

Armed conflict increases with proximity to borders in Africa

Borders: Colonial, Ethnic, and Religious

Spatial Regression Analysis



CSCI 491

Project 4

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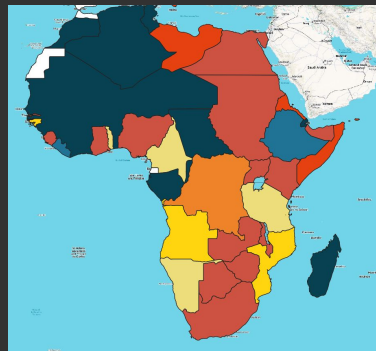
Data for border types

Polygons for each category



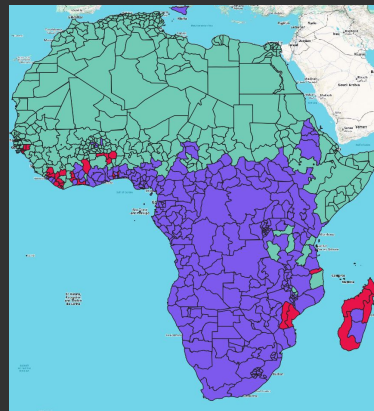
Political

Polygons of present-day national borders.



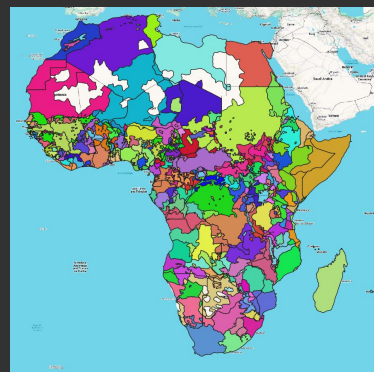
Colonial

Former European demarcation of the continent.



Religious

Religious majority per adm3 polygons.

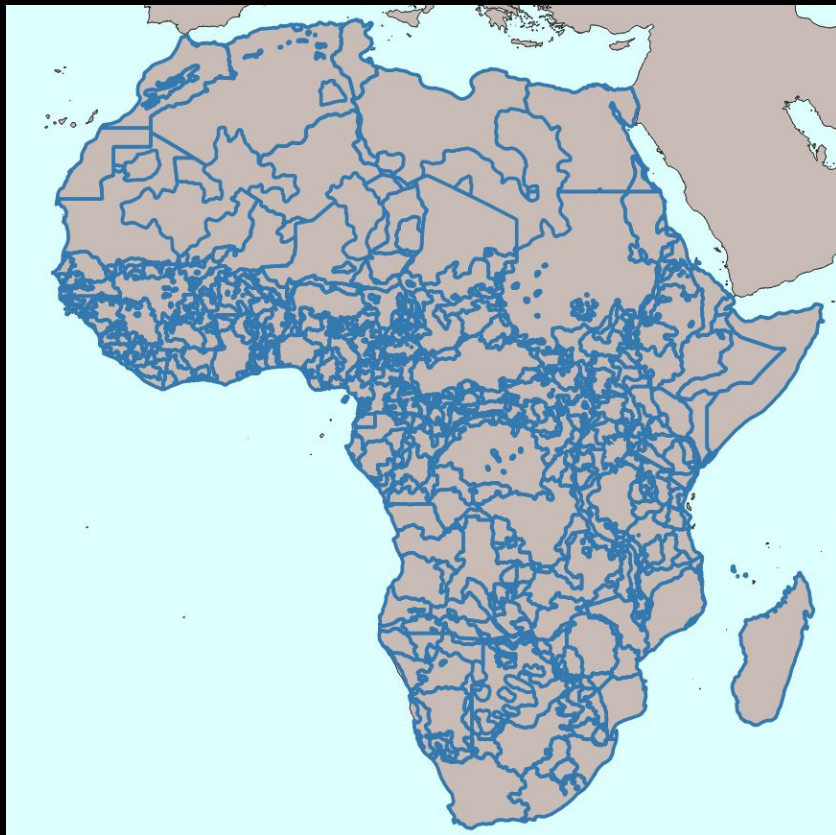


Ethnic

Polygons of major ethnic groups in Africa.

Vectorizing polygon perimeters as lines.

- Basis of our distance calculations.
- Save attributes to categorize each border type: national, colonial, ethnic, and religious.
- These vectorized lines will be used to calculate the closest distance between a cell centroid and a border.



Data for conflict violence

ACLED ID	EVENT DATE	TYPE	ACTOR	LOCATION	DEATHS	WOUNDS	PROPERTY DAMAGE	ASSETS	STATUS	REMARKS	COORDINATES	PRECISION	ACLED DATE
ACLED100	10-November-2024	100	100	100	100	100	100	100	100	100	100	100	100
ACLED101	11-November-2024	101	101	101	101	101	101	101	101	101	101	101	101
ACLED102	12-November-2024	102	102	102	102	102	102	102	102	102	102	102	102
ACLED103	13-November-2024	103	103	103	103	103	103	103	103	103	103	103	103
ACLED104	14-November-2024	104	104	104	104	104	104	104	104	104	104	104	104
ACLED105	15-November-2024	105	105	105	105	105	105	105	105	105	105	105	105
ACLED106	16-November-2024	106	106	106	106	106	106	106	106	106	106	106	106
ACLED107	17-November-2024	107	107	107	107	107	107	107	107	107	107	107	107
ACLED108	18-November-2024	108	108	108	108	108	108	108	108	108	108	108	108
ACLED109	19-November-2024	109	109	109	109	109	109	109	109	109	109	109	109
ACLED110	20-November-2024	110	110	110	110	110	110	110	110	110	110	110	110
ACLED111	21-November-2024	111	111	111	111	111	111	111	111	111	111	111	111
ACLED112	22-November-2024	112	112	112	112	112	112	112	112	112	112	112	112
ACLED113	23-November-2024	113	113	113	113	113	113	113	113	113	113	113	113
ACLED114	24-November-2024	114	114	114	114	114	114	114	114	114	114	114	114
ACLED115	25-November-2024	115	115	115	115	115	115	115	115	115	115	115	115
ACLED116	26-November-2024	116	116	116	116	116	116	116	116	116	116	116	116
ACLED117	27-November-2024	117	117	117	117	117	117	117	117	117	117	117	117
ACLED118	28-November-2024	118	118	118	118	118	118	118	118	118	118	118	118
ACLED119	29-November-2024	119	119	119	119	119	119	119	119	119	119	119	119
ACLED120	30-November-2024	120	120	120	120	120	120	120	120	120	120	120	120
ACLED121	01-December-2024	121	121	121	121	121	121	121	121	121	121	121	121
ACLED122	02-December-2024	122	122	122	122	122	122	122	122	122	122	122	122
ACLED123	03-December-2024	123	123	123	123	123	123	123	123	123	123	123	123
ACLED124	04-December-2024	124	124	124	124	124	124	124	124	124	124	124	124
ACLED125	05-December-2024	125	125	125	125	125	125	125	125	125	125	125	125
ACLED126	06-December-2024	126	126	126	126	126	126	126	126	126	126	126	126
ACLED127	07-December-2024	127	127	127	127	127	127	127	127	127	127	127	127
ACLED128	08-December-2024	128	128	128	128	128	128	128	128	128	128	128	128
ACLED129	09-December-2024	129	129	129	129	129	129	129	129	129	129	129	129
ACLED130	10-December-2024	130	130	130	130	130	130	130	130	130	130	130	130
ACLED131	11-December-2024	131	131	131	131	131	131	131	131	131	131	131	131
ACLED132	12-December-2024	132	132	132	132	132	132	132	132	132	132	132	132
ACLED133	13-December-2024	133	133	133	133	133	133	133	133	133	133	133	133
ACLED134	14-December-2024	134	134	134	134	134	134	134	134	134	134	134	134
ACLED135	15-December-2024	135	135	135	135	135	135	135	135	135	135	135	135
ACLED136	16-December-2024	136	136	136	136	136	136	136	136	136	136	136	136
ACLED137	17-December-2024	137	137	137	137	137	137	137	137	137	137	137	137
ACLED138	18-December-2024	138	138	138	138	138	138	138	138	138	138	138	138
ACLED139	19-December-2024	139	139	139	139	139	139	139	139	139	139	139	139
ACLED140	20-December-2024	140	140	140	140	140	140	140	140	140	140	140	140
ACLED141	21-December-2024	141	141	141	141	141	141	141	141	141	141	141	141
ACLED142	22-December-2024	142	142	142	142	142	142	142	142	142	142	142	142
ACLED143	23-December-2024	143	143	143	143	143	143	143	143	143	143	143	143
ACLED144	24-December-2024	144	144	144	144	144	144	144	144	144	144	144	144
ACLED145	25-December-2024	145	145	145	145	145	145	145	145	145	145	145	145
ACLED146	26-December-2024	146	146	146	146	146	146	146	146	146	146	146	146
ACLED147	27-December-2024	147	147	147	147	147	147	147	147	147	147	147	147
ACLED148	28-December-2024	148	148	148	148	148	148	148	148	148	148	148	148
ACLED149	29-December-2024	149	149	149	149	149	149	149	149	149	149	149	149
ACLED150	30-December-2024	150	150	150	150	150	150	150	150	150	150	150	150

Event type

Battle / Protest / Riot /
Explosion / Violence
Against Civilians /
Strategic Development

Each has more subcategories

Date

Date with specification of
time precision (day,
month, year)

Actor

Perpetrator of incident
and any association with
movements

Multiple actors possible

Location

Country, Region,
Subregion, District, City,
Latitude/Longitude
(EPSG:4326)

Includes geoprecision scale from 1-3

Fatalities

Number of fatalities
recorded per event

Notes

Short description of
event.

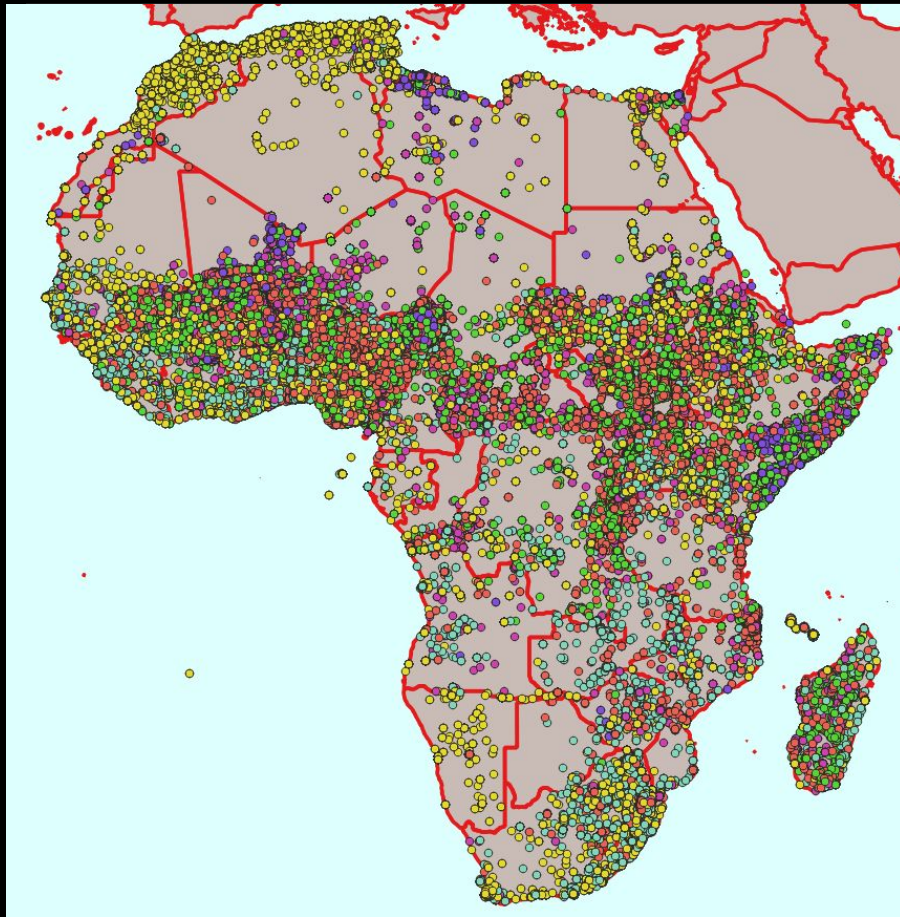
Can help decide whether to exclude
event from analysis

Source

Sources used to codify
conflict event.

Civilian targets

Binary 0/1 for events
targeting civilians

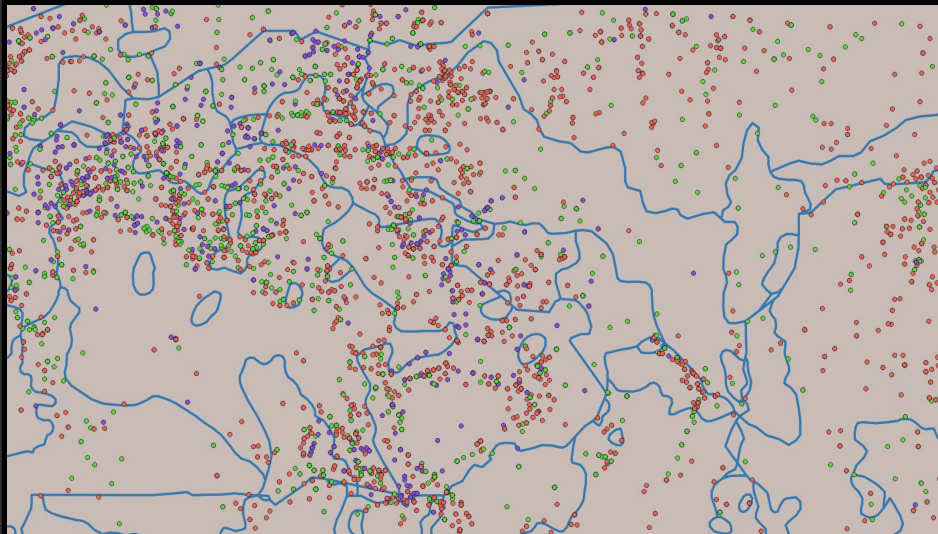
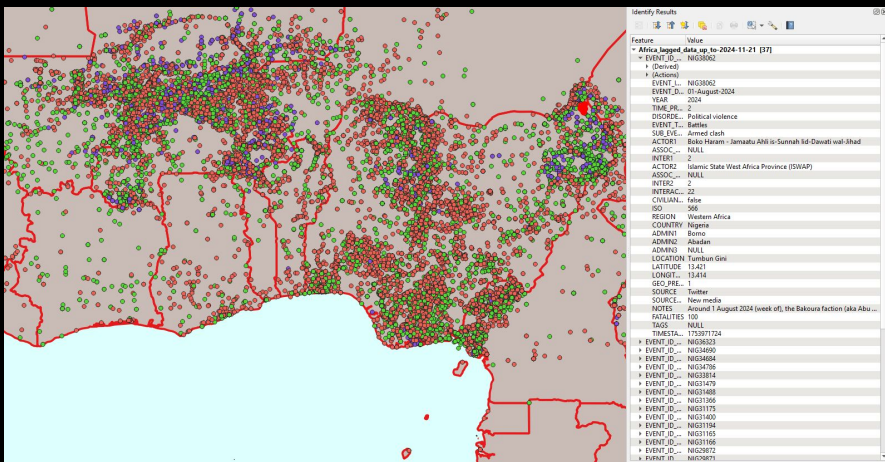
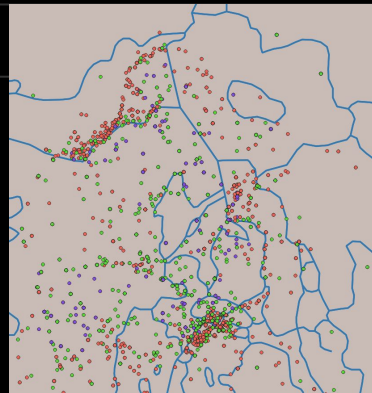
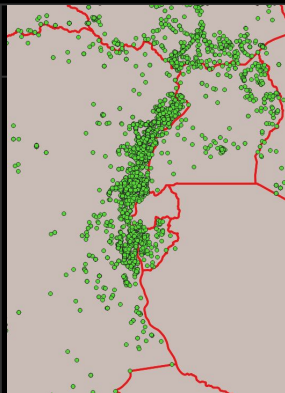
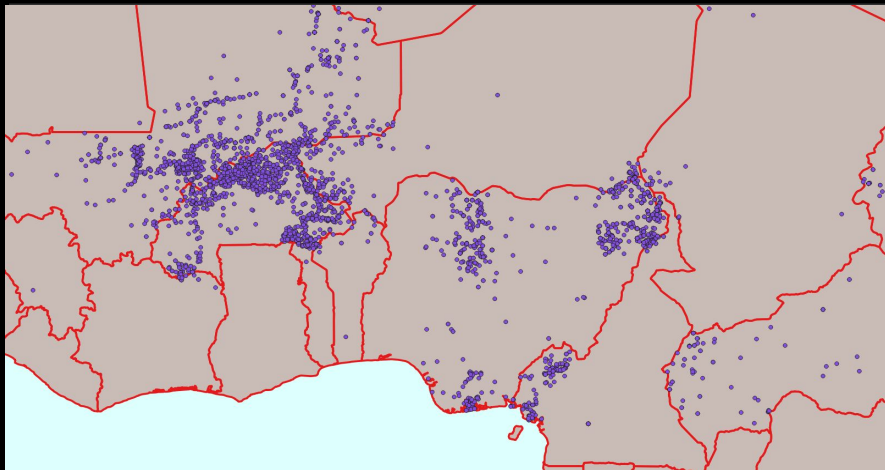


QGIS Visualization

Provider: ACLED
Dataset: Africa
(12-month lag)
Period: 2020-2024

Symbolized by event type category





Control Variables

Population

NASA

Areas with more people will inherently have more reports of violent conflict.

Road km

OpenStreetMap

Control for easily accessible areas versus areas with less motorized access.

War Status

ACLED

Important to determine whether the area (country, region) is in a state of war. Helps to determine the conflict-risk of the neighborhood surrounding a cell.

Land cover

Google Earth Engine

Urban areas will likely have more events reported than remote areas. Challenging terrain will also likely have an effect that should be controlled for (desert, jungle, riversheds, etc.)

Temporal

ACLED

Control for seasonality which might affect some areas more than others.

Consider counting number of conflict incidents per month.

Plan for analysis

When two cells are otherwise similar, does the one closer to a border have a higher expected number of violent events?

1

Grid

Apply grid across area of analysis to create equal-area cell units.

2.1

Cell data aggregation

Aggregate statistics per grid cell: count of conflict event (by type, per month), population, road kms, land cover, etc.

2.2

Measure distances

Compute distance between each grid cell centroid to closest border (of each type).

3.1

Regression on distance

Predicts expected number of conflict events per cell by distance to borders.

3.2

Control variables

Control for factors that may affect the presence/lack of violent conflict depending on where the cell exists in space.