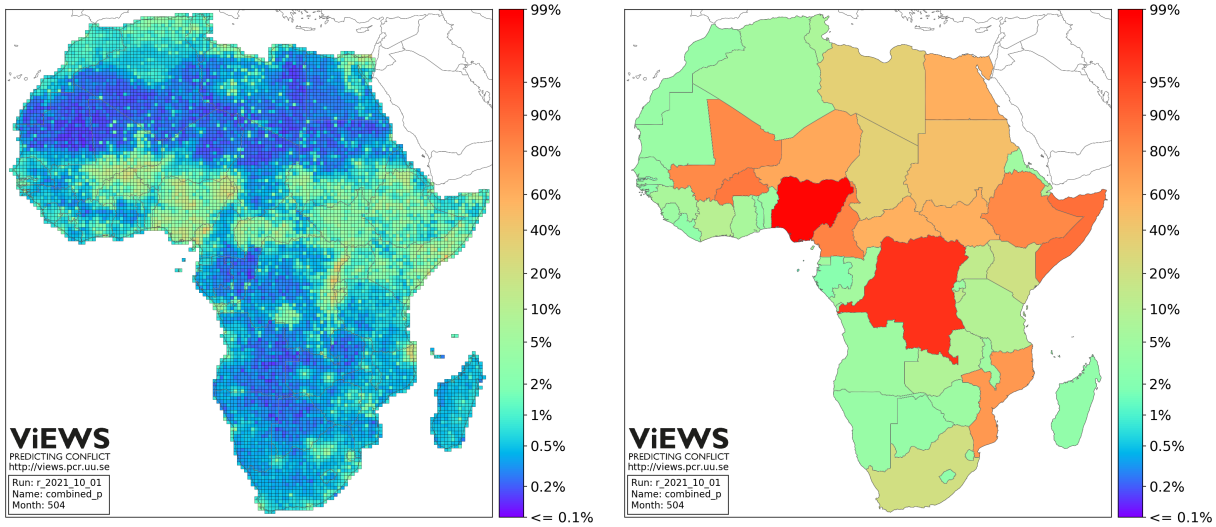
The Risk Monitor: October 2021

Africa-wide forecasts from the Violence Early Warning System (ViEWS)

Forecasts for December 2021, based on data up to and including August 2021.*

By: The ViEWS Team



(a) Forecasts, sub-national level

(b) Forecasts, country level

Figure 1. Combined forecasts for fatal political violence in December 2021. Predicted risk (0-100%) that at least one fatality occurs per sub-national location (left), or at least 25 fatalities per country (right)—from either state-based, non-state, or one-sided violence.

EXECUTIVE SUMMARY

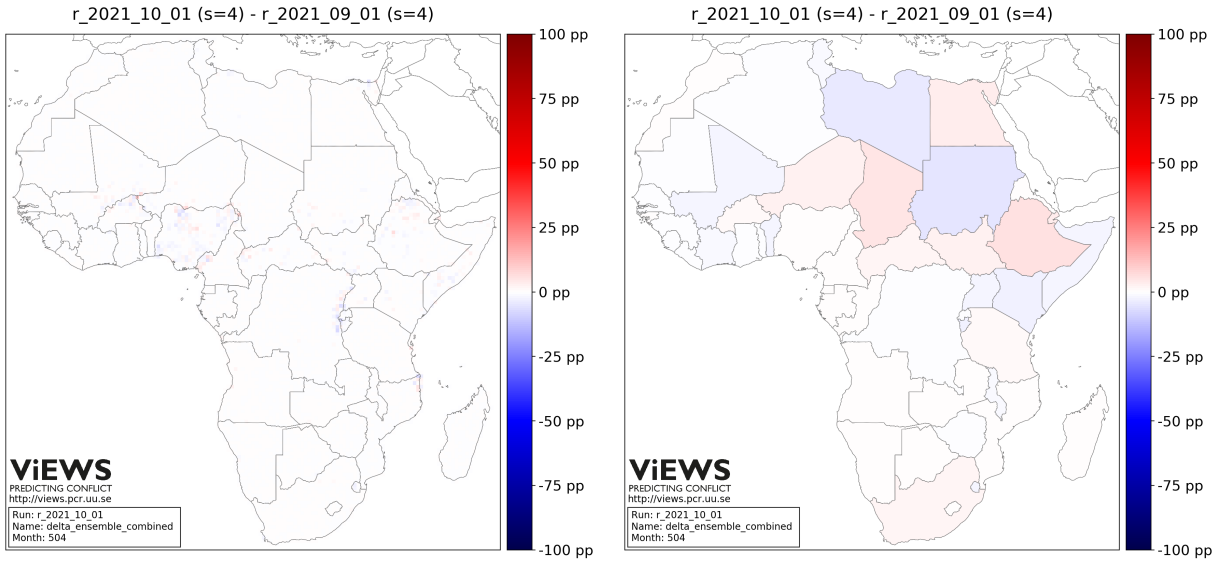
ViEWS generates high-risk alerts for countries with a recent history of fatal political violence. By December 2021, 25 or more fatalities per month from at least one of the three types of violence that ViEWS predicts (see page 9) are almost certain in DRC and Nigeria, and highly likely in Somalia, Mali, Cameroon, Ethiopia, and Burkina Faso ($> 75\%$ risk; Figure 1b). More specifically, the forecasting system detects accentuated risks of fatal political violence over the near future in Borno, Katsina, Kaduna, Zamfara, and the southern states in Nigeria; the Far North and Anglophone region of Cameroon; the Ituri and Kivu provinces of DRC; and in the tripartite border region between Mali, Burkina Faso and Niger. Other high-risk locations include the Tigray region and scattered locations across Amhara, Afar, and Oromiya in Ethiopia; Mogadishu and other select locations in both southern and central Somalia and in the Central African Republic; the coast of the Sinai peninsula in Egypt; Tripoli and Sirte in Libya; the Saloum mountain in Tunisia; and the Cabo Delgado province of Mozambique. This is illustrated by Figure 1a, displaying forecasts for at least one fatality per appoximately 55x55km location and month by December 2021. Diffuse risks furthermore form a belt across the Sahel region, its southern neighbours, and the Horn of Africa.

*The forecasts were computed on resources provided by the Swedish National Infrastructure for Computing (SNIC) at Uppsala Multidisciplinary Center for Advanced Computational Science (UPPMAX). Descriptions of the ViEWS methodology, including the data informing the forecasts, can be found in Hegre et al. (2019) and Hegre et al. (2021). For a brief overview of key models and definitions, please see page 9 of this report.

Table I. Short-term watchlists[a]

Top 5 high-risk locations in December 2021		Most notable changes since last month	
Nationally	*Locally*	*Nationally*	*Locally*
Nigeria	North-East (Nigeria)	Ethiopia ↑	The Far North and Anglophone Cameroon ↑
Somalia	Mogadishu (Somalia)	Chad ↑	The tripartite border (Mali/BF/Niger) ↑
DRC	Ituri and Kivu provinces (DR Congo)	Egypt ↑	Amhara, Afar, Oromiya (Ethiopia) ↑
Cameroon	Anglophone Cameroon	Sudan ↓	South Kivu (DR Congo) ↓
Burkina Faso	Cabo Delgado (Mozambique)	Libya ↓	Southern regions (Nigeria) ↓

[a]Based on Figure 1–2, in no particular order.



(a) Changes, sub-national level

(b) Changes, country level

Figure 2. Changes to the combined forecasts since last month by percentage points (pp). Sub-national level (left) and country level (right).

Sub-national changes to the forecasts as compared to last month are predominantly confined to the regions above (Figure 2a). Of particular note are the reduced risks in southern Nigeria and DRC's South Kivu; the heightened risks on the border between Mali, Burkina Faso, and Niger; and the risk elevation in the Far North and Anglophone Cameroon.

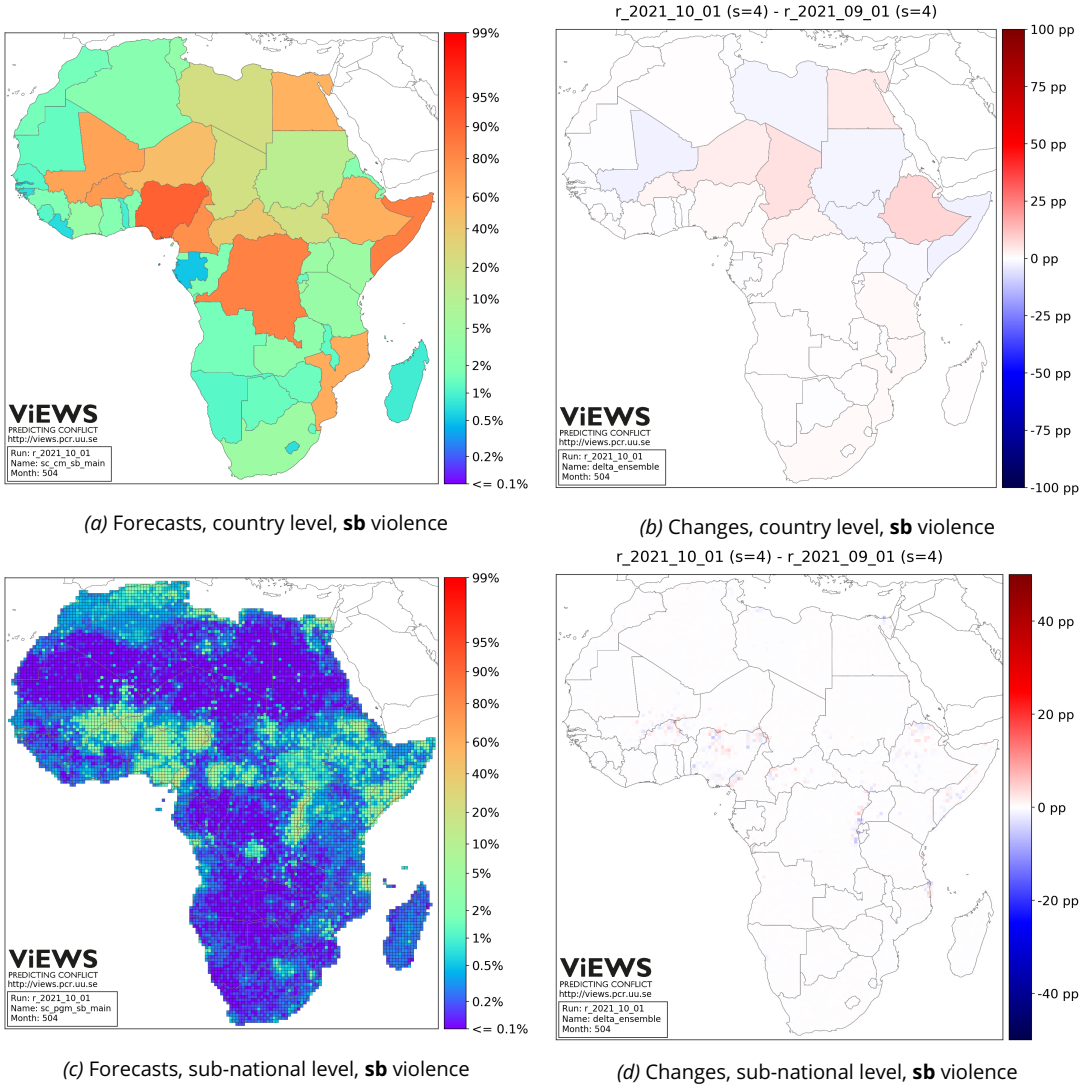
At the country level, the combined risks of 25 or more fatalities per month from either one of the three types of violence have increased for a number of countries – most notably for Chad, Ethiopia, and Egypt – while reducing for Sudan, Libya, and Mali, amongst others (Figure 2b).

Over the following pages, the forecasts are presented and discussed separately for each category of violence.

STATE-BASED CONFLICT (SB)

The ViEWS system generates alerts for conflict involving a government of a state in countries with a recent history of fatal political violence and/or mass protests. In Nigeria, DRC, Somalia, Cameroon, Mali, Mozambique, Burkina Faso, Egypt, and Ethiopia, the risk of 25 or more fatalities per month by December 2021 remain high and above 50%, as seen from the red and bright orange fill colors in Figure 3a (red colors indicating a near-certain risk, light orange a risk equal to a coin toss, and purple $< 0.1\%$ risk.)

More specifically, the system suggests that the risks of fatal violence are particularly pronounced for Nigeria: for Borno and Yobe state in the North-East; Katsina, Kaduna, and Zamfara in the North-West; the cities of Lagos and Abuja; as well as for a portion of the South-East and South-South. High-risk locations are also found in the Far North and Anglophone regions of Cameroon; the Ituri and Kivu provinces of DRC; Cabo Delgado in Mozambique; the broader border region between Mali, Burkina Faso and Niger; the Tigray region in Ethiopia along with a number of locations across Oromiya and Amhara; Mogadishu and other select locations in southern and central Somalia; the north-eastern coast of Egypt, the north-western coast of Libya; as well as for the central and western regions of Central African Republic (CAR). This is illustrated by Figure 3c, which maps the risk of at least one fatality per approximately 55x55km (0.5x0.5 decimal degree lo-



(a) Forecasts, country level, **sb** violence

(b) Changes, country level, **sb** violence

(c) Forecasts, sub-national level, **sb** violence

(d) Changes, sub-national level, **sb** violence

Figure 3. Forecasts for the risk of at least 25 fatalities (country level, top left) and 1 fatality (sub-national level, bottom left) from state-based (**sb**) violence in December 2021, and changes to the respective forecasts since last month by percentage points (right-hand column).

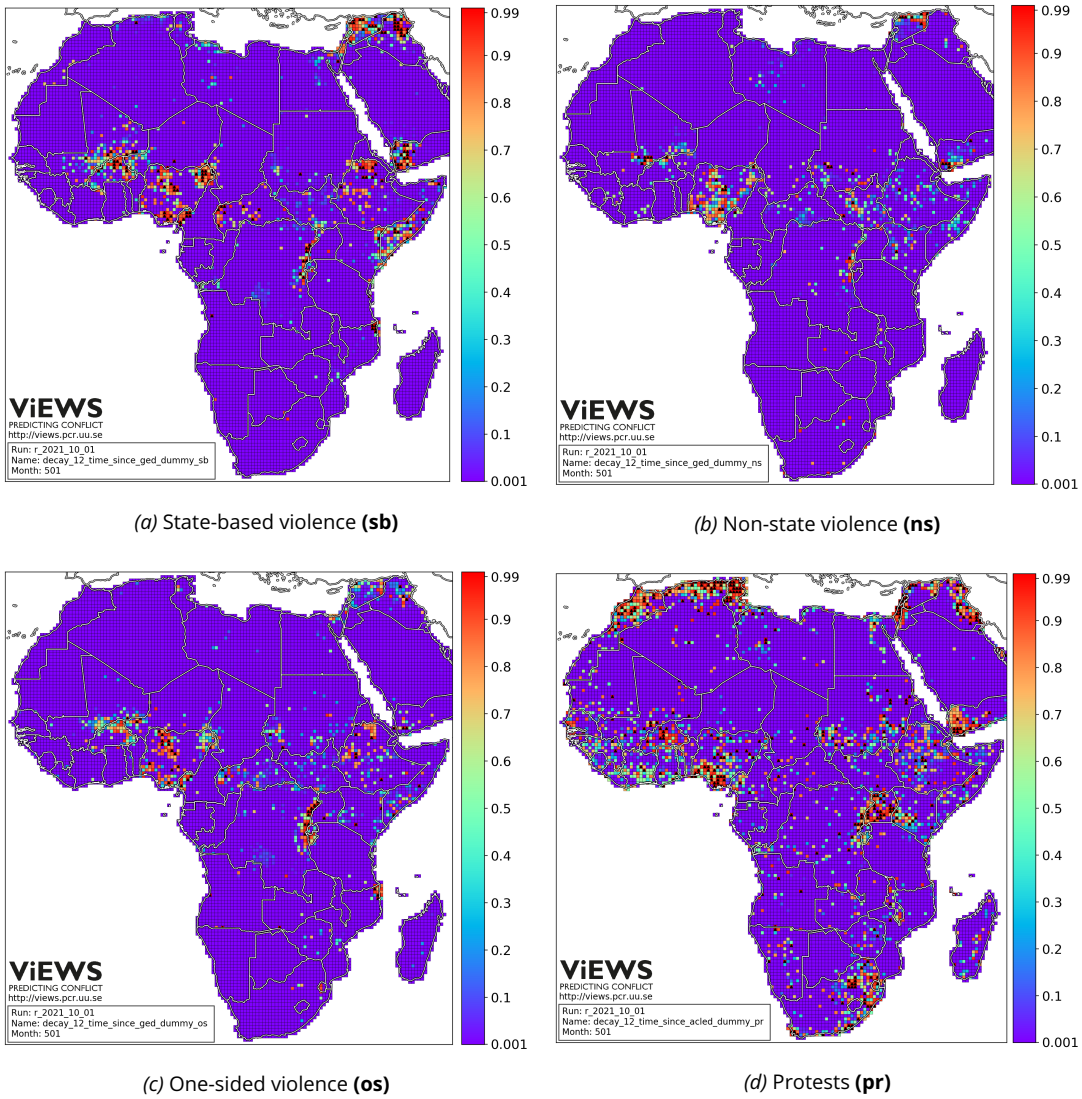
cation, or PRIO-GRID cell) location [1] and month across the African continent.

Figure 3b and 3d show how the respective forecasts have changed since last month.[2] Red colors point to heightened risks, whereas blue colors indicate that risks have reduced. The severity of each risk alteration (by percentage points, *pp*) is illustrated by the color saturation; white indicating no change. Figure 3b shows that conflict risks at the country level have increased notably (red colors) in Ethiopia, Chad, Niger, and Egypt, while reducing (blue colors) in Mali, Libya, Sudan and South Sudan, as well as in Somalia, Kenya, and Uganda (moderately in the latter two).

The Ethiopian escalation follow continued fighting between Tigray rebels and the Ethiopian government, resulting in over 60 fatalities over the course of August in Afar and Amhara, while the risk increase in Chad can be sourced back to a jihadist attack that took the lives of 26 Chadian soldiers in the Lake Chad region the same month.[3] Egypt, in turn, observed nearly 120 fatalities in August 2021 from fighting between the Egyptian government and IS in the North and Central Sinai governorates. The location of all of these events are marked with black triangles superimposed on red grid cells in the conflict history map in Figure 4a.

Contrary to the cases above, the number of deaths from state-based violence in Niger decreased somewhat between July and August, but increased by nearly 40 in the one-sided violence category. Since actors involved in one-sided violence often also engage in state-based conflicts, the ViEWS system generated a heightened alert also for the latter category this month.

Amongst the countries that observed a reduced conflict risk this month, the UCDP recorded a second month



(a) State-based violence **(sb)**

(b) Non-state violence **(ns)**

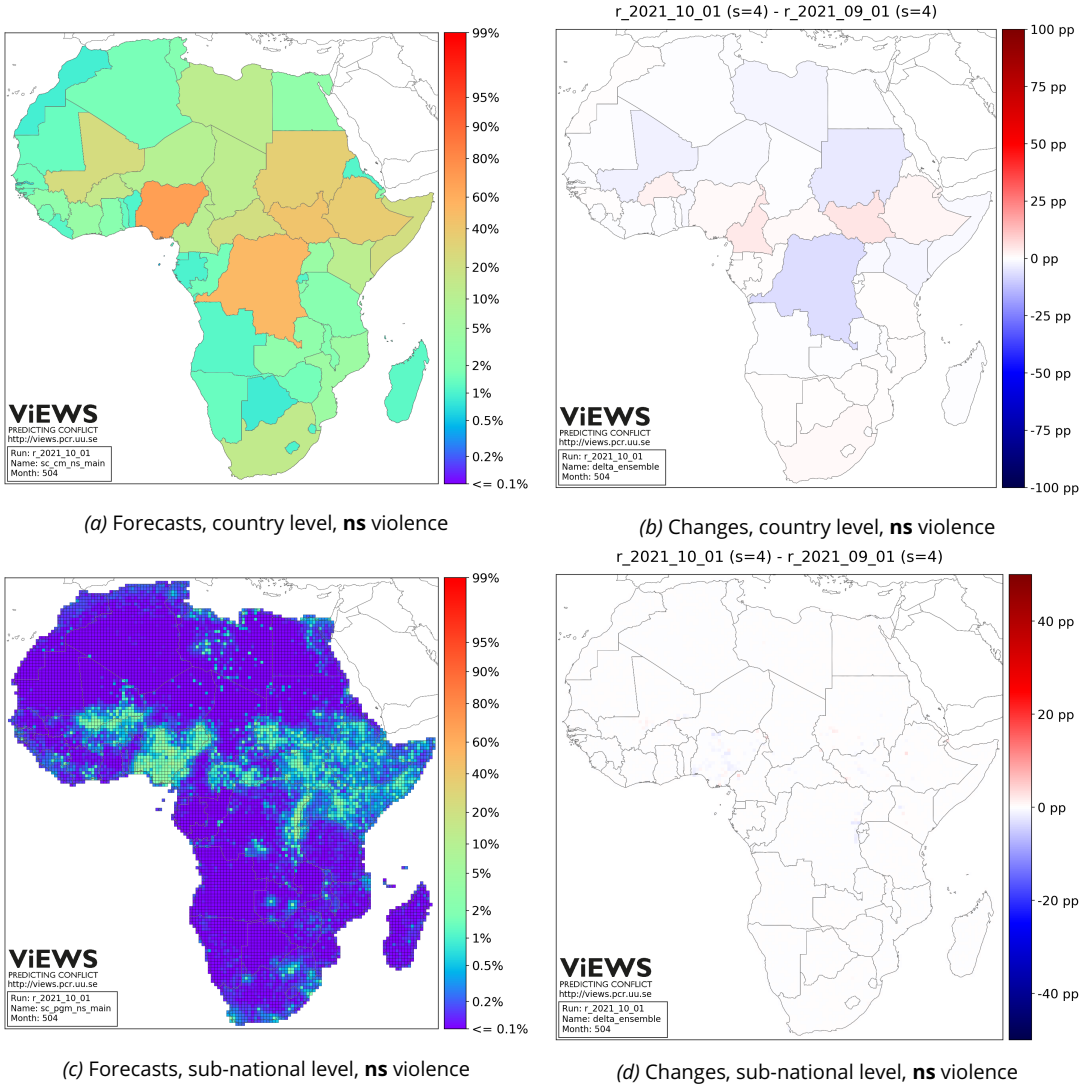
(c) One-sided violence **(os)**

(d) Protests **(pr)**

Figure 4. Illustrations of the recent history of fatal political violence as well as protests (violent and non-violent), as recorded by the UCDP (`http://ucdp.uu.se`) and ACLED (`http://acleddata.com`), respectively. Red cells observed qualifying incidents in August 2021 (distinguished by a black marker) or July 2021. Purple cells have not experienced such incidents for many years.

free from state-based violence in Libya and South Sudan, a decline in fatalities in Kenya and Uganda, and only one fatality in Sudan (coupled with notable declines in the non-state and one-sided violence categories).

Last, the risk declines in Mali and Somalia may appear somewhat counterintutive for those closely following the UCDP conflict data updates, as both countries saw a rise in state-based fatalities this August. In addition, Somalia saw an elevation also of one-sided violence, and Mali for both one-sided and non-state conflict. The reason why the ViEWS system is still able to show a reduced predicted probability of state-based conflict in the near future lies in the so-called ensemble modeling that informs the final forecasts – the ViEWS system is informed by a number of sub-models that capture different themes of conflict predictors. While UCDP-recorded conflict history is the by far most important predictor of future violence in the ViEWS system, it is only one of many sub-models, even within the theme of conflict history. From a review of the forecasts generated by each of these sub-models (available in the October data release of the ViEWS forecasts), we find that the sub-model informed by ACLED data on conflict history, both of the dynamic simulation models (within the conflict history theme), and the sub-model informed by The Rulers, Elections, and Irregular Governance (REIGN) dataset, all show reducing risks for Mali as compared to last month. Their relative contribution to the final – ensemble – forecasts were strong enough to offset the effect of the spike in state-based fatalities this August. A similar reasoning applies for Somalia: the minor alert generated



(a) Forecasts, country level, **ns** violence

(b) Changes, country level, **ns** violence

(c) Forecasts, sub-national level, **ns** violence

(d) Changes, sub-national level, **ns** violence

Figure 5. Forecasts for the risk (0-100%) of at least 25 fatalities (country level, top left) and 1 fatality (sub-national level, bottom left) from non-state (**ns**) violence in December 2021, and changes to the respective forecasts since last month by percentage points (right-hand column).

by the UCDP conflict history sub-model was offset by risk reductions from the ACLED violence and onset models. For more about the models, please see the appendix.

The impact of the conflict events discussed above is particularly evident from the recent changes to the sub-national forecasts. In Figure 3d, mapping changes to the risk of at least one fatality per approximately 55x55 km location and month over the near future, we see locations at heightened risk in all of the countries that observed fatal violence in August 2021 above. Other geographic locations that observe heigtened tensions include: nortern/north-eastern Burkina Faso, the Far North of Cameroon, north-eastern Yobe and Borno state in Nigeria,[4] and the Cabo Delgado province of Mozambique (militant Islamist activity); Katsina, Kaduna, Zamfara, and Niger states in Nigeria (banditry and military operations to combat them); Anglophone Cameroon (the Ambazonia separatist movement), CAR (continued clashes between rebels and government, or government-affiliated forces), and the Ituri and Kivu provinces of DRC (clashes between government forces and various armed groups).

NON-STATE CONFLICT (NS)

Seen from the mostly blue, green, or light orange shades in Figure 5a, the short-term risks of 25 or more fatalities per month from conflict between two or more armed non-state groups (non-state conflict) are relatively low for the strong majority of the African countries, most often less than 10 or even 5%. The system nevertheless alerts to high risks of conflict in both DRC and Nigeria, and somewhat lesser but pronounced risks in Sudan, South Sudan,

Ethiopia, Somalia, CAR, Burkina Faso, and Mali.

The sub-national forecasts are closely correlated with the country-level predictions. Geographic locations at risk of at least one fatality per month over the near future form a belt spanning the Horn of Africa, the southern parts of Sudan, South Sudan, CAR, south-eastern and south-western Chad, northern-most and Anglophone Cameroon, the whole of Nigeria, and the tripartite border area between Mali, Burkina Faso and Niger (Figure 5c). A more intense risk cluster is also found in the Ituri and Kivu provinces of DRC, coupled with scattered at-risk locations across Libya, lands along the Nile delta, southern Côte d'Ivoire and Guinea, West Kasai in DRC, and the largest cities in South Africa.

At the country-level, changes to the forecasts since last month point to reducing risks in DRC (with only one fatality from non-state violence in August 2021), Sudan (a drop by nearly 30 fatalities between July and August), and Mali,[5] with heightened risks in Cameroon and South Sudan (Figure 5b).

The risk elevation in Cameroon follow a bout of ethnic violence between fishers from the Mousgoum ethnic groups and Arab Herders in the Far North, which took 26 lives this August, coupled with the killing of a separatist fighter in the North-West region. South Sudan, in turn, observed fighting on three fronts this August: communal clashes between Balanda and Azande communities in West Equatoria state killing a total of 170 people,[6] intercommunal violence in Warrap state resulting in 35 deaths, and fighting between rival factions of the SPLA-IO in Upper Nile state, causing 32 deaths.

The model does not expect much to change at the sub-national level over the next few months – the change map in Figure 5d is almost completely blank. Somewhat reducing risks are nevertheless found across Nigeria as the number of deaths from non-state violence dropped by nearly 50 between July and August 2021 (August being the last month of data informing the October forecasts). Mild local increases are also found in the Mopti region of Mali (where militant Islamist violence was observed, see Figure 4b), in Sudan's Darfur (attacks by, and clashes between, armed groups), the South Sudanese border to CAR (see above) and in Kenya's Baringo county (banditry). More accentuated risk elevations are in turn detected in Ethiopia's Oromiya region (ethnic violence), as well as in the Anglophone and Far North regions of Cameroon, discussed above.

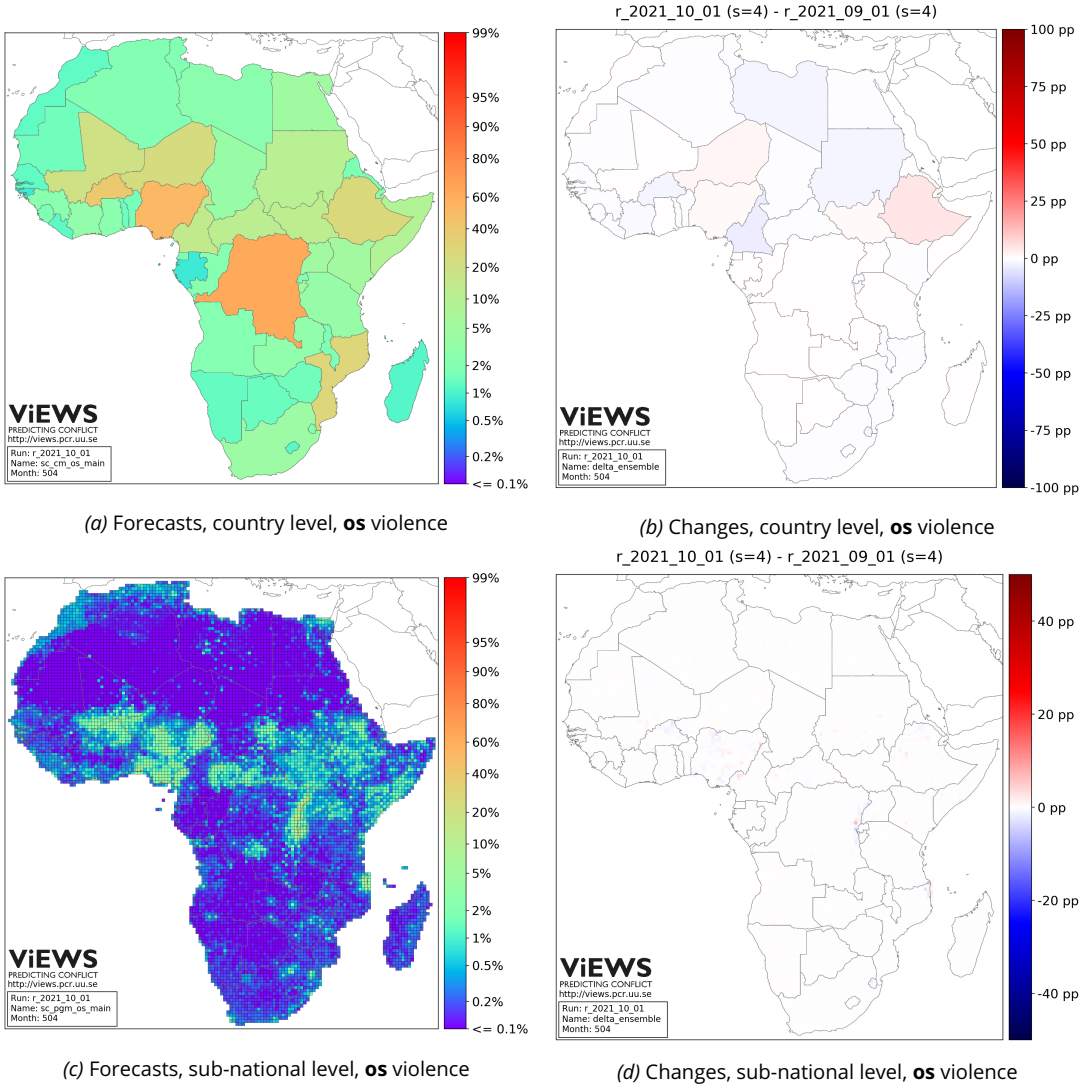
ONE-SIDED VIOLENCE (OS)

With a handful exceptions, the risks of 25 or more fatalities per month are relatively low (less than 5–10%) also with regards to one-sided violence – violence exerted by an armed actor against unarmed civilians – for the majority of African countries. Most pronounced are the risk profiles for DRC, Nigeria, and Burkina Faso (bright orange colors in Figure 6a). Also Mali, Niger, Ethiopia, Mozambique, Cameroon, CAR, Sudan, South Sudan, and Somalia nevertheless stand out in the conflict forecasts for December 2021.

At the sub-national level, assessing the risk of at least one fatality per approximately 55x55km location, results are more refined (Figure 6c). We find the Ituri and Kivu provinces of DRC to be particular hot-spots for one-sided violence, persistently plagued by police brutality, Islamist militants, and various armed groups. A less severe risk cluster is also found over DRC's Kasai/Kasai-Central. In Nigeria, in turn, particular high-risk locations include Borno state (grappling with Boko Haram and IS-affiliated groups), Katsina, Kaduna, and Zamfara states (with a history of banditry), and the southern states. Other 'hot-spots' include northernmost Cameroon, Cabo Delgado in Mozambique, and the broader tripartite risk cluster spanning central Mali, northern/north-eastern Burkina Faso, and south-western Niger (all of which are prone also to state-based violence due militant Islamist operations in the area); Anglophone Cameroon; central and western CAR; and Darfur in Sudan. Last, a more diffuse risk cluster is found over the Horn of Africa.

Changes to the sub-national forecasts as compared to last month are mostly mild and confined to the high-risk areas above (Figure 6d). Most notable is the red grid cell in DRC's North Kivu, in which the predicted probability of fatal violence has increased since last month following the CMC killing of a deserter on August 20th, while the larger province suffered a number of ADF attacks the same month. We also see a cluster of grid cells at somewhat higher conflict risk in Cameroon's Far North (a Boko Haram attack that killed two on August 20th), as well as in the Anglophone region (civilian casualties at the hands of both the Ambazonia insurgents and government forces over the course of August 2021).

Changes to the forecasts are moderate also at the country level, where Ethiopa is the only country to show a notable risk elevation since last month. The heightened risk follow an OLA attack in Kiramu woreda that claimed



(a) Forecasts, country level, **os** violence

(b) Changes, country level, **os** violence

(c) Forecasts, sub-national level, **os** violence

(d) Changes, sub-national level, **os** violence

Figure 6. Forecasts for the risk (0-100%) of at least 25 fatalities (country level, top left) and 1 fatality (sub-national level, bottom left) from one-sided (**os**) violence in December 2021, and changes to the respective forecasts since last month by percentage points (right-hand column).

150 lives on August 18th.

NOTES

1. The systematic grid structure formed is known as the PRIO-GRID. It is the most spatially granulated level that the ViEWS system currently produces forecasts for. See page 9 for the full definition.

2. Changes to the risk assessments as compared to last month are indicative of effects from new input data, most commonly by publicly available conflict and protest data from the Uppsala Conflict Data Program (UCDP, `http://ucdp.uu.se`) (Pettersson, Högbladh, and Öberg, 2019; Sundberg and Melander, 2013; Hegre et al., 2020) and the Armed Conflict Location and Event Dataset (ACLED, `http://acleddata.com`) (Raleigh et al., 2010).

3. Unless otherwise stated, all fatality counts and details on conflict events noted in this report are derived from the latest relase of the Uppsala Conflict Data Program (UCDP, `https://ucdp.uu.se`) Candidate Events Dataset (Pettersson, Högbladh, and Öberg, 2019; Sundberg and Melander, 2013; Hegre et al., 2020), here the September 2021 release covering the month of August 2021. Any fatality counts listed correspond to the 'best estimate' records.

4. Albeit remaining a conflict hot-spot, risks are

however mostly reducing in Borno.

5. The decline in Mali follows the same logic that applied to the risk reduction in the state-based conflict category. Mali saw an increase in monthly non-state fatalities from 25 to 48 between July and August, but the ViEWS forecasts suggest a reducing risk for the country. While the sub-models informed by UCDP conflict data do show a risk increase this month, the models informed by ACLED protest and conflict data – making use of less restrictive definitions and thus capturing a greater range of violent and non-violent events – show a significantly reduced risk relative to the forecasts generated in September 2021. Also the sub-model capturing the conflict history of adjacent countries shows a reducing risk for Mali this month. When combined, the intial alert is thus offset by the ACLED and neighbour history models, resuling in a mild risk reduction also for non-state violence in Mali over the near future.

6. Please note that the death toll is reported as a summary event by the UCDP – the date of each death has not yet been confirmed and may not all have occurred in August 2021.

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DATA SOURCES

Conflict and protest data

Uppsala Conflict Data Program (UCDP)
http://ucdp.uu.se

Armed Conflict Location and Event Data (ACLED)
https://acleddata.com

Other input data

Varieties of Democracy (V-Dem)
https://v-dem.net

World Bank World Development Indicators (WDI)
https://datacatalog.worldbank.org/dataset/world-development-indicators

International Crisis Group's Crisis Watch (ICGCW)
https://www.crisisgroup.org/crisiswatch

PRIO-GRID dataset
`https://grid.prio.org/#/`
REIGN Rulers, Elections, and Irregular Governance dataset (REIGN), `https://oefdatascience.github.io/REIGN.github.io/`
SPEI Global Drought Monitor (SPEI)
`https://spei.csic.es/index.html`
Shared Socioeconomic Pathways dataset (SSP)
`https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=welcome`
Ethnic Power Relations dataset (EPR)
`https://icr.ethz.ch/data/epr/`

DEFINITIONS AND MODELING SET-UP

Types of violence

The ViEWS forecasts take the form of monthly probabilistic assessments of the risk and likely severity of three forms of organized political violence occurring in a given month, as defined by the Uppsala Conflict Data Program (UCDP):

- **State-based (sb) violence**: the use of armed violence over either government or territory between armed actors, in which at least one is a government of a state;
- **Non-state (ns) violence**: the use of armed force between two organized armed groups, neither of which is a government of a state, and;
- **One-sided (os) violence**: the deliberate use of armed force by the government of a state, or by a formally organized group, against civilians.

Levels of analysis

The results are presented at two levels of analysis using the calendar month as the temporal unit of analysis:

- The country-month (*cm*) level, which follows the country outline determined by CShapes (Weidmann, Kuse, and Gleditsch, 2010), and;
- The PRIO-GRID-month (*pgm*) level, which is outlined by fine-grained geographical locations known as PRIO-GRID-cells, a global quadratic grid structure with cells measuring 0.5 x 0.5 degrees in longitude and latitude, spanning approximately 55 km^2 along the equator (Tollefsen, 2012, `https://grid.prio.org/#/`).

Model descriptions

The forecasting system consists of a suite of forecasting models, each of which has been trained to capture the effects of a particular theme of conflict-inducing factors.

At the national level, the system gives particular weight to structural, slow-moving features and patterns that often characterize countries over a longer period of time, such as the stability of political institutions, democracy indices, and socio-economic factors. It also relies heavily on a number of conflict and protest history models that capture not only the long-term trends in each country and region, but also the most recent developments in each country. Changes to the ViEWS projections are nevertheless most often informed by the latter, more specifically by data updates from the Uppsala Conflict Data Program (UCDP, `http://ucdp.uu.se`) and the Armed Conflict Location and Event Dataset (ACLED, `http://acleddata.com`).

While the national level forecasts do inform the the local forecasts—and vice versa—the forecasting models employed at the two levels of analysis differ from each other. Models informing the national level forecasts bring, for instance, valuable structural and historical factors to the table, whereas models tailored to the sub-national level excel in accentuating effects from local compound risks. This includes—but is not limited to—heightened risks related to local demography, terrain, proximity to natural resources, local precipitation levels, droughts, and conflict history in neighbouring areas. The two sets of forecasts should therefore be seen as separate assessments, which nevertheless are best interpreted in conjunction with each other.

The full suite of forecasting models are described in detail in Appendix B and C to our Special Data Feature in *Journal of Peace Research* (Hegre et al., 2021), available at `https://pcr.uu.se/research/views/publications/`.

Steps s ahead

In some figures, you may see a reference to a particular step s. This refers to the internal ViEWS notation for what number of months ahead (1-36) a given forecast is produced. In any given run of the forecasting system, $s = 1$ refers to the first calendar month following the last month of available data. In this report, the last month of available data was August 2021). Forecasts for $s = 1$ would thus effectively have referred to forecasts for last month, $s = 2$ to the 'nowcast' for the month of writing, $s = 3$ to the forecasts for the following calendar month, and so forth.

FUNDING

The research presented in this report was funded by the European Research Council, project H2020-ERC-2015-AdG 694640 (ViEWS), and Uppsala University.

COLLABORATIONS

ViEWS has an active interaction with other projects, including CLIMSEC, CAVE and CROP at PRIO (`https://prio.org/`), the MISTRA Geopolitics project, and most importantly the Uppsala Conflict Data Program (`https://ucdp.uu.se/`) at Uppsala University.

CODEBASE & PUBLICATIONS

ViEWS' codebase is available at:

`https://github.com/UppsalaConflictDataProgram/OpenViEWS2`

The full list of publications are accessible at:

`https://pcr.uu.se/research/views/publications/`