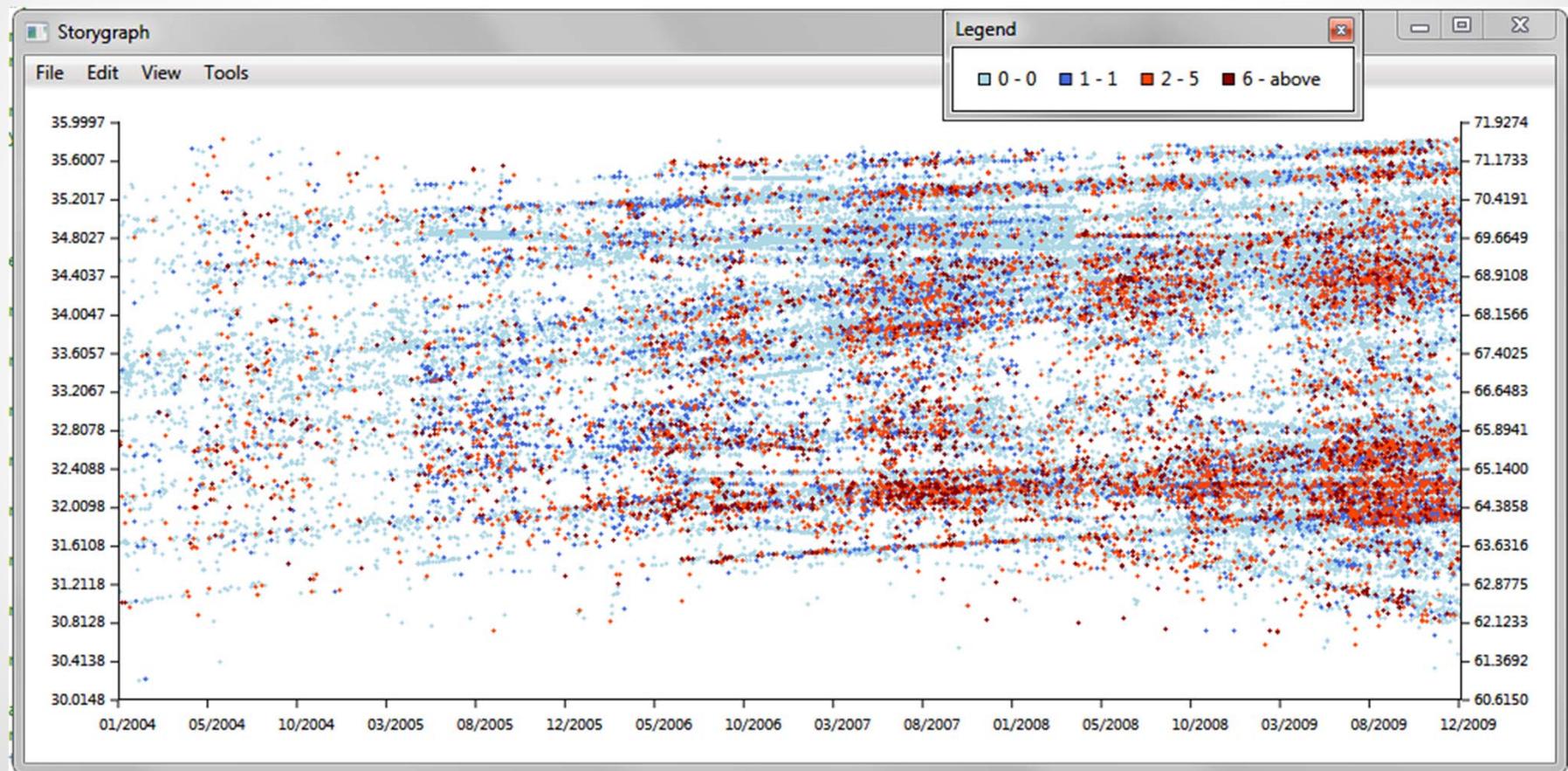
Previous visualizations

- The Guardian
 - <http://www.theguardian.com/world/datablog/interactive/2010/jul/25/afghanistan-war-logs-events>
 - <http://flowingdata.com/2010/07/27/afghanistan-war-logs-revealed-and-mapped/>
- The Atlantic
 - <http://www.theatlantic.com/technology/archive/2010/07/wikileaks-data-on-afghanistan-deaths-visualized/60482/>
- Andy Kirk: visualization blogger
 - <http://www.visualisingdata.com/index.php/2010/07/visualising-the-wikileaks-war-logs-using-tableau-public/>

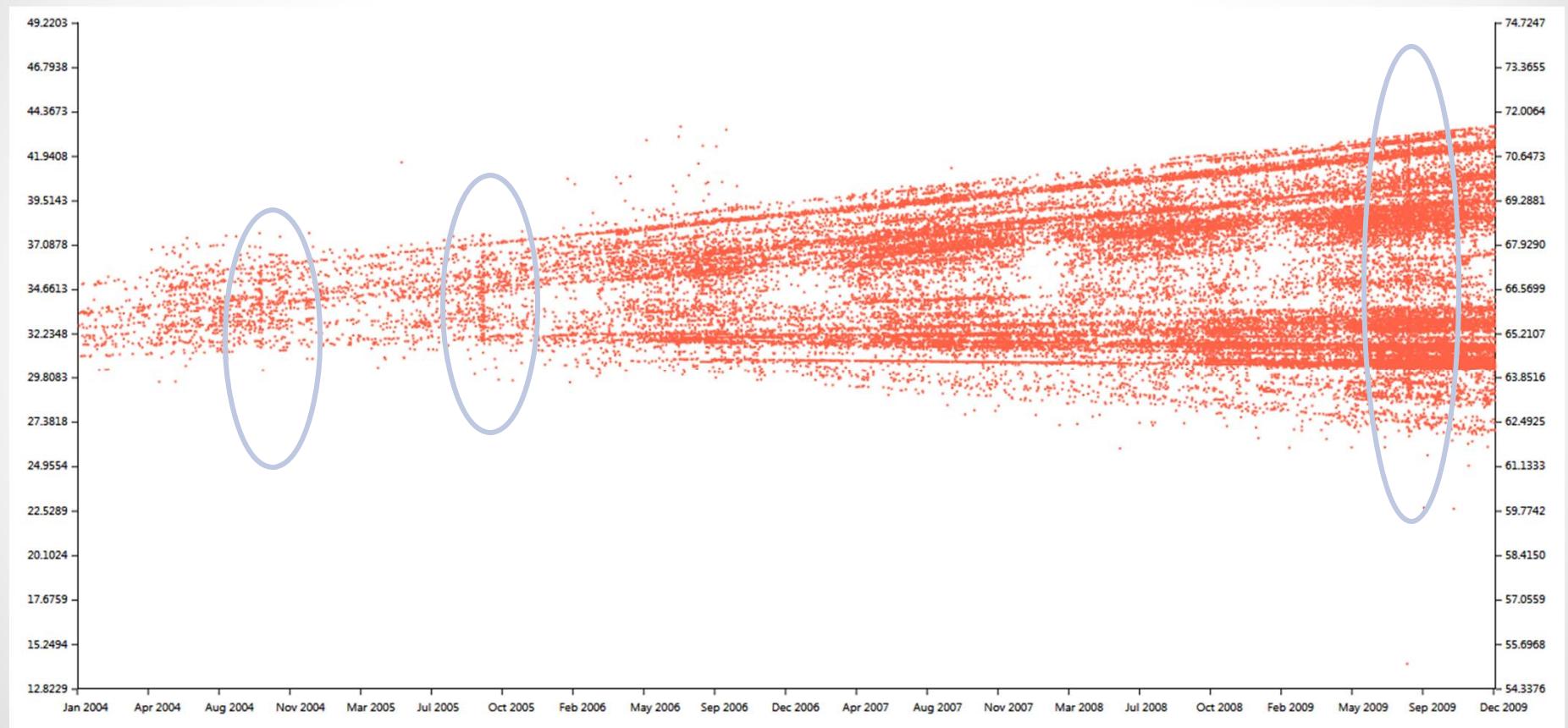
Afghan War Diary: Our visualization



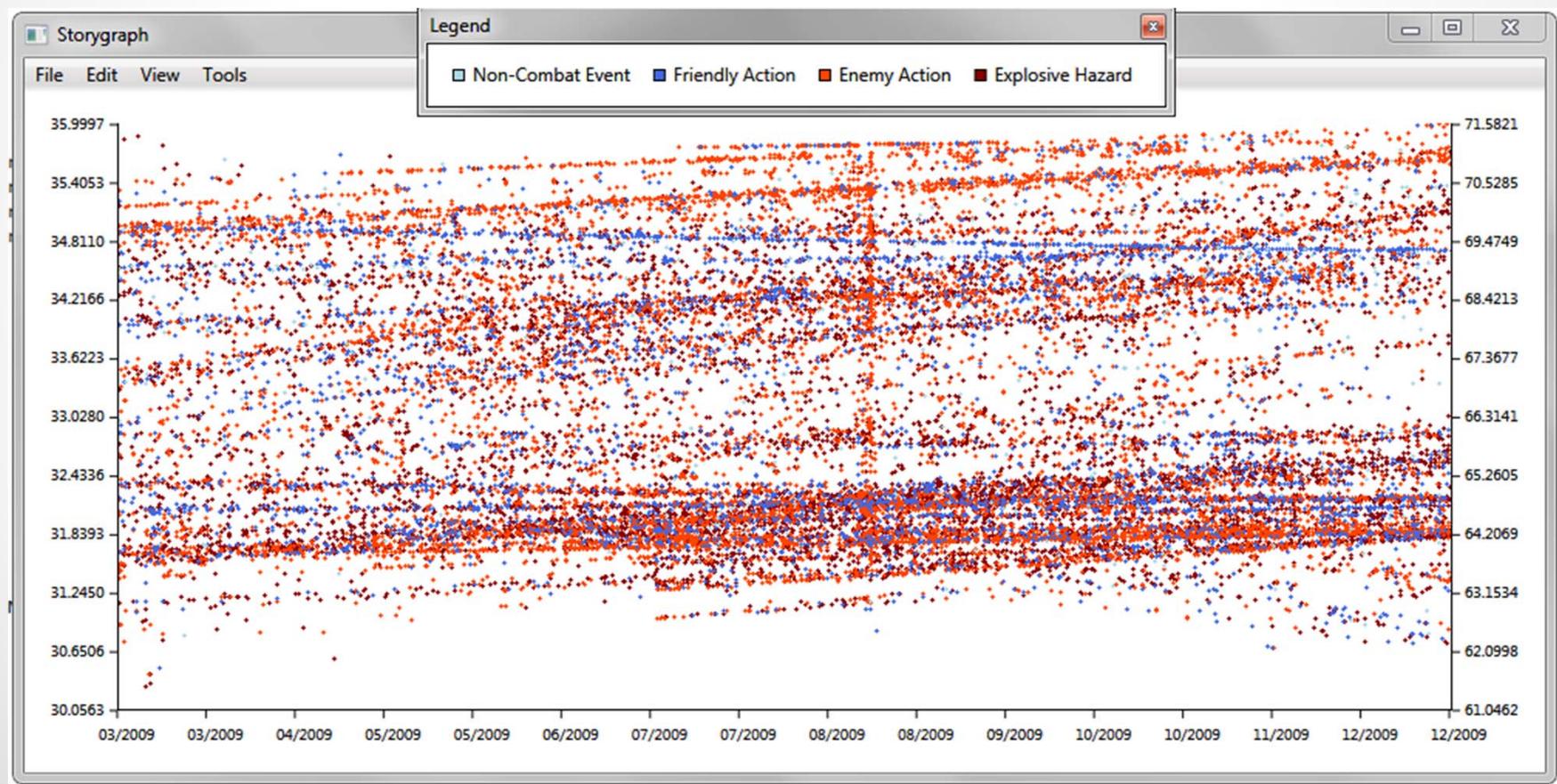
Casualties



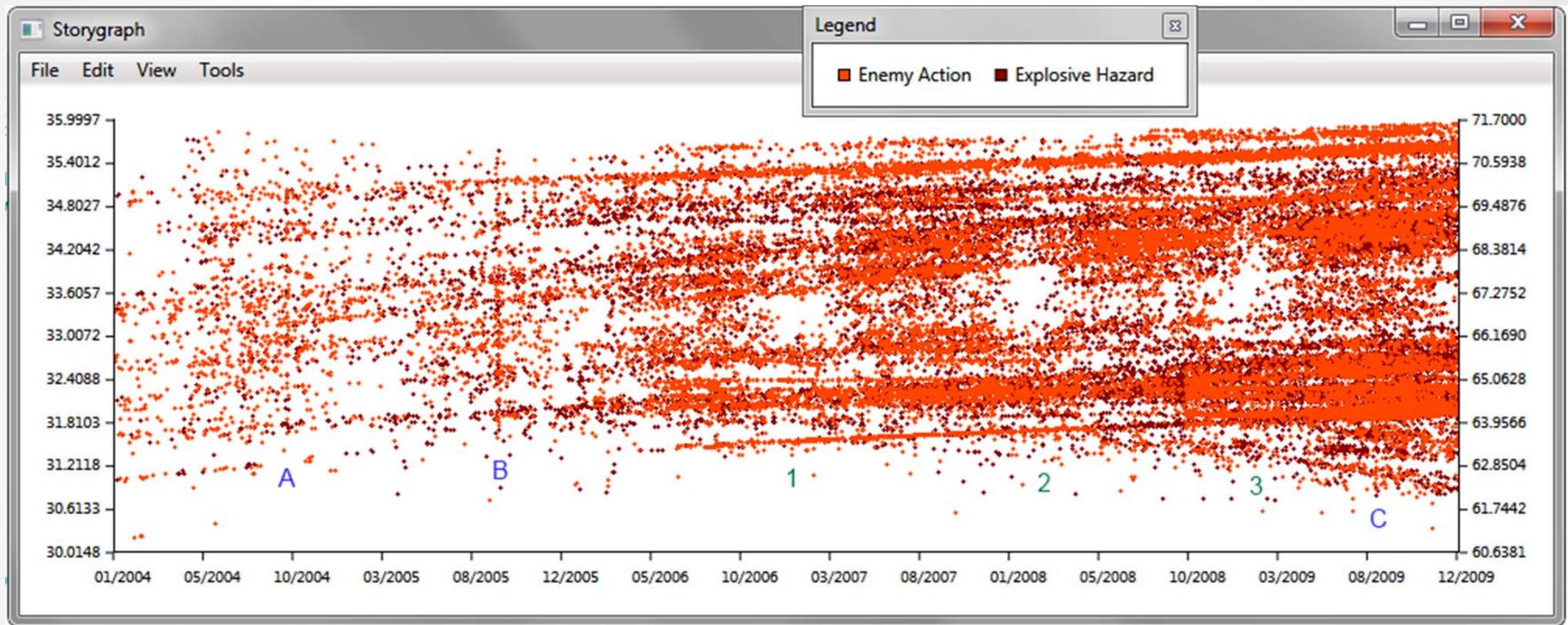
Patterns of widespread violence



Patterns' link to elections

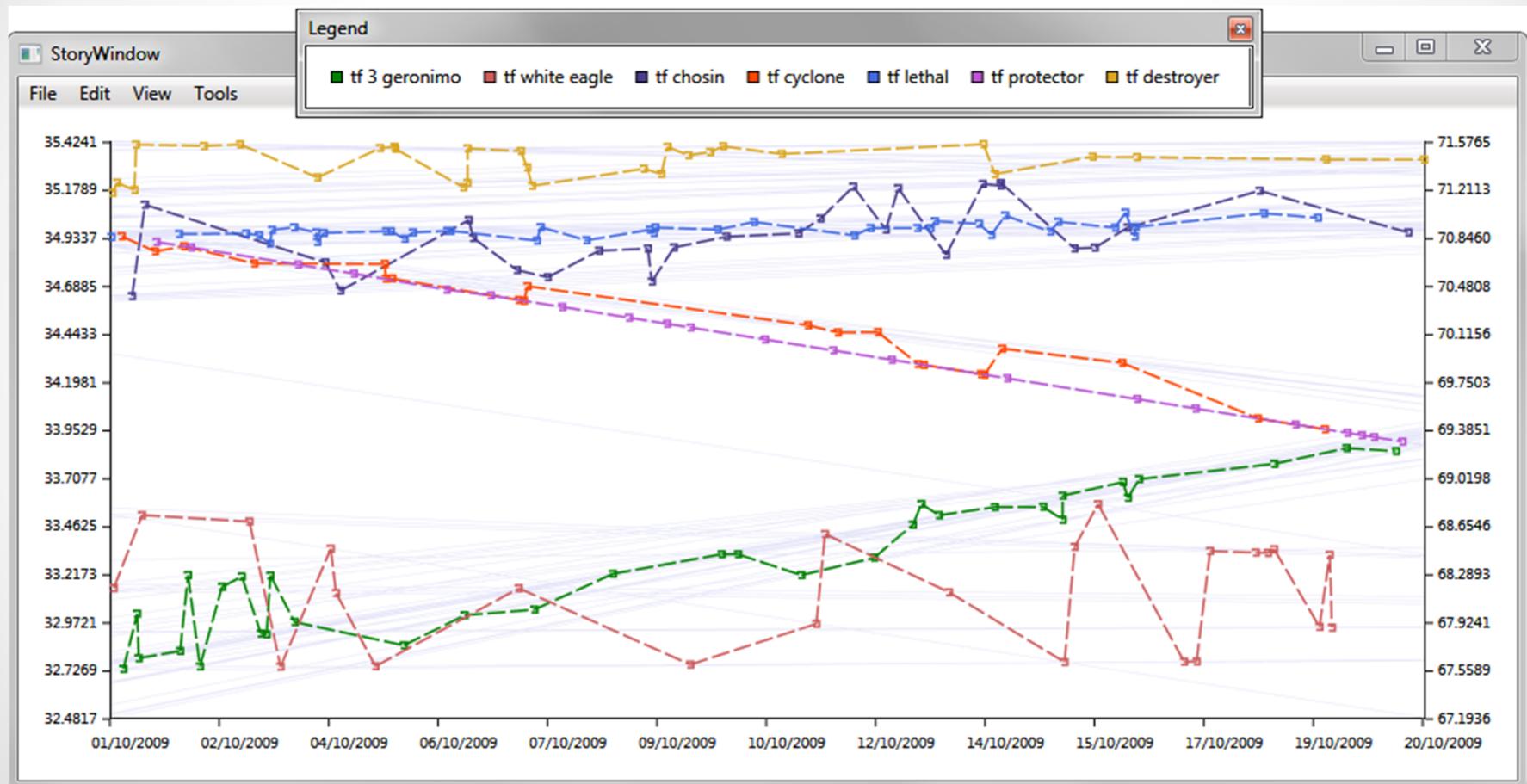


Suspicious holes in the dataset

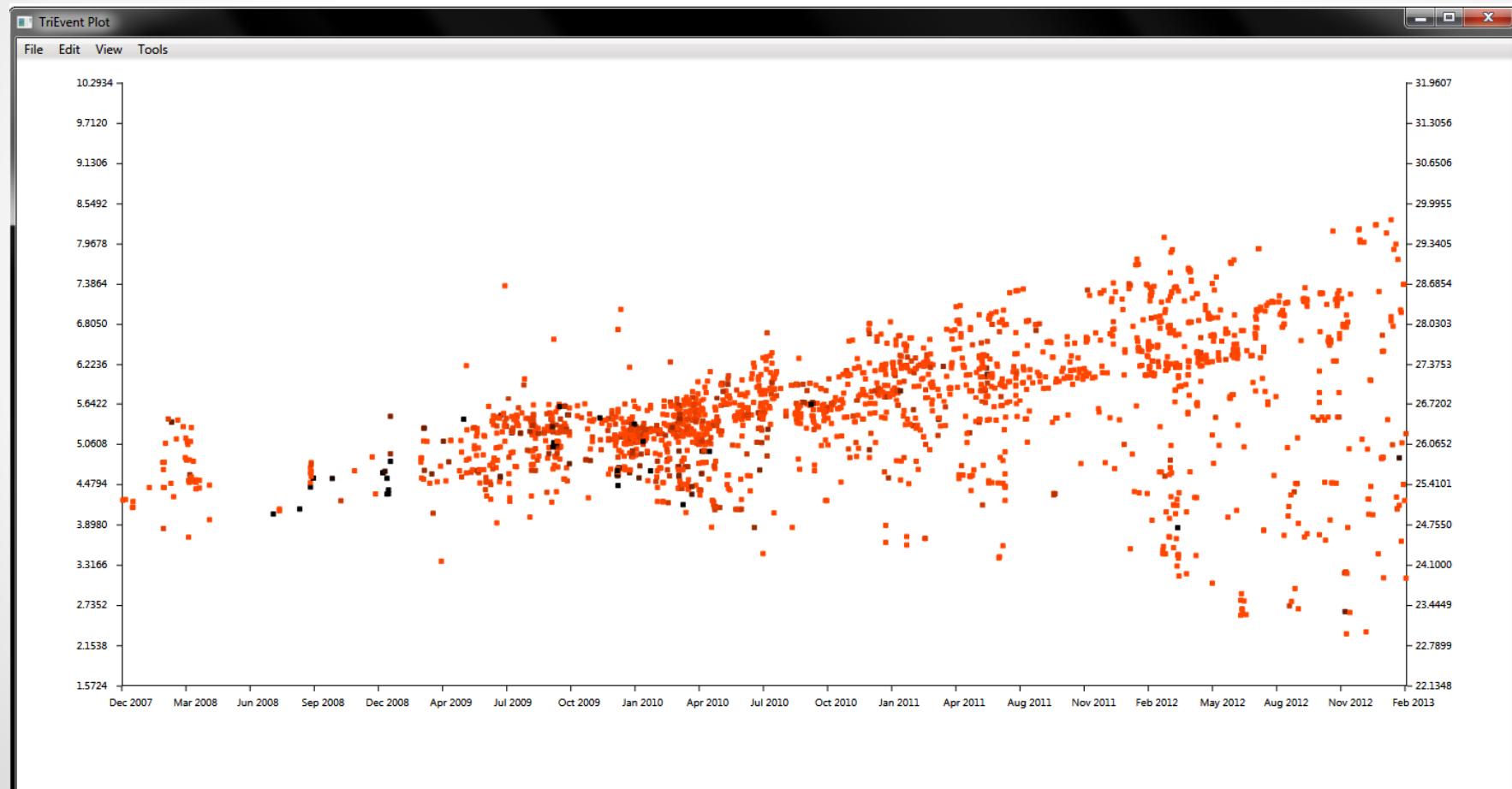


- Linked to Kabul-Kandahar Highway

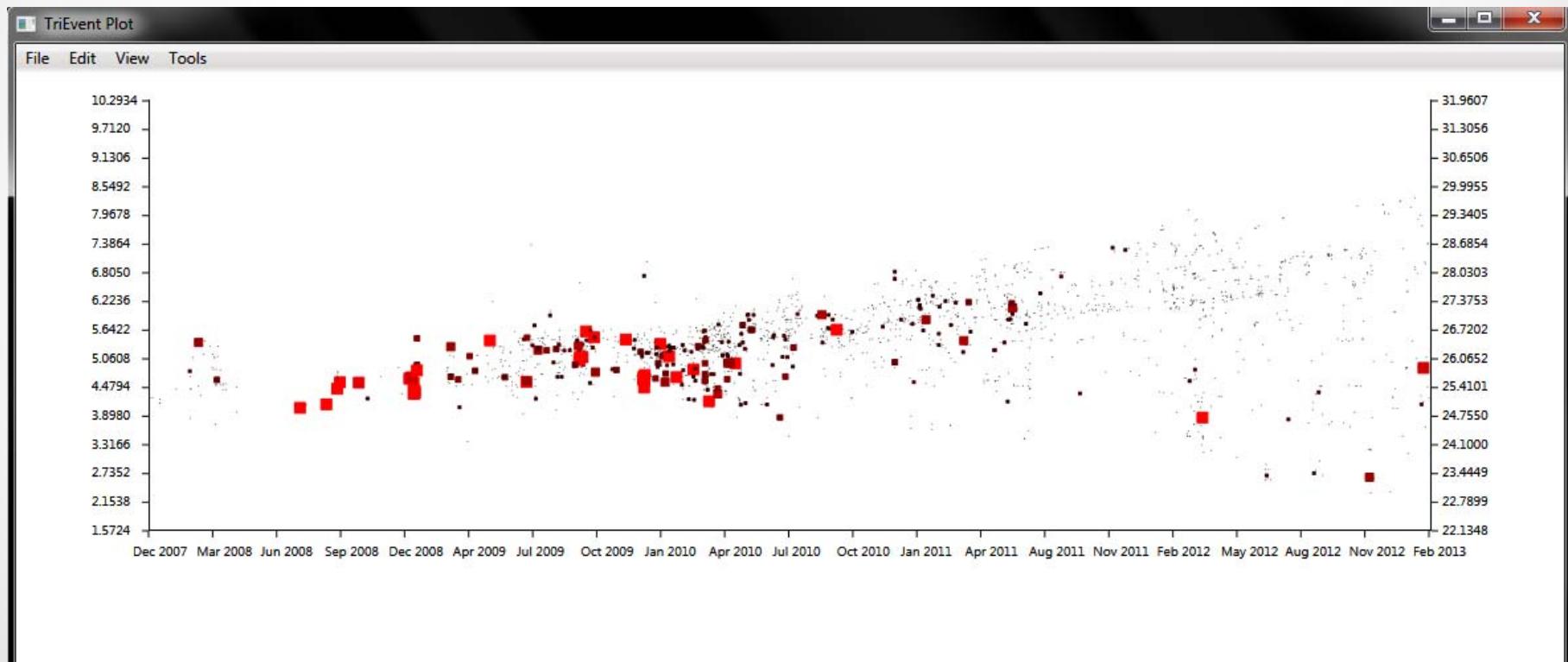
Storylines of military units



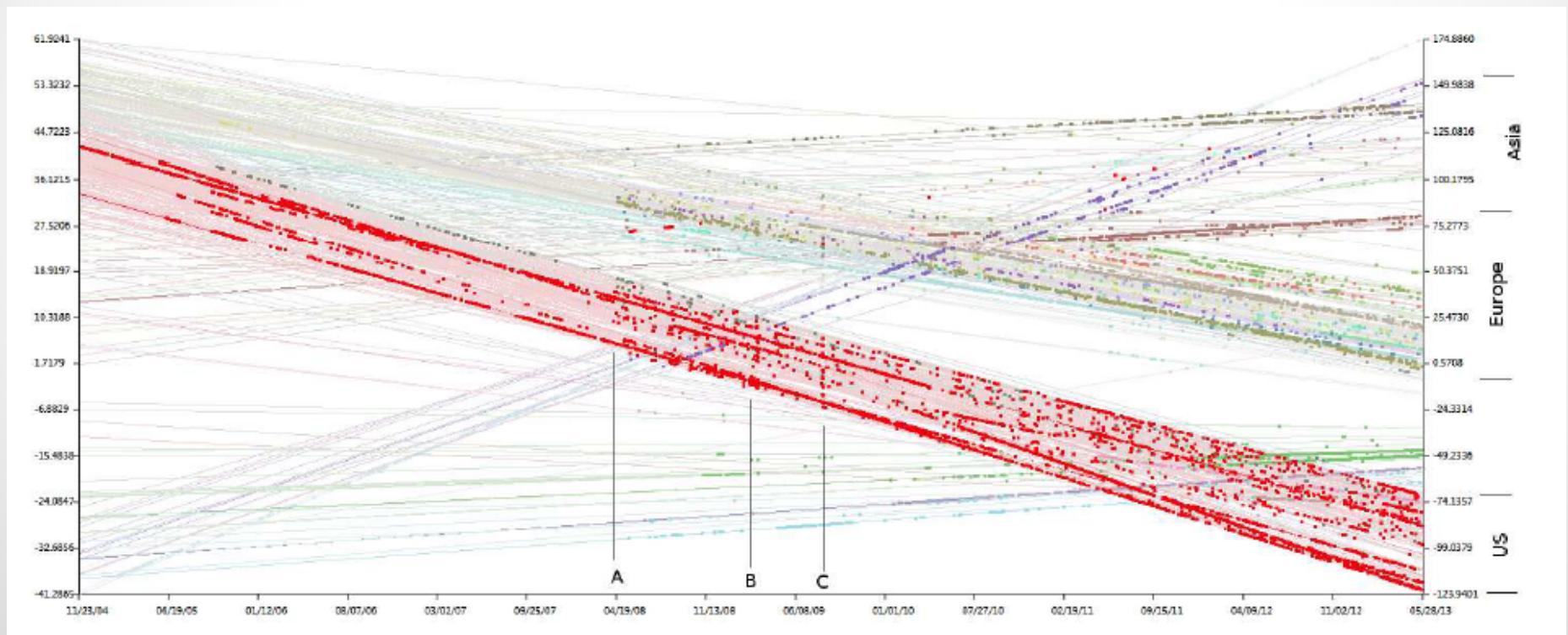
Case study: Lord's Resistance Army



Case study: Lord's Resistance Army



Case study: Open source project developers



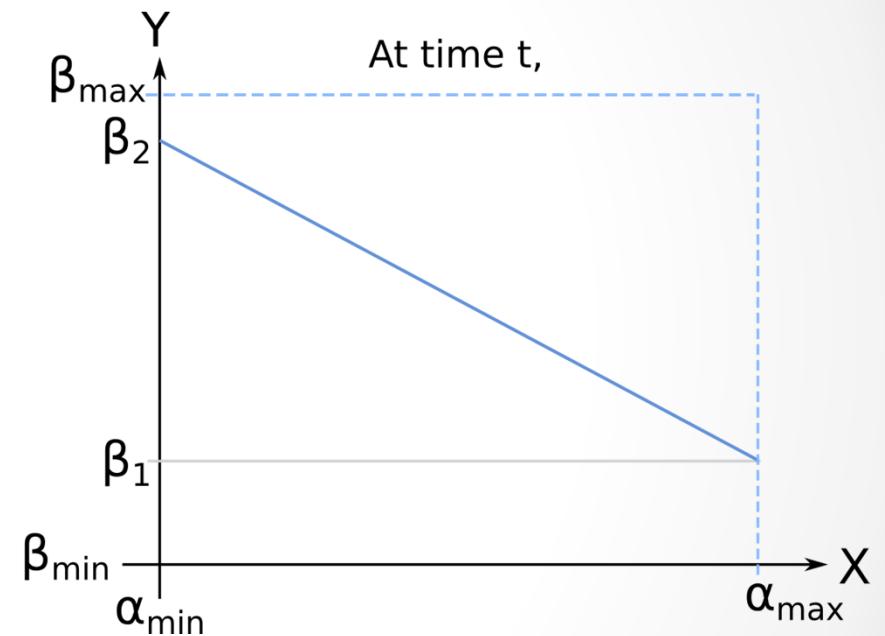
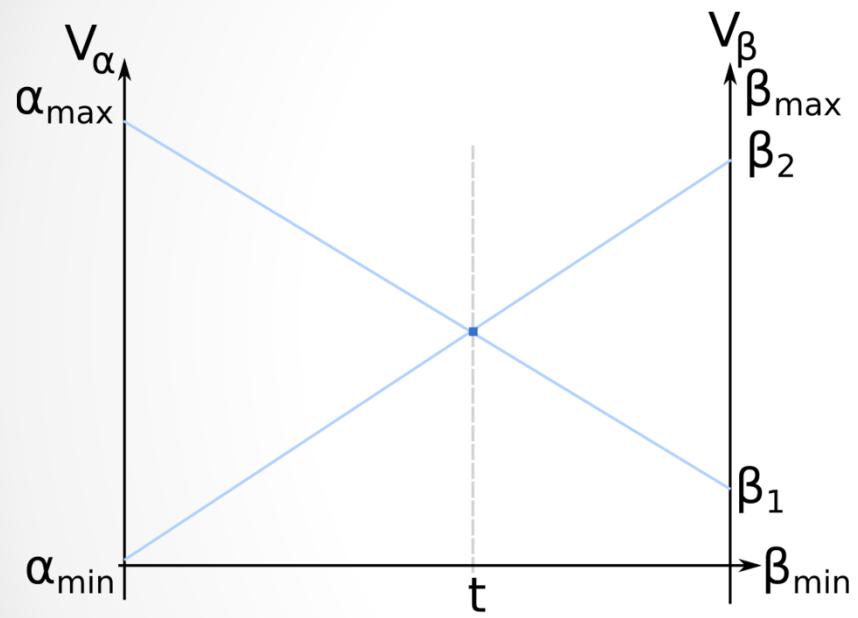
Benefits

- A visualization technique that integrates characters, time, location, and surroundings in a single view.
- Simple to implement, easy to use
- Case studies have shown promising results

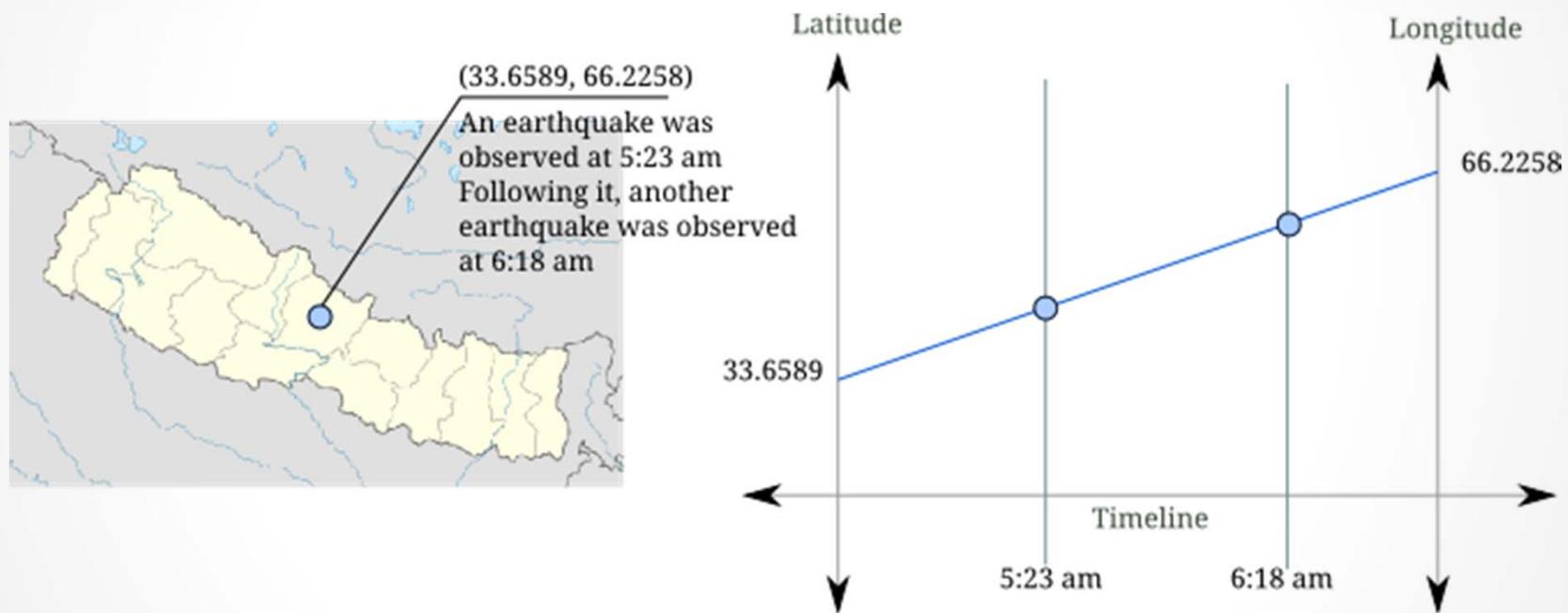
Problems and possible solutions

- Location ambiguity
 - Interactively highlight the location lines
 - Synchronized map view
- Cluttering problem with large data sets
 - Hide the location lines
 - Clustering
 - Filtering
 - User interactions
- Location lines are not horizontal
 - Non-linear mapping of latitude and longitude data to the parallel axes.

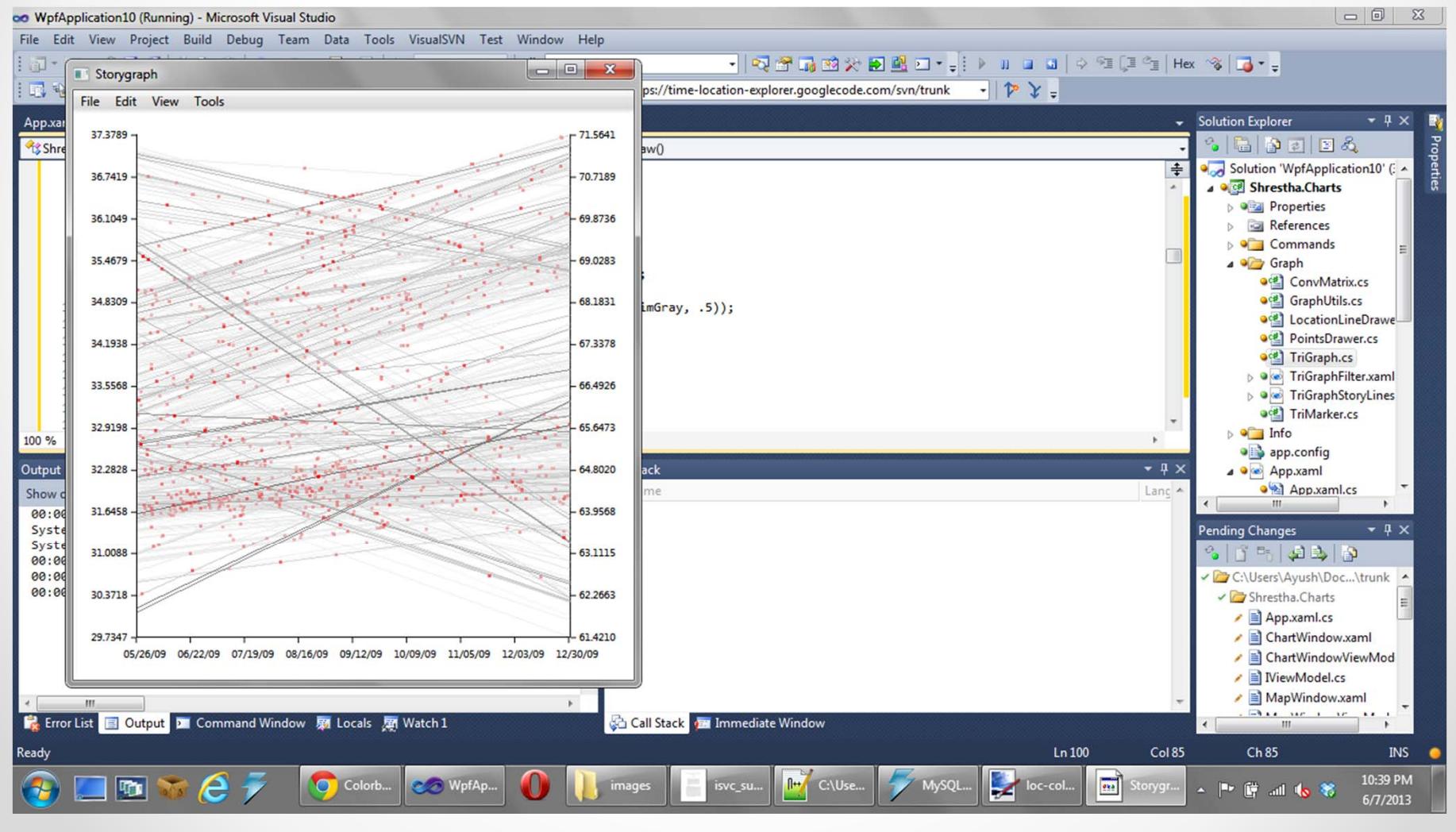
Location ambiguity



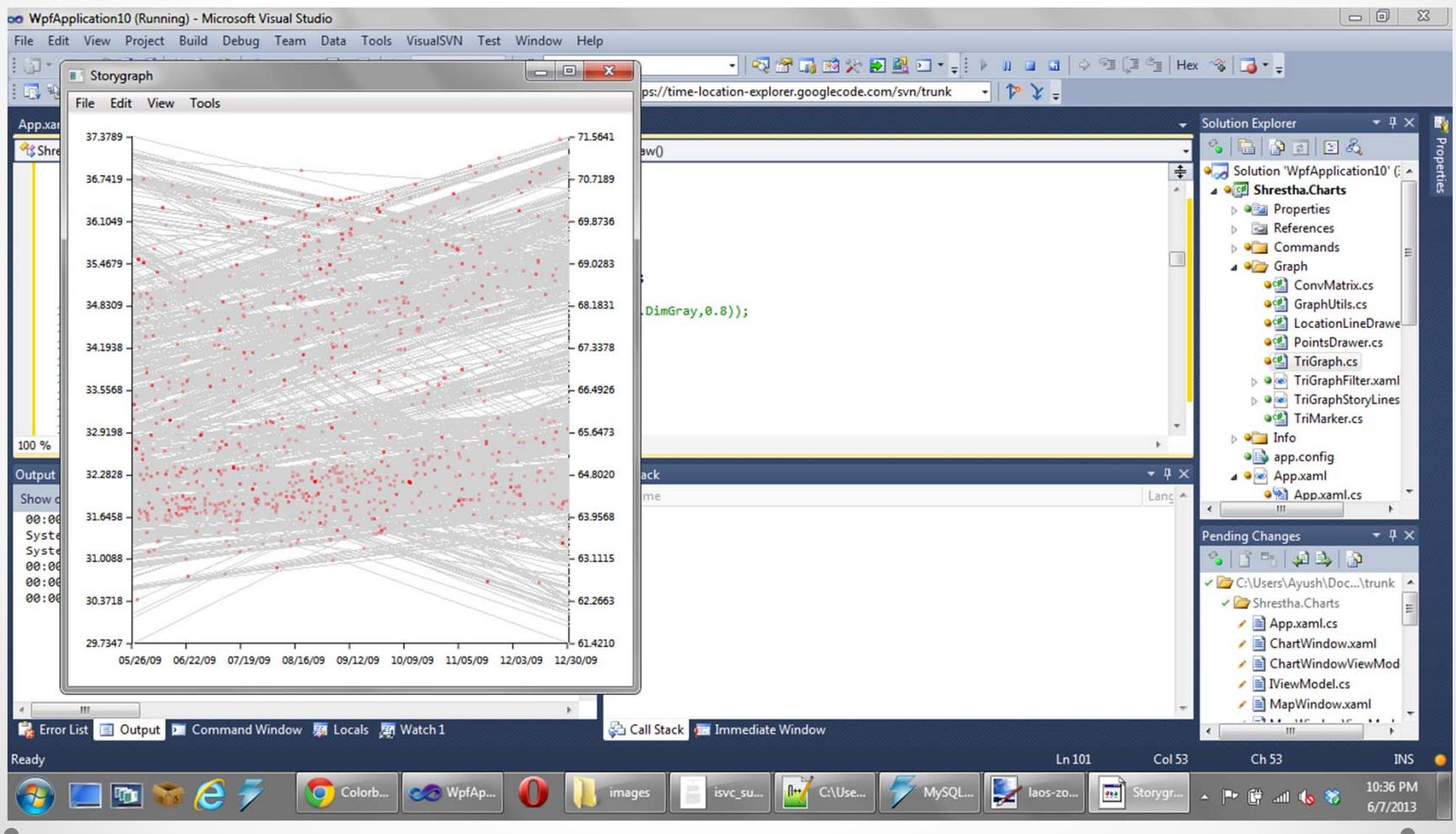
Synchronized map view



Location line crossings



Location line crossings



Thank you!

- Questions & comments
- Contact me at yzhu@gsu.edu