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# Detailed forecasts January 2020–December 2022

Online appendix F to ViEWS<sub>2020</sub>: Revising and evaluating the ViEWS political  
Violence Early-Warning System.

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## Abstract

In this appendix we present supplementary material on the forecasts presented in the main article. Section F-1 shows forecasts for state-based conflict, F-2 for one-sided, and F-3 for non-state. In each section, we include figures showing the forecasts for all countries in Africa. We also look more closely into six countries referred to in the main article: Mali, Burkina Faso, Cameroon, Mozambique, Nigeria, and Egypt.

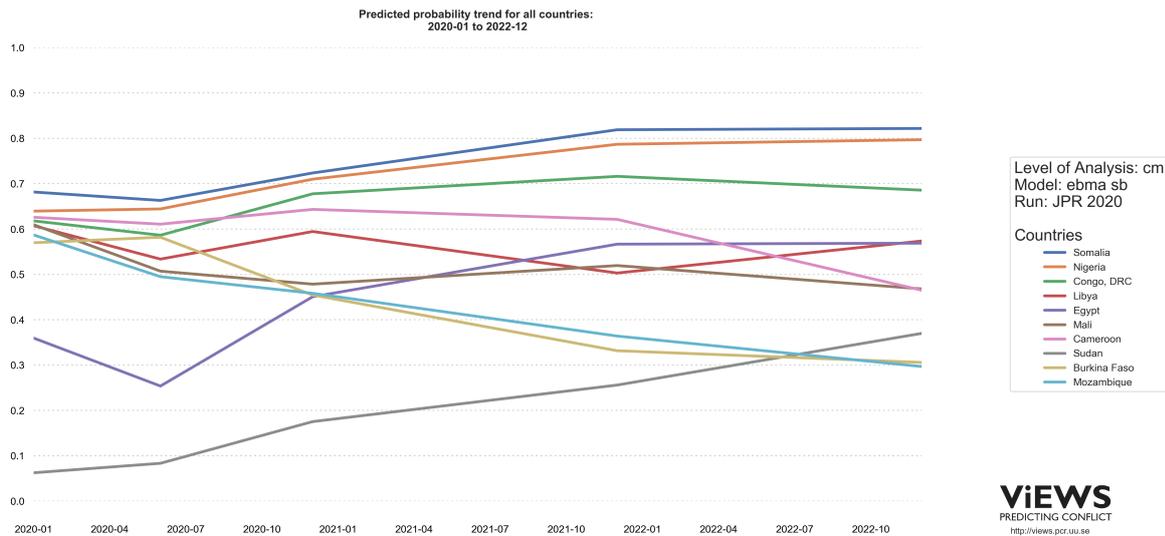
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## F-1 STATE-BASED (SB) CONFLICT

Figure F-1 shows the predicted probability of at least 25 battle-related deaths (BRDs) in state-based **sb** conflict for a selection of countries over the forecasting period. Figure F-2 shows the same information in map form for three months in the forecasting period: March 2020 (for  $s = 3$  months into the future beyond the last month with data), December 2020 ( $s = 12$ ), and December 2022 ( $s = 36$ ).

Figure F-1. Predicted probabilities of at least 25 BRDs per month in **sb** conflict at the *cm* level for a selection of countries in Africa, January 2020–December 2022



Nigeria, DRC, and Somalia are expected to remain the countries with most state-based conflict in Africa, as our *cm* model predicts at least 25 BRDs per month with a probability of 0.6 or higher from late summer 2020 and onwards in all three countries (Figure F-1). The *pgm* model further suggests **sb** violence will be concentrated in the regions where violence has been most intensive over the past few years, although there is a high risk of diffusion to central Nigeria and Puntland (Figure F-2).

Cameroon and Burkina Faso have high predicted probabilities of conflict over most of 2020, but the model suggests the likelihood of violence is decreasing. The forecasted probabilities in Egypt and Sudan, on the other hand, are increasing over the coming years.

Figure F-2 also show low forecasted risk of state-based violence in much of West and Southern Africa, in addition to Gabon, Eritrea, and Equatorial Guinea. Toward the end of the forecasting period, predicted differences between countries and regions become less clear—a larger proportion of the maps have a green color in the bottom row of Figure F-2. This is to a large extent due to uncertainty—when looking longer into the future we can be much less confident about differences in risk. Since we expect the baseline danger of conflict to remain roughly constant, this turns out as a more evenly-colored prediction map.

To understand these differences in predicted probabilities between countries and over time, looking at the estimated weights of the constituent models is a good point of departure (see Table F-1 and Appendix B). For **sb** conflict, the most important models are the conflict history model (*cflong*), the political institutions model (*vdem\_glob*), the development model (*wdi\_all\_glob*), and the broad model (*all\_glob*). Conflict history is dominating forecasts in the immediate future, whereas socio-economic and political institutions become more important later. Appendix B gives more details about the models and presents prediction maps for each of these models.

Most of the countries and locations with high predicted probability of **sb** conflict have seen recent conflict. Seen from Table F-1, the conflict history model is however estimated to be less important when we forecast 2–

Figure F-2. Predicted probabilities of at least 25 BRDs in **sb** conflict at the *cm* level in March 2020 (top), December 2020 (middle), and December 2022 (bottom)

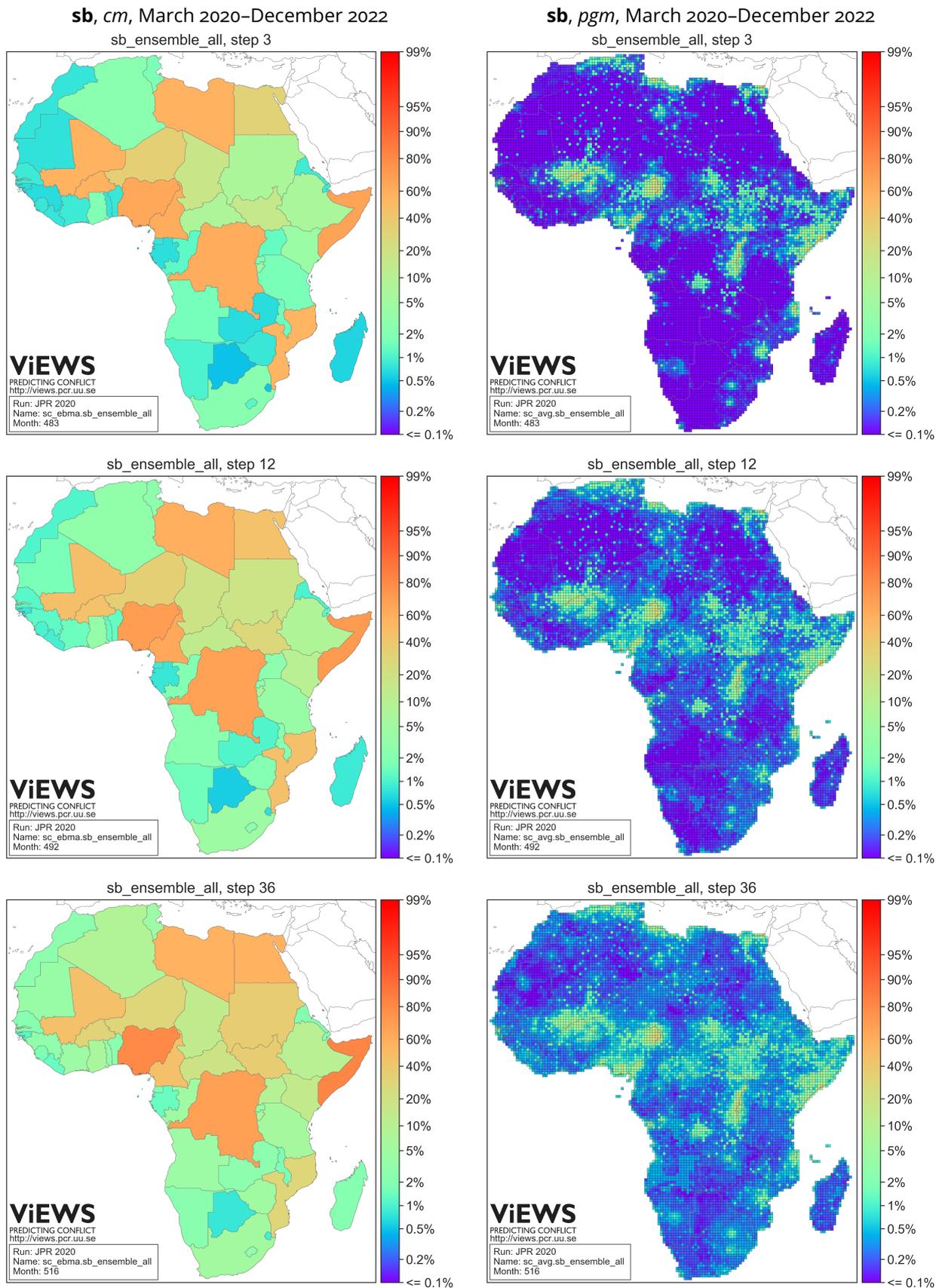
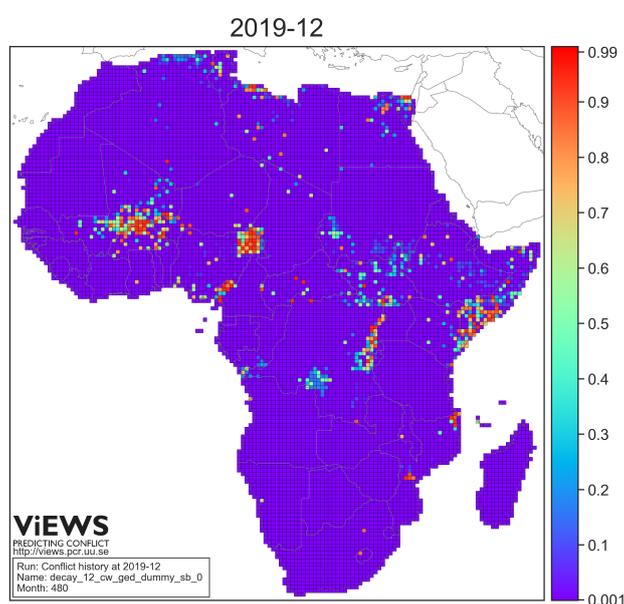


Table F-1. Weights in original EBMA ensemble, **sb**, *cm* level

Model	Step 1	Step 6	Step 12	Step 24	Step 36
sb_cflong	0.2841	0.3076	0.2068	0.1191	0.1958
sb_acled_violence	0.0084	0.0136	0.0112	0.0172	0.0130
sb_neibhist	0.0075	0.0085	0.0078	0.0074	0.0072
sb_cdummies	0.0080	0.0090	0.0102	0.0089	0.0096
sb_acled_protest	0.0055	0.0059	0.0063	0.0059	0.0060
sb_reign_coups	0.0055	0.0059	0.0061	0.0060	0.0061
sb_icgcw	0.0064	0.0071	0.0067	0.0065	0.0065
sb_reign_drought	0.0056	0.0059	0.0060	0.0059	0.0061
sb_reign_glob	0.0083	0.0080	0.0075	0.0067	0.0075
sb_vdem_glob	0.0556	0.0422	0.1452	0.1813	0.2383
sb_demog	0.0104	0.0128	0.0130	0.0125	0.0239
sb_wdi_all_glob	0.1244	0.1010	0.2159	0.3694	0.2735
sb_ds_25	0.1275	0.1037	0.0500	0.0244	0.0206
sb_ds_dummy	0.0335	0.0671	0.0575	0.0307	0.0205
sb_all_glob	0.3028	0.2943	0.2418	0.1893	0.1496
sb_onset24_25_all	0.0064	0.0073	0.0079	0.0088	0.0158

Figure F-3. History of **sb** conflict in Africa up to December 2019, *pgm* level. Red cells saw events with at least one fatality in the latest months.

3 years into the future. When looking longer into the future, institutional and socio-economic factors instead become more important (Collier and Hoeffler, 2004; Fearon and Laitin, 2003; Hegre et al., 2001; Hegre, 2014).

For countries like Somalia, all models indicate a high probability of **sb** conflict. Hence, the predicted probability only increases (see F-2). For countries like Mozambique with a more brief recent conflict history, the predicted probability decreases. For other countries such as Zambia, which have no recent conflict but resemble conflict countries in many other ways, the predicted probability of conflict is estimated to increase.

### F-1.1 A closer look at Burkina Faso, Mali, and Cameroon, *cm* level, **sb**

To improve our intuition of what drives these forecasts, it is instructive to look at the forecasts for individual models in the ensemble at the *cm* level. Here, we will look at Burkina Faso, Mali, and Cameroon. Mali has seen intense **sb** violence over several years, whereas the violence in Burkina Faso and Cameroon is more recent, as seen from Figure F-3. Figure F-4 shows the per-month and cumulative predicted probability of **sb** conflict for these three countries.

Figure F-4. Predicted probabilities for at least 25 BRDs in **sb** conflict at the *cm* level in Burkina Faso, Cameroon, and Mali, January 2020–December 2022. Monthly probabilities (left) and cumulative probabilities (right).

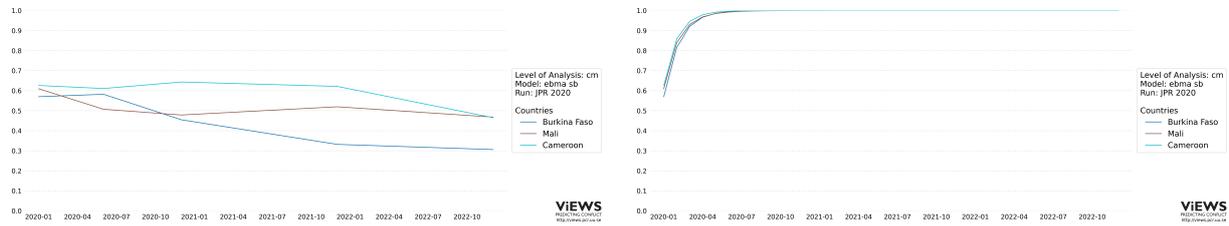


Figure F-5. Contributions to the predicted probabilities of at least 25 BRDs in **sb** conflict at the *cm* level in Burkina Faso, Mali, and Cameroon, for January 2020 (top), December 2020 (middle), and December 2022 (bottom)

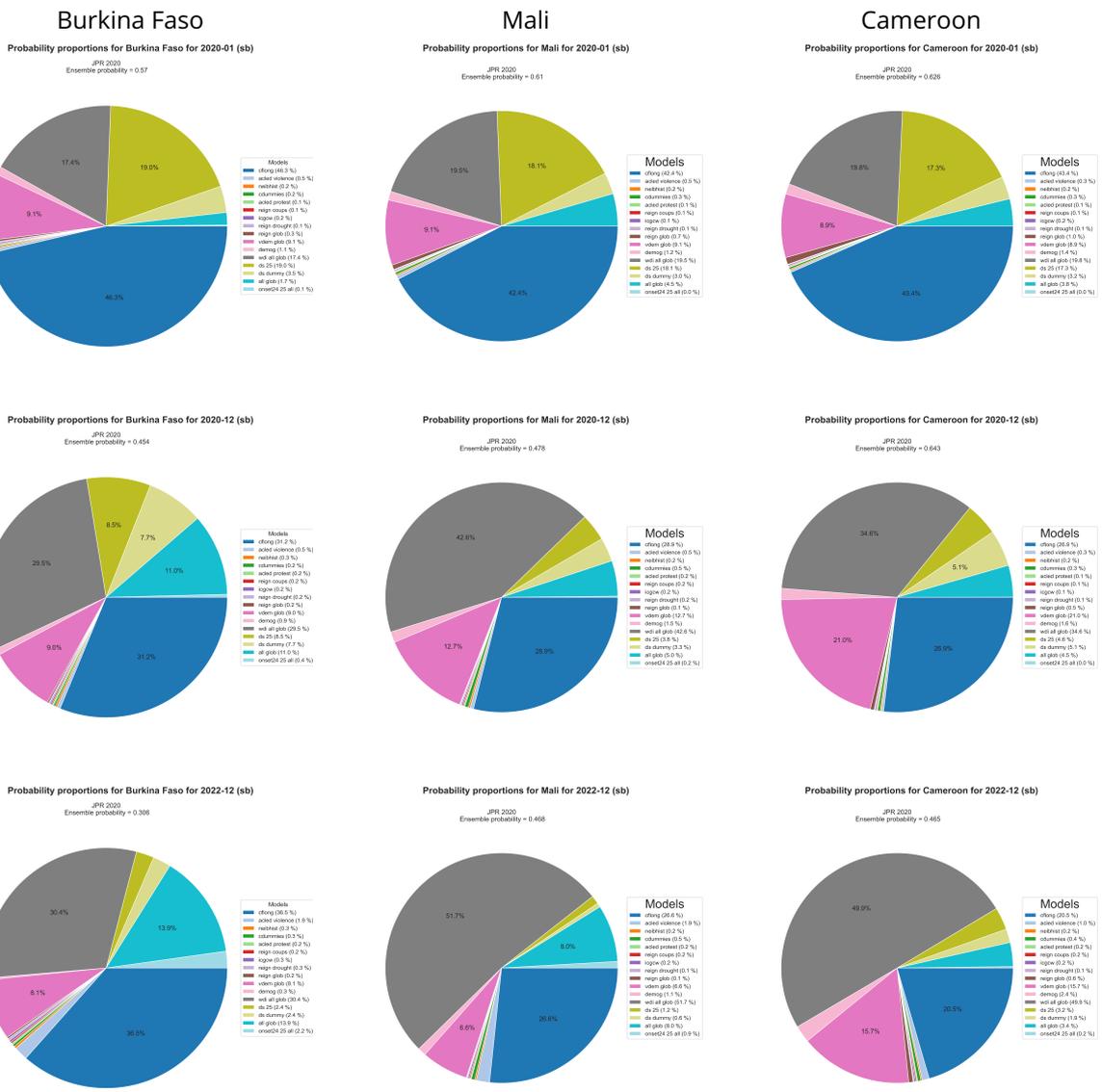


Figure F-5 shows in pie chart form the contribution of each constituent model to the ensemble prediction for **sb** conflict for individual country months—the proportion of the predicted probability that is due to a constituent model in the ensemble.<sup>1</sup> The top row shows the nowcasts for  $s = 1$ , the middle a year into the future ( $s = 12$ ), and the bottom three years out ( $s = 36$ ). Burkina Faso, Mali, and Cameroon have quite similar risk profiles. For the immediate future, nearly half of the predicted probabilities are due to conflict history (blue). Figure F-3 shows the conflict clusters in Mali/Burkina Faso and in Cameroon that are the backgrounds for these forecasts.

The remaining contributions are dominated by political institutions (*vdem\_glob*, pink), socio-economic factors (*wdi\_all\_glob*, grey), and by a set of broad models containing a large number of features (e.g. our dynasim models, green). As we look further out into the future (bottom row of plots), the contribution from immediate conflict history is diminishing, whereas the importance of the others increase. The model including a large number of socio-economic indicators from the World Development Indicators (the grey slice) becomes dominant, in particular for Mali and Cameroon. The WDI model does however not indicate as high a risk of **sb** conflict in Burkina Faso as in the other two countries.

Figure F-6 shows the same information as a line plot. The  $y$  axis shows the predicted probability of at least 25 BRDs in **sb** conflict as the weighted sum of the probabilities from each of the constituent models. The models are represented by the same colors as in the pie charts, and are grouped in themes. At the bottom, we show pure conflict history models, of which *cflong* (blue) is the most important for the near future. In the middle, we find structural models such as *vdem\_glob* and *wdi\_all\_glob*. At the top, we have placed broad models that contain many features. The plots must be interpreted with some caution. When models are highly correlated, the EBMA algorithm may divide weights somewhat arbitrarily between them.<sup>2</sup> Still, the plots suggest how to interpret the forecasts.<sup>3</sup>

### F-1.2 A closer look at Mozambique, Nigeria, and Egypt, *cm* level, **sb**

Figure F-7 shows how the predicted probabilities for state-based conflict as well as the corresponding model contributions change over time for Mozambique, Nigeria, and Egypt. The conflict history of these countries is a major driver of these forecasts. In Mozambique, this refers to the Islamist violence in the Cabo Delgado province and a fresh bout of violence in central Mozambique following the peace agreement (Figure F-3). In Nigeria, most of the **sb** violence is located in the north-east, and in Egypt it is found in Sinai.

For Nigeria and Egypt, the political institutions model (*vdem\_glob*) is more important than for the West African countries discussed above. This is likely due to the combination of democratic and less democratic components of the political system in Nigeria, and the post-Arab spring series of changes in Egypt. In all countries, socio-economic factors such as poverty and inequality are thus driving the risk. In addition, Egypt and Nigeria are very populous countries with a high overall risk of violence (Raleigh et al., 2010).

<sup>1</sup>The contribution is calculated as the predicted probability from a constituent model times the EBMA model weight, divided by the ensemble probability of conflict.

<sup>2</sup>See Appendix B for correlations between predictions.

<sup>3</sup>The series are not very smooth. In the current version of the system, we have estimated the constituent models as well as the ensembles only for steps 1, 6, 12, 24, and 36, and interpolated predicted probabilities between these times. Due to correlations between predictions and random events in the calibration partition, the estimated contributions differ more between each estimated  $s$  than desired. In later releases, ViEWS will estimate models and weights for a higher number of steps as well apply a smoothing function.

Figure F-6. Predicted probabilities of at least 25 BRDs in **sb** conflict at the *cm* level over time, coupled with contributions from constituent models. Burkina Faso (top), Mali (middle), Cameroon (bottom).

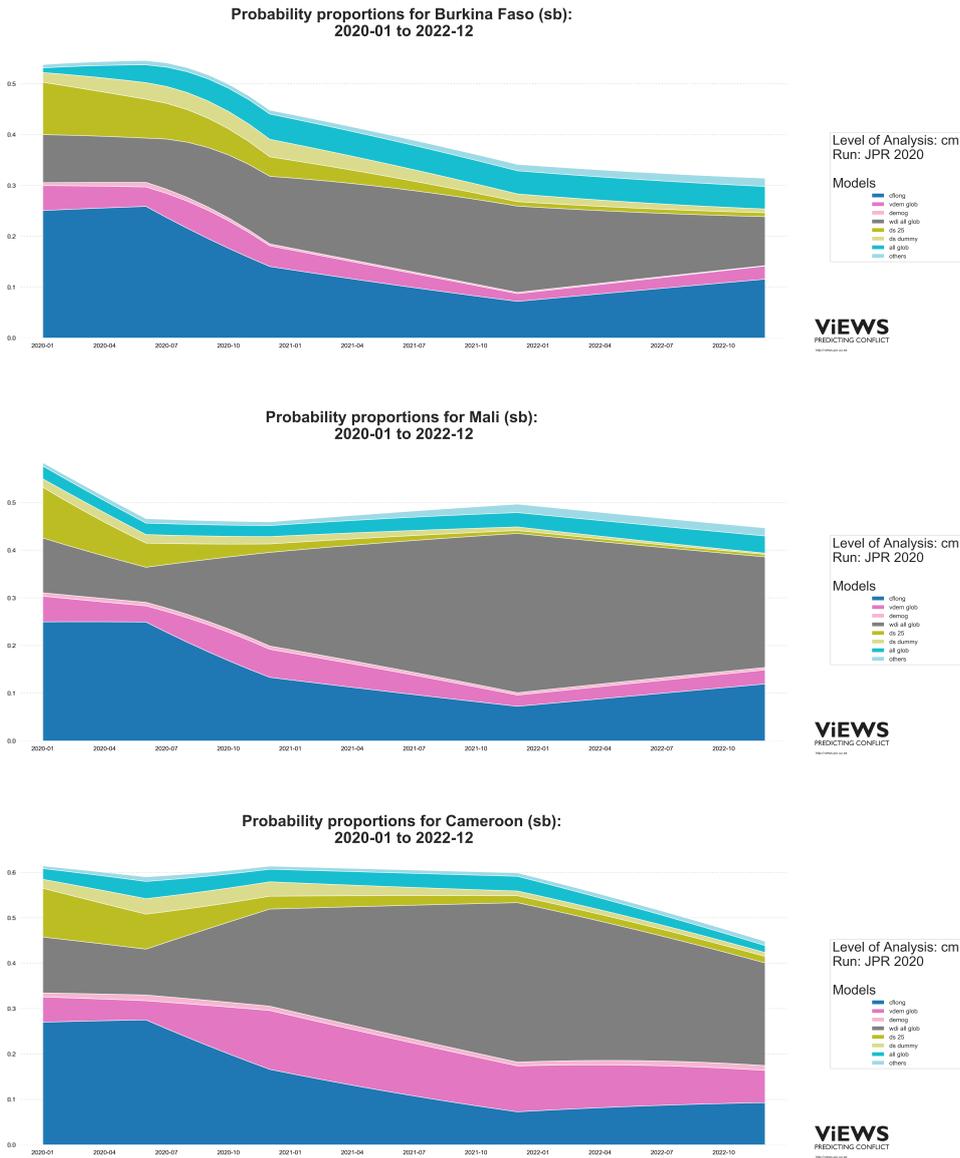
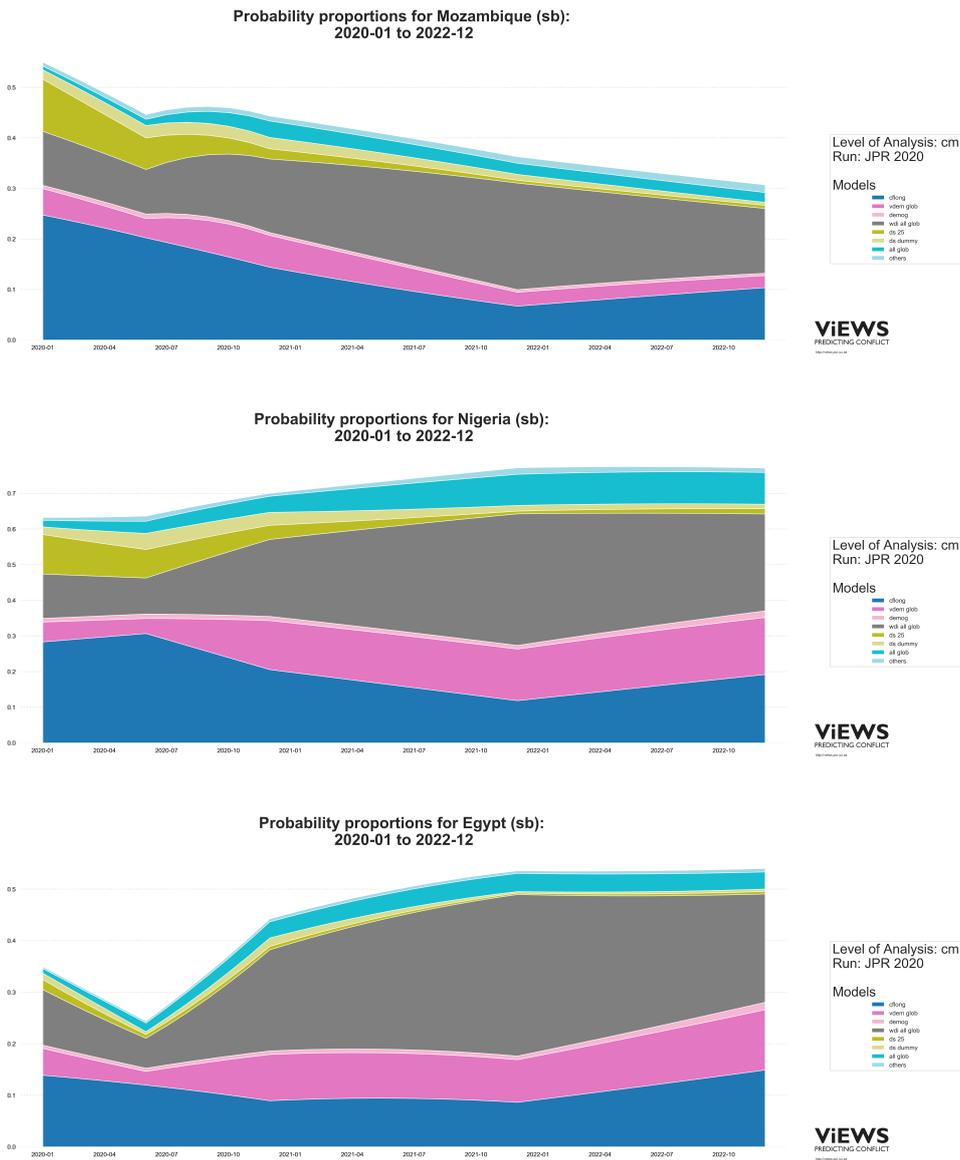


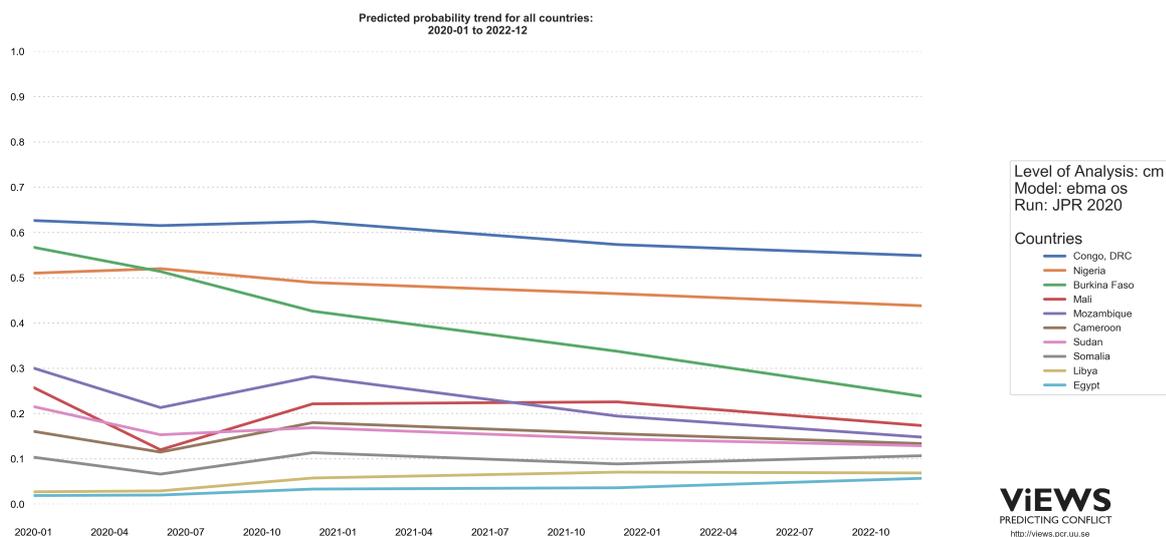
Figure F-7. Predicted probabilities of at least 25 BRDs in **sb** conflict at the *cm* level over time, coupled with contributions from constituent models. Mozambique (top), Nigeria (middle), and Egypt (bottom).



## F-2 ONE-SIDED (OS) VIOLENCE

Figure F-8 shows the predicted probability of at least 25 battle-related deaths in one-sided violence over the forecasting period. Figure F-9 shows the same information in map form, for three months in the forecasting period: March 2020 ( $s = 3$ ), December 2020 ( $s = 12$ ), and December 2022 ( $s = 36$ ). Overall, the predicted probability of at least 25 battle-related deaths in one-sided violence is lower than for **sb** conflict, reflecting that **os** violence is normally less lethal (Pettersson and Eck, 2018, p. 536).

Figure F-8. Predicted probabilities of at least 25 BRDs per month in **os** violence at the *cm* level for a selection of countries in Africa, January 2020–December 2022



Nigeria and DRC remain the countries with highest probability of one-sided violence in Africa, as our model predicts at least 25 BRDs in about half of each of the coming three years (Figure F-8). Burkina Faso also has a high predicted probability of **os** conflict over the next months, but the model sees this risk as receding. We expect less **os** violence in Somalia, Libya, and Cameroon compared to the forecasts for **sb** violence (Section F-1). One-sided violence is however likely to continue in Mozambique, Sudan, Central African Republic and Mali.

The *pgm* model suggests **os** violence will be concentrated in the regions where violence has been most intensive over the past few years (Figure F-9). Compared to **sb** conflict, one-sided violence is more prevalent in Southern Nigeria, and we forecast a high probability of **os** conflict in Darfur.

We also forecast a low risk of **os** violence in much of West and Southern Africa, as well as in North Africa where fighting is predominantly state-based. Toward the end of the forecasting period, predicted differences between countries and regions become less clear – a larger proportion of the maps have a green color in the bottom row of Figure F-9. This is to a large extent due to uncertainty – when looking longer into the future we can be much less confident about differences in risk. Since we expect the baseline danger of conflict to remain roughly constant, this turns out as a more evenly-colored prediction map.

To understand these differences in predicted probabilities between countries and over time, we will again look at the estimated weights of the constituent models (see Table F-2 and Appendix B). Also for **os** conflict, the most important models are the conflict history model *cflong*, the political institutions model *vdem\_glob*, the development model *wdi\_all\_glob*, and the broad model *all\_glob* (see Eck and Hultman, 2007, for an overview). Conflict history is dominating forecasts in the immediate future, whereas socio-economic and political institutions become more important later. Appendix B shows prediction maps for each of these models.

Figure F-9. Predicted probabilities of at least 25 BRDs in **os** violence at the *cm* level in March 2020 (top), December 2020 (middle), and December 2022 (bottom)

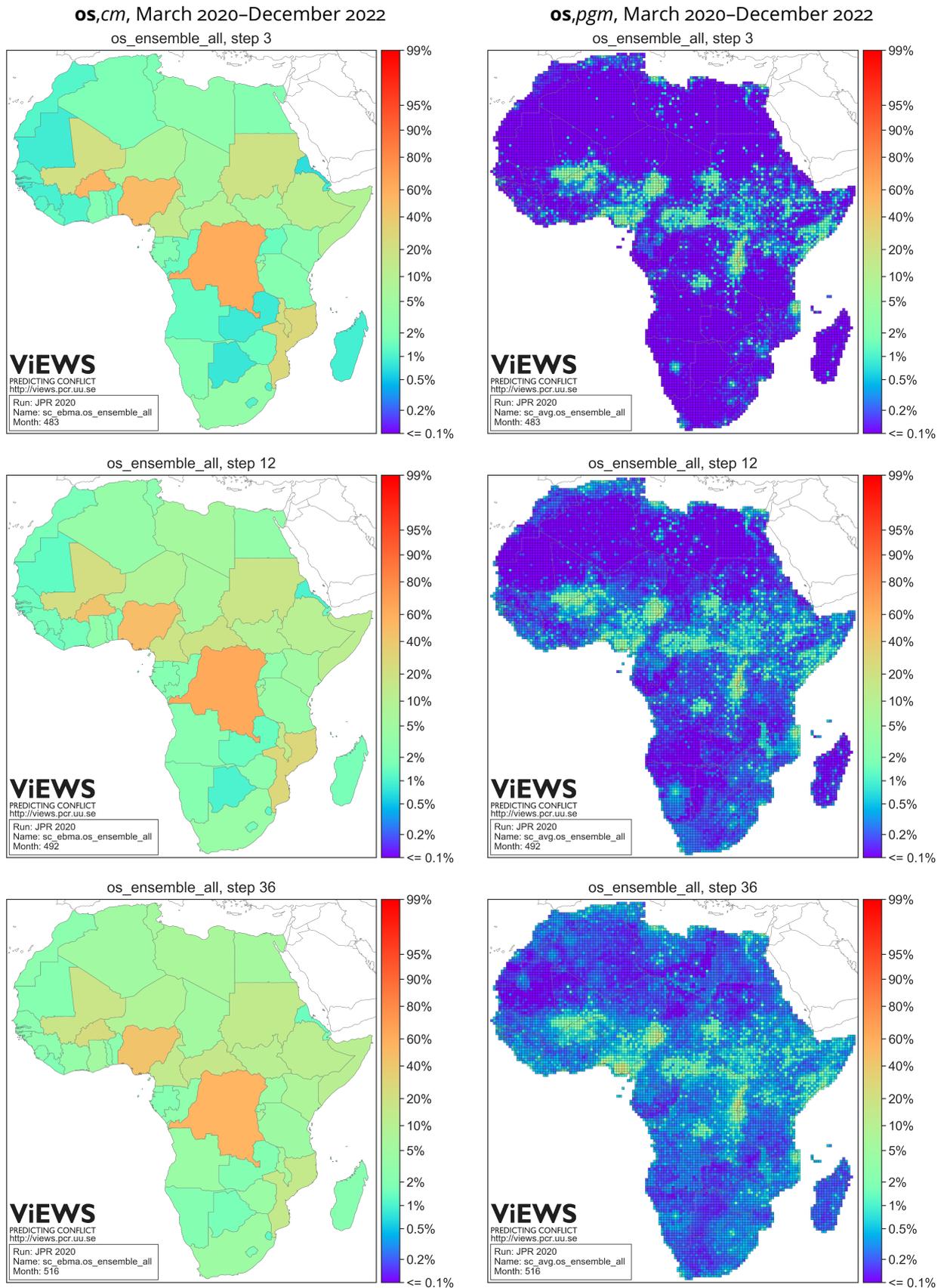
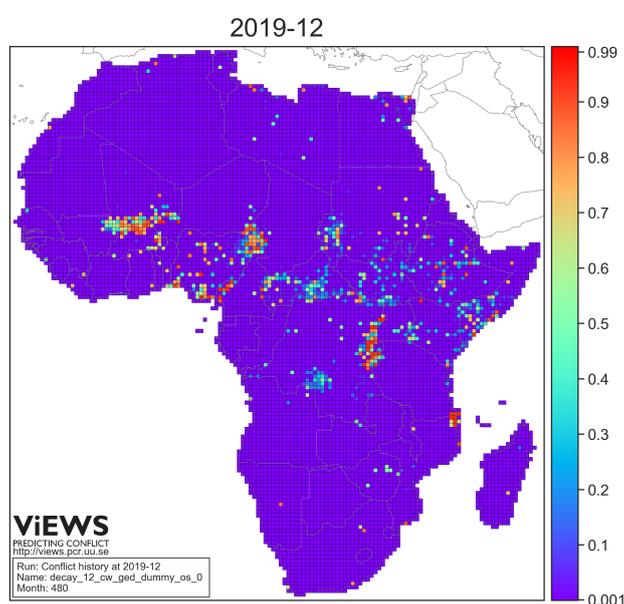


Table F-2. Weights in original EBMA ensemble, **os**, *cm* level

Model	Step 1	Step 6	Step 12	Step 24	Step 36
sb_cflong	0.2841	0.3076	0.2068	0.1191	0.1958
sb_acled_violence	0.0084	0.0136	0.0112	0.0172	0.0130
sb_neibhist	0.0075	0.0085	0.0078	0.0074	0.0072
sb_cdummies	0.0080	0.0090	0.0102	0.0089	0.0096
sb_acled_protest	0.0055	0.0059	0.0063	0.0059	0.0060
sb_reign_coups	0.0055	0.0059	0.0061	0.0060	0.0061
sb_icgcw	0.0064	0.0071	0.0067	0.0065	0.0065
sb_reign_drought	0.0056	0.0059	0.0060	0.0059	0.0061
sb_reign_glob	0.0083	0.0080	0.0075	0.0067	0.0075
sb_vdem_glob	0.0556	0.0422	0.1452	0.1813	0.2383
sb_demog	0.0104	0.0128	0.0130	0.0125	0.0239
sb_wdi_all_glob	0.1244	0.1010	0.2159	0.3694	0.2735
sb_ds_25	0.1275	0.1037	0.0500	0.0244	0.0206
sb_ds_dummy	0.0335	0.0671	0.0575	0.0307	0.0205
sb_all_glob	0.3028	0.2943	0.2418	0.1893	0.1496
sb_onset24_25_all	0.0064	0.0073	0.0079	0.0088	0.0158

Figure F-10. History of **os** violence in Africa up to December 2019, *pgm* level. Red cells saw events with at least one fatality in the latest months.

As shown in Figure F-10, most of the countries and locations with high predicted probability of **os** conflict have recent violence of this form. This is particularly true for Burkina Faso, Nigeria, and DRC. With the exception of Mozambique and Mali, West and Southern Africa has seen little **os** violence.

When looking longer into the future, institutional and socio-economic factors become more important also when forecasting **os** violence. Burkina Faso, Nigeria, and DRC are predicted to have a high probability of **os** violence also based on these models (see the model-specific prediction maps in Figure B-6, Appendix B). In addition, our political institutions model (*vdem\_glob*) suggests that Somalia, Ethiopia, Sudan, Cameroon, and Mozambique are prone to one-sided violence over the longer horizon. The socio-economic model (*wdi\_all\_glob*) highlights the same set of countries as most at risk.

The model suggests that Malawi is somewhat at risk of **os** violence. This is mainly due to an erroneous observation of such violence that the UCDP has since corrected.

### F-2.1 A closer look at Burkina Faso, Mali, and Cameroon, *cm* level, **os**

Again, it is instructive to look at the forecasts for individual models in the ensemble at the *cm* level to get a sense of why the model forecasts what it does. Figure F-11 shows the per-month and cumulative predicted probability of **os** violence for Burkina Faso, Mali, and Cameroon.

Figure F-11. Predicted probabilities for at least 25 BRDs in **os** violence at the *cm* level in Burkina Faso, Cameroon, and Mali, January 2020–December 2022. Monthly probabilities (left) and cumulative probabilities (right).

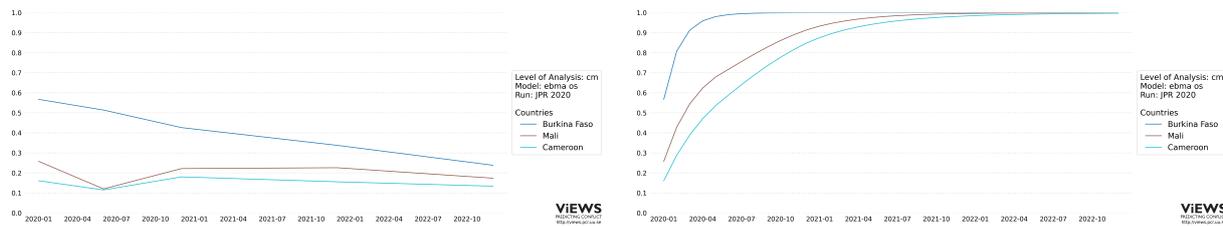


Figure F-12 shows the contribution of each constituent model to the ensemble prediction for **os** violence for individual country-months in pie chart form—the proportion of the predicted probability that is due to a constituent model in the ensemble.<sup>4</sup> The top row shows the nowcasts for  $s = 1$ , the middle a year into the future ( $s = 12$ ), and the bottom three years out ( $s = 36$ ).

For **os** violence, past incidents seem less important for the predictions than we saw for **sb** violence, although conflict history also affects the forecasts through some of our broad models such as our *dynasim* (*ds*) models. A much larger proportion of the predicted probability can however be attributed to the *wdi\_glob* and *vdem\_glob* models in the cases of Burkina Faso and Mali. For Cameroon, the WDI model is less important.

Figure F-13 shows the same information in line plot form. The  $y$  axis shows the predicted probability of at least 25 deaths in **os** conflict as the weighted sum of the probabilities from each of the constituent models. The models are represented by the same colors as in the pie charts, and are grouped in themes. At the bottom, we show pure conflict history models, of which *cflong* (blue) is the most important. In the middle, we find structural models such as *vdem\_glob* and *wdi\_all\_glob*. At the top, we have placed broad models that contain many features.<sup>5</sup>

Compared to what we saw for **sb** violence, the most important to note is that the overall probability of violence is lower—in general, one-sided violence causes fewer fatalities than state-based. As we noted above, conflict history is less important for the forecasts, and socio-economic factors are main drivers of future risk in Burkina Faso and Mali. The drivers in Cameroon are more diffuse, and the predicted probability is somewhat lower.

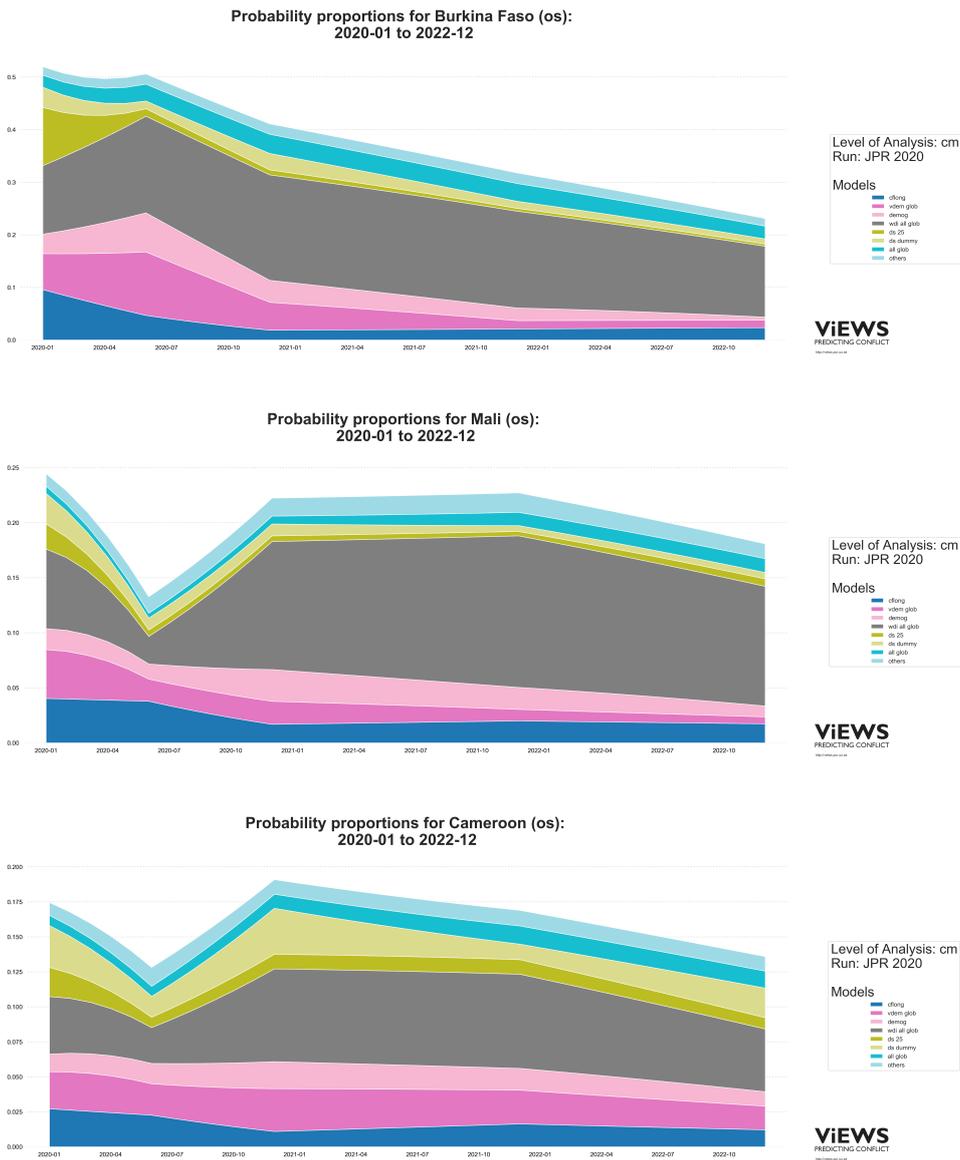
<sup>4</sup>The contribution is calculated as the predicted probability from a constituent model times the EBMA model weight, divided by the ensemble probability of conflict.

<sup>5</sup>The plots must be interpreted with some caution. When models are highly correlated, the EBMA algorithm may divide weights somewhat arbitrarily between them. Still, the plots suggests how to interpret the forecasts. See Appendix B for correlations between models.

Figure F-12. Contributions to the predicted probabilities of at least 25 BRDs in **os** violence at the *cm* level in Burkina Faso, Mali, and Cameroon, for January 2020 (top), December 2020 (middle), and December 2022 (bottom)



Figure F-13. Predicted probabilities of at least 25 BRDs in **os** violence at the *cm* level over time, coupled with contributions from constituent models. Burkina Faso (top), Mali (middle), Cameroon (bottom).

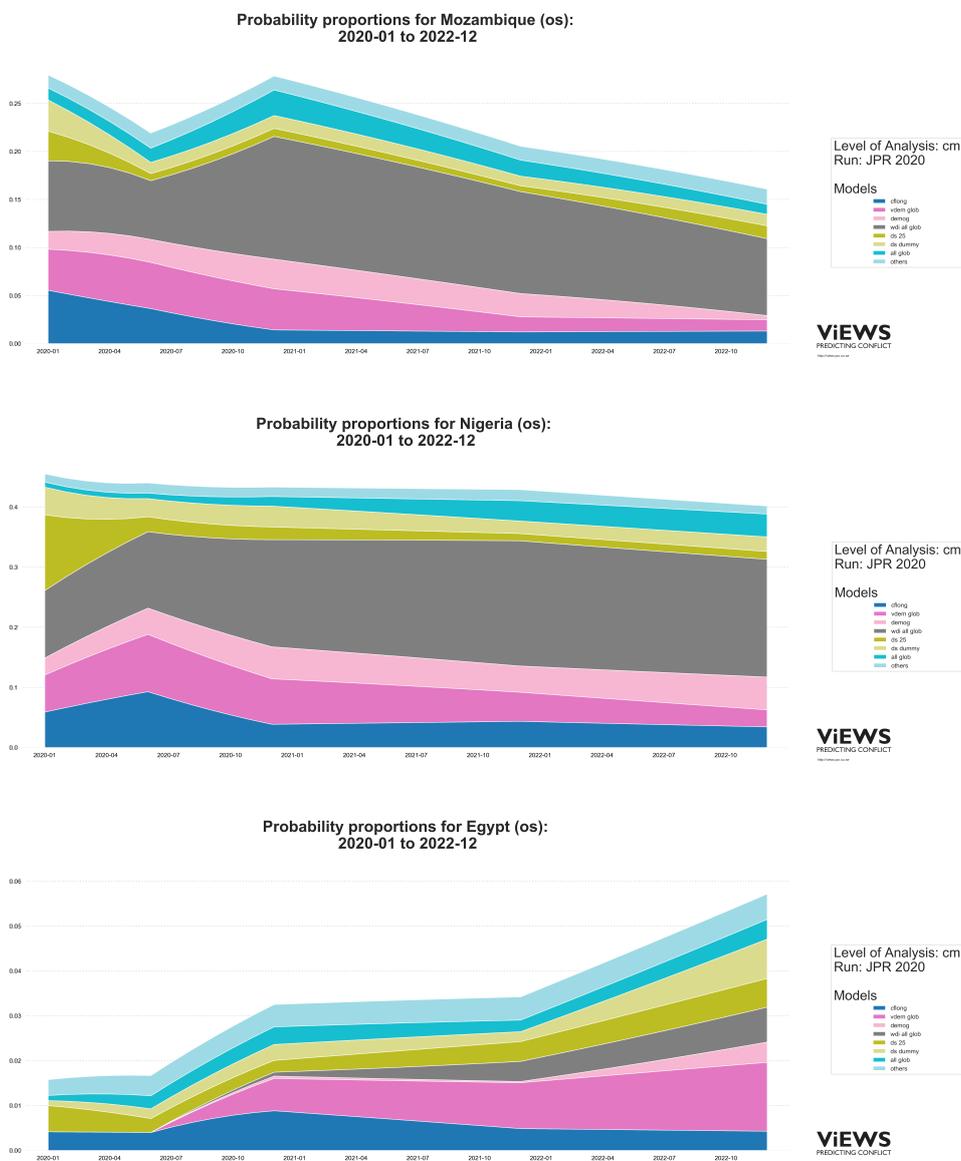


### F-2.2 A closer look at Mozambique, Nigeria, and Egypt, *cm* level, *os*

Figure F-14 shows how the predicted probabilities for one-sided violence as well as the corresponding model contributions change over time for Mozambique, Nigeria, and Egypt. Here, the conflict history is not a major driver of the forecasts (seen by the blue shade in the figures). In Mozambique, one-sided violence has only been observed in the Cabo Delgado province (Figure F-10). In Nigeria and Egypt, most of the **os** violence occurred in connection with the **sb** violence in the north-east of both countries.

Our forecasts for **os** violence may be less due to the persistence of earlier violence than is the case for the **sb** type. In particular 6–24 months into the future, the socio-economic factors are important in Mozambique and Nigeria. In Egypt, characteristics of the political system are instead particularly important, although the overall risk is very low.

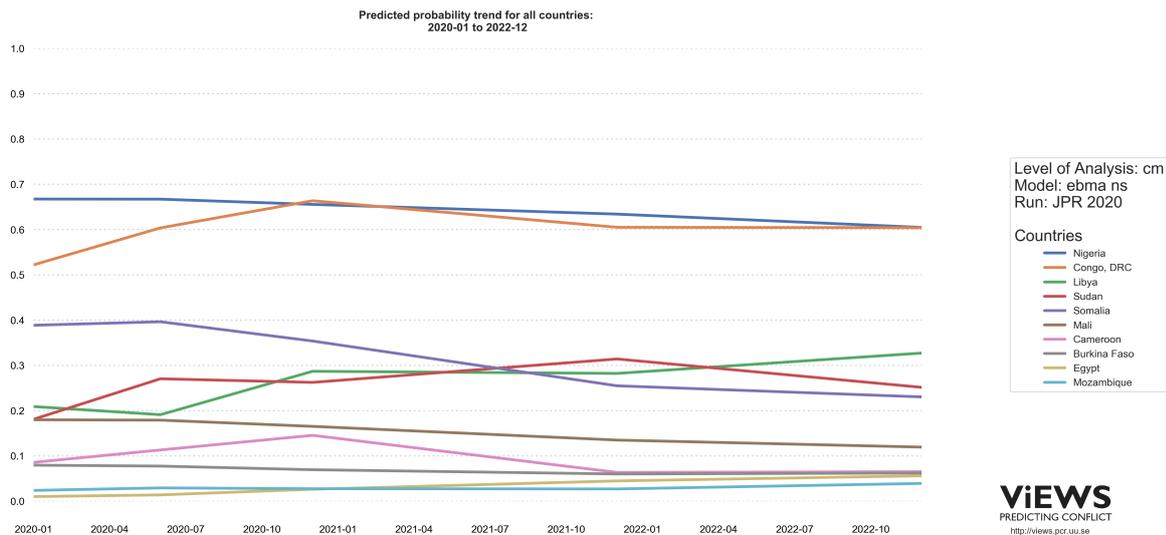
Figure F-14. Predicted probabilities of at least 25 BRDs in **os** violence at the *cm* level over time, coupled with contributions from constituent models. Mozambique (top), Nigeria (middle), and Egypt (bottom).



### F-3 NON-STATE (NS) CONFLICT

Figure F-15 shows the predicted *cm* level probability of at least 25 battle-related deaths in non-state violence over the forecasting period. Figure F-16 shows the same information for both the *cm* and *pgm* levels in map form, for three months in the forecasting period: March 2020 (at  $s = 3$ ), December 2020 (at  $s = 12$ ), and December 2022 (at  $s = 36$ ).

Figure F-15. Predicted probabilities of at least 25 BRDs per month in **ns** conflict at the *cm* level for a selection of countries in Africa, January 2020–December 2022



Again, Nigeria and DRC are expected to remain the countries with highest probability of non-state violence in Africa, as our model predicts at least 25 BRDs (with a probability of 0.5–0.7) throughout the coming three years (Figure F-15).

Seen from Figure F-16, non-state conflict is also very likely to continue in Somalia and CAR, and the forecasted probability is increasing in Libya, Sudan, South Sudan, and Ethiopia. The *pgm* model also suggest a high probability of at least one death per month in northern Kenya (Figure F-16).

Overall, a much lower number of people are killed in non-state violence than in the state-based and one-sided forms. The prediction maps for **ns** are therefore much more green and blue than the corresponding maps for the other violence forms. Non-state conflict is also much more diffuse and hard to predict—our models are less able to separate between high- and low-risk cases. The distribution of risk resembles that of the other violence forms, with low probabilities in West and Southern Africa. South Africa is an exception here, due to reports of violence close to Johannesburg in late 2019.

To understand these differences in predicted probabilities between countries and over time, we return to the estimated weights of the constituent models (Table F-3 and Appendix B). Also for **ns** conflict, the most important models are the conflict history model *cflong*, the political institutions model *vdem\_glob*, the development model *wdi\_all\_glob*, and the broad model *all\_glob*, but the differences between models are less clear-cut than for the other types of violence. Again, conflict history is dominating forecasts in the immediate future, whereas socio-economic and political institutions become more important later. Appendix B gives more details about these models, shows correlations between predictions from each model, and prediction maps for each of them.

Figure F-16. Predicted probabilities of at least 25 BRDs in ns conflict at the cm level in March 2020 (top), December 2020 (middle), and December 2022 (bottom)

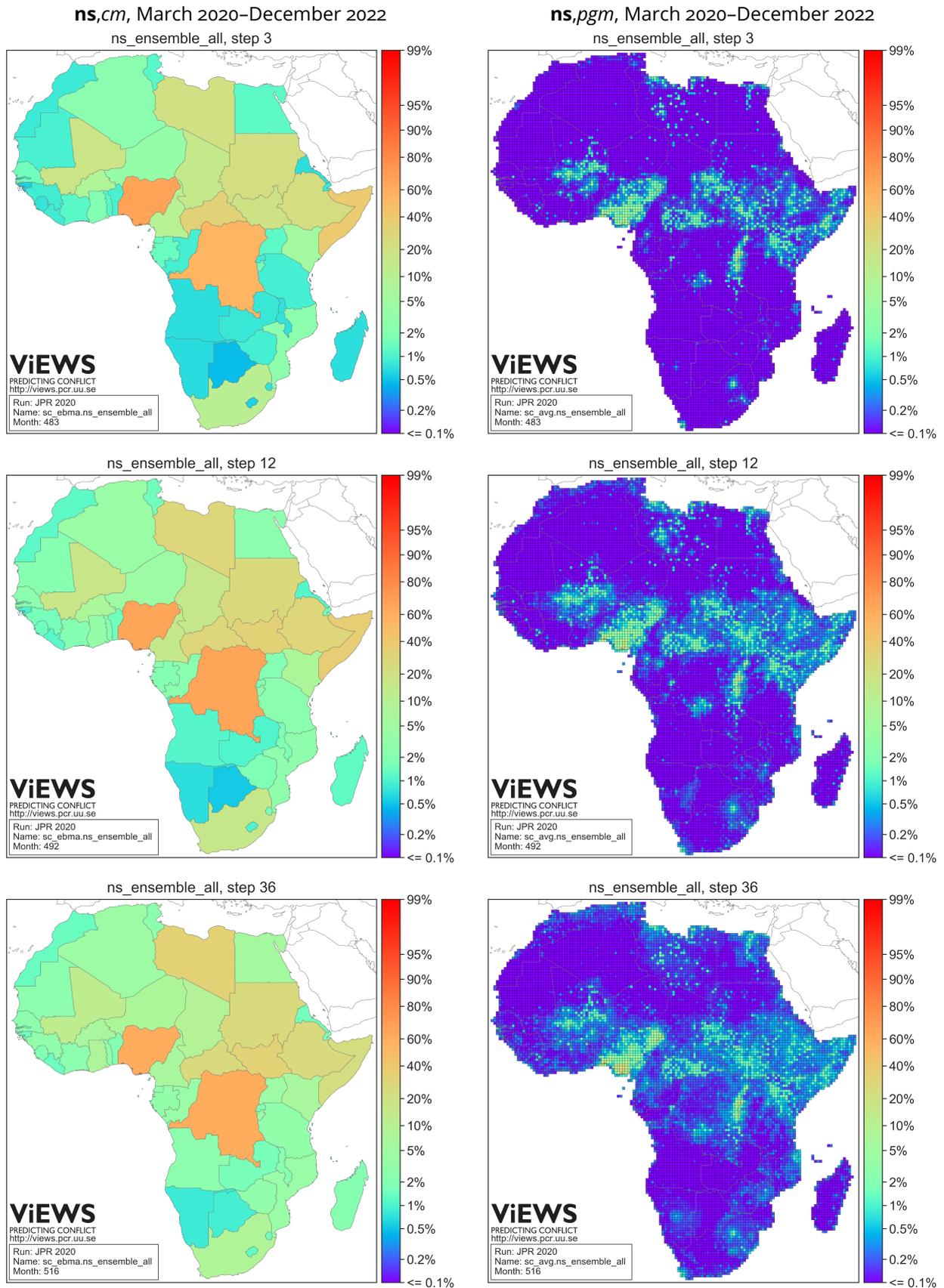


Table F-3. Weights in original EBMA ensemble, *ns*, *cm* level

Model	Step 1	Step 6	Step 12	Step 24	Step 36
ns_cflong	0.1912	0.1390	0.0927	0.0711	0.0920
ns_acled_violence	0.0242	0.0271	0.0370	0.0286	0.0240
ns_neibhist	0.0231	0.0314	0.0285	0.0242	0.0258
ns_cdummies	0.0257	0.0382	0.0393	0.0496	0.0517
ns_acled_protest	0.0095	0.0108	0.0107	0.0106	0.0115
ns_reign_coups	0.0091	0.0102	0.0104	0.0104	0.0107
ns_icgcv	0.0103	0.0119	0.0118	0.0120	0.0127
ns_reign_drought	0.0091	0.0100	0.0104	0.0104	0.0106
ns_reign_glob	0.0102	0.0121	0.0164	0.0161	0.0173
ns_vdem_glob	0.0804	0.0973	0.1720	0.1885	0.1883
ns_demog	0.0449	0.0539	0.0752	0.1085	0.1242
ns_wdi_all_glob	0.0835	0.1035	0.1355	0.1313	0.1379
ns_ds_25	0.1579	0.1353	0.0802	0.0516	0.0308
ns_ds_dummy	0.1025	0.0926	0.0776	0.0436	0.0408
ns_all_glob	0.2066	0.2129	0.1876	0.2135	0.1921
ns_onset4_25_all	0.0118	0.0140	0.0149	0.0297	0.0298

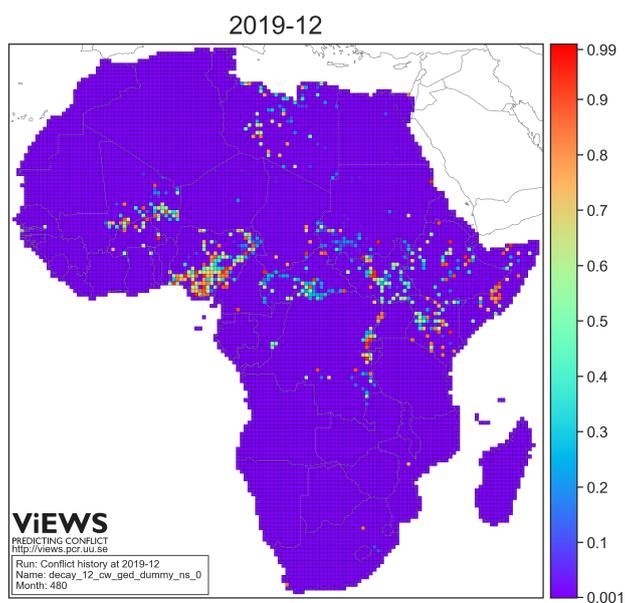
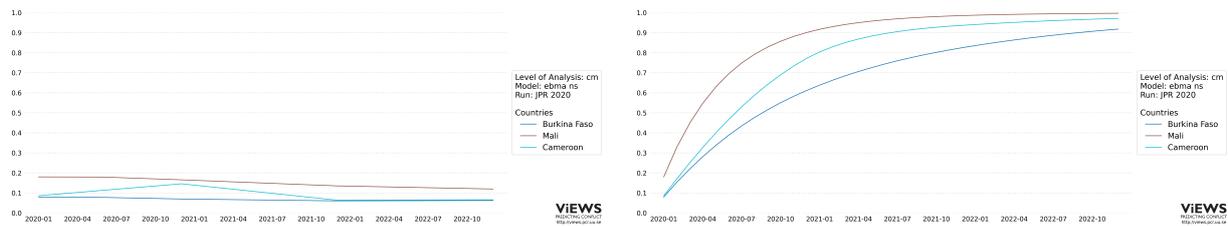
Figure F-17. History of *ns* violence in Africa up to December 2019, *pgm* level. Red cells saw events with at least one fatality in the latest months.

Figure F-18. Predicted probabilities for at least 25 BRDs in **ns** conflict at the *cm* level in Burkina Faso, Cameroon, and Mali, January 2020–December 2022. Monthly probabilities (left) and cumulative probabilities (right).



Most of the countries and locations with high predicted probability of **ns** conflict have recent violence of this form. This is particularly true for Nigeria and DRC, but also for most countries in the Sahel. The UCDP has also recorded non-state violence in Libya, Mozambique, and South Africa (see Figure F-17). The political institutions and socio-economic models, as seen from Figure B-6.1 in Appendix B, estimate high probabilities of non-state conflict in the near future in Mali, Nigeria, DRC, Libya, Chad, CAR, the two Sudans, Ethiopia and Somalia, but see the rest of the continent as less prone to such conflict.

### F-3.1 A closer look at Burkina Faso, Mali, and Cameroon, *cm* level, **ns**

Again, it is instructive to look at the forecasts for individual models in the ensemble at the *cm* level to get a sense of why the model forecasts what it does. Figure F-18 shows the per-month and cumulative predicted probability of **ns** conflict for Burkina Faso, Mali, and Cameroon.

Figure F-19 shows the contribution of each constituent model to the ensemble prediction for **ns** conflict for individual country months in pie chart form – the proportion of the predicted probability that is due to a constituent model in the ensemble.<sup>6</sup> The top row shows the nowcasts for  $s = 1$ , the middle a year into the future ( $s = 12$ ), and the bottom three years out ( $s = 36$ ).

Predicting **ns** violence is harder than the other two types of violence, and interpreting the ensemble forecasts is also harder. Figure F-19 shows that the two dynamic simulation models (green shades) contribute significantly to the forecasts. Since these models are broad and include features from many of the other models, including conflict history, the pie charts are less instructive than was the case for **sb** and **os**. Past conflict is probably the most important predictor also for **ns** violence. In Burkina Faso and Cameroon, the forecasts depend considerably on past conflict recorded by ACLED rather than UCDP. In Mali, features in the *vdem\_glob* model are important risk factors. Figure F-20 shows the same information in line plot form.

<sup>6</sup>The contribution is calculated as the predicted probability from a constituent model times the EBMA model weight, divided by the ensemble probability of conflict.

Figure F-19. Contributions to the predicted probabilities of at least 25 BRDs in ns conflict at the cm level in Burkina Faso, Mali, and Cameroon, for January 2020 (top), December 2020 (middle), and December 2022 (bottom)

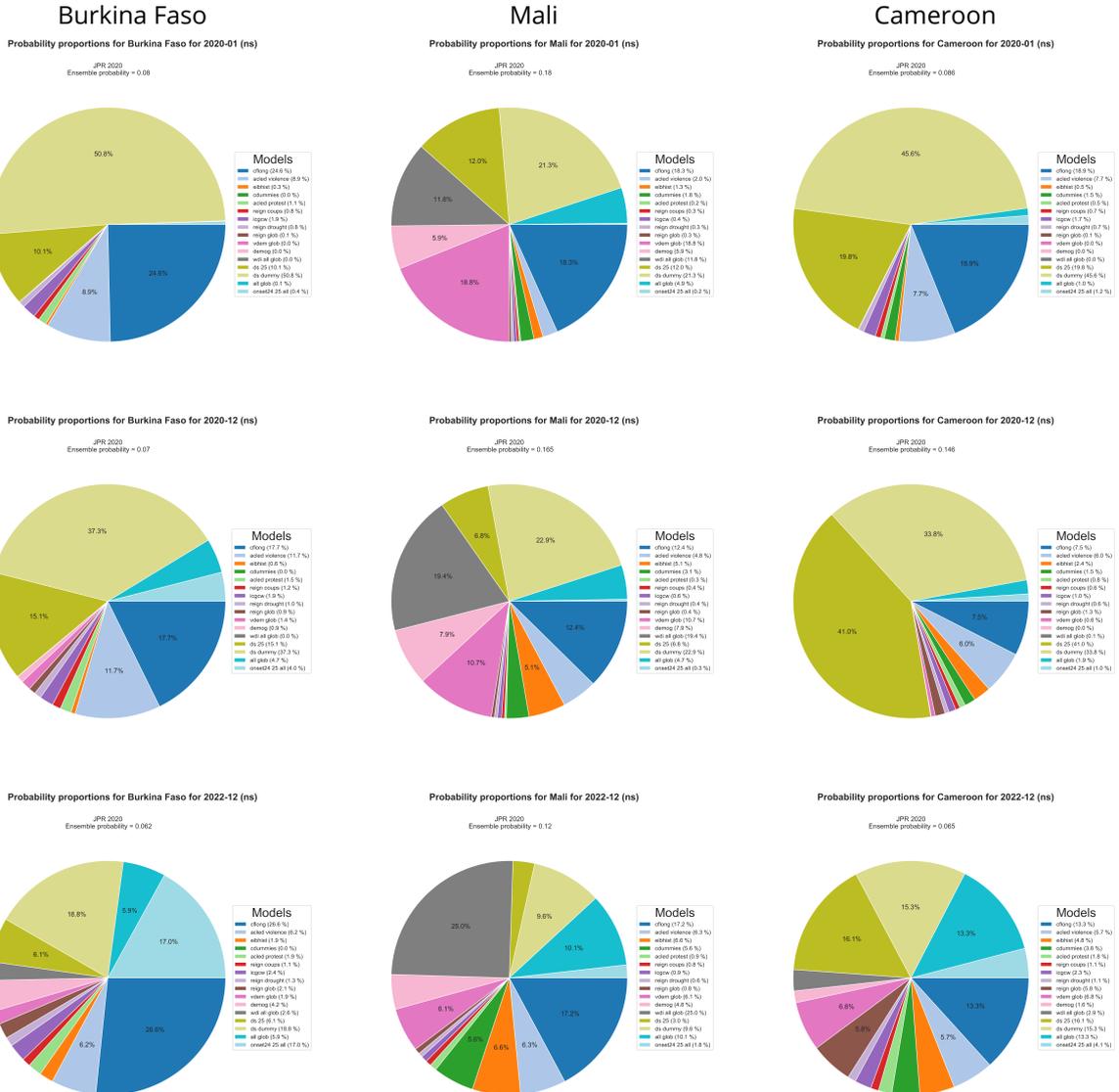
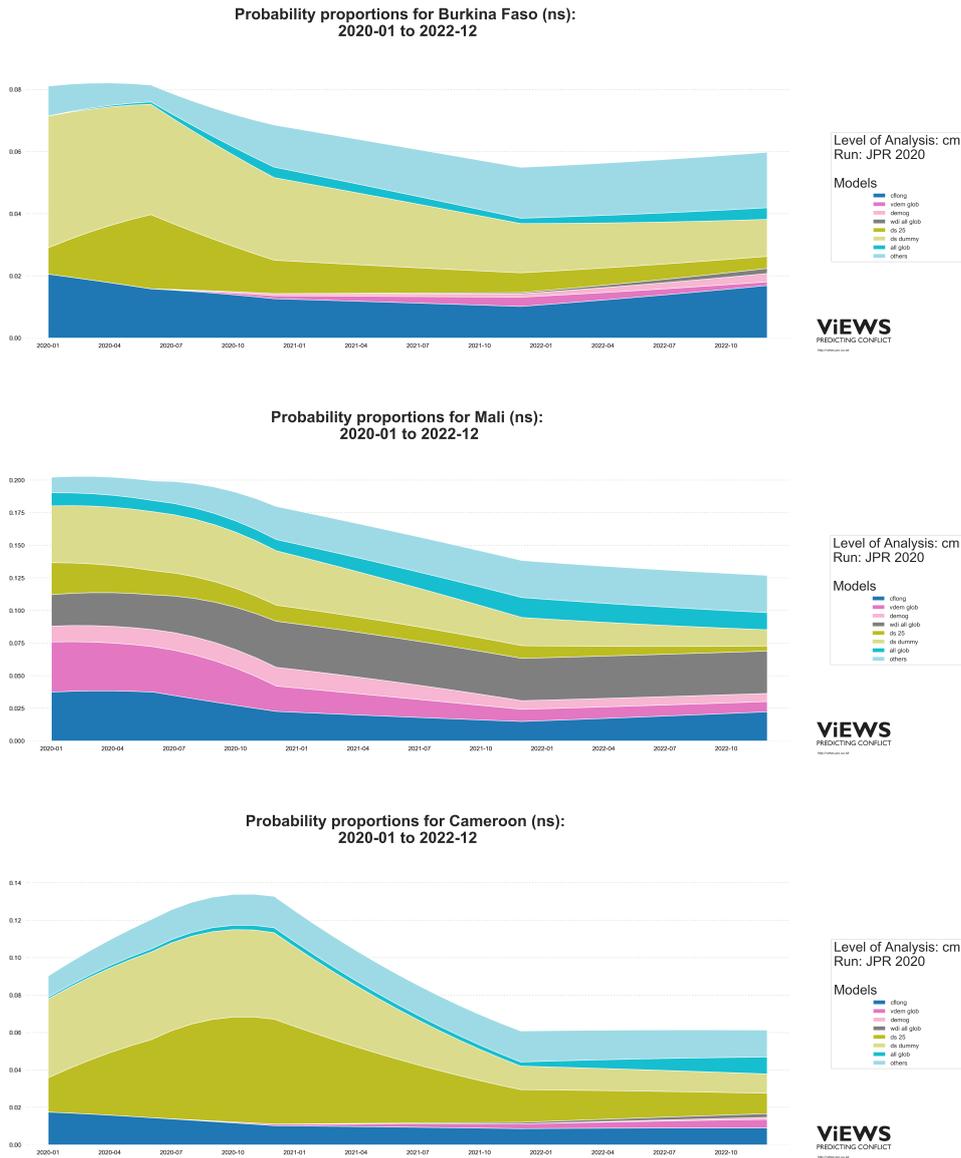


Figure F-20. Predicted probabilities of at least 25 BRDs in **ns** conflict at the **cm** level over time, coupled with contributions from constituent models. Burkina Faso (top), Mali (middle), Cameroon (bottom).



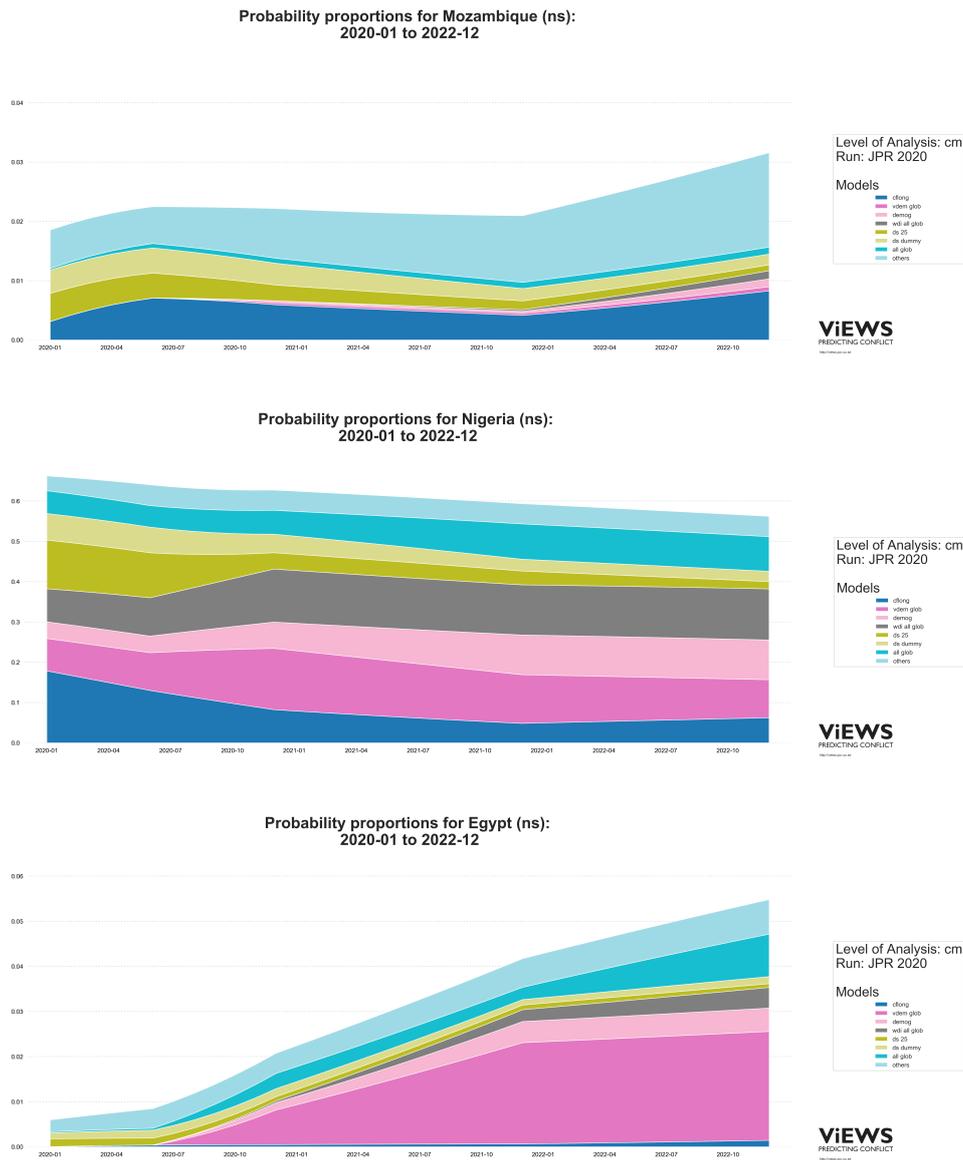
### F-3.2 A closer look at Mozambique, Nigeria, and Egypt, *cm level, ns*

Figure F-21 shows how the predicted **ns** violence probabilities and model contributions change over time for Mozambique, Nigeria, and Egypt. For Mozambique, the model contributions are less instructive as we see the broader and more inclusive models (light blue and green shades) take precedence in our predictions. The UCDP conflict history model (*cflong*, dark blue shade) however remains a steady key contributor, which may explain the relative weight offered by the broader models, all of which include various conflict history features. The forecasted risk of non-state violence is also very low, with a predicted probability ranging from shy of 0.02 to just over 0.03 over the next three years.

Also the forecasts for Egypt show a very low predicted probability of non-state conflict, with minimal contribution from conflict history models. The latter is informed by the lack of recorded UCDP data in recent years (seen from Figure F-17). Nevertheless, the conflict risk increases from less than 0.01 to about 0.55 by the end of 2022. In Egypt, we instead see a major contribution from the political institutions model *vdem\_global*, likely due to the aftermath of the Arabic Spring.

Nigeria, in turn, sees a far greater distribution between the model contributions, while the predicted risk of non-state conflict remains relatively steady at around 0.6. As seen in many of the cases above, we see a strong contribution of the conflict history model *cflong* in forecasts for the near future, while the political institutions, demography, and WDI models (pink and grey shades) take precedence when forecasting farther into the future. As discussed above, Nigeria is a very populous country with a high overall risk of violence (Raleigh et al., 2010), underpinning the strong contribution of the demography model.

Figure F-21. Predicted probabilities of at least 25 BRDs in ns conflict at the cm level over time, coupled with contributions from constituent models. Mozambique (top), Nigeria (middle), and Egypt (bottom).



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## CODEBASE &amp; PUBLICATIONS

ViEWS' codebase is available at:

  
[https://github.com/  
UppsalaConflictDataProgram/  
OpenViEWS2](https://github.com/UppsalaConflictDataProgram/OpenViEWS2)

The full pool of publications are accessible at:

  
[https://pcr.uu.se/research/  
views/publications/](https://pcr.uu.se/research/views/publications/)