Gulf of Guinea maritime criminality analysis with Geographic Information Systems

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Abstract

Over the past few years, the Gulf of Guinea has been increasing its world share of oil production. At the same time, armed robbery and piracy attacks have become a permanent threat to the maritime agents in the region. Oil theft, crew kidnapping for ransom and robbery of crew and ship valuables are the most common outcomes of successful attacks.

To better understand the phenomena, a political, economic, social and environmental analysis of the region was performed, and a geographic information system was developed to provide a deeper analysis and understanding of the correlation between geographical and scope factors of this criminal activity, considering the period from January 2012 to May 2015. The system integrates the land and maritime boundaries, population, religion, oil/gas platforms, oil/gas fields, reported attacks on ships and spatial analysis results.

Several factors are pointed out as major contributors to today's maritime criminality in the Gulf of Guinea. The geographic information system analytical outputs provide a view of the geographical concentration, trends and perceive a slow decreasing of this threat until 2014 and a slow growing tendency in 2015.

Keywords

Gulf of Guinea; maritime piracy; maritime assaults; shipping; oil.

1. Introduction

The Gulf of Guinea (GoG) is a maritime natural resources rich environment, both live and mineral. Its strategic value is growing proportionally to its oil and gas production, and fishing is also not to be neglected. Over the last few years, the shipping and fishing activities have been under piracy (outbound the territorial sea) and armed robbery assaults (inbound the territorial sea limits). To deal with these illicit activities several national, international and multinational strategies have been designed. To better understand the maritime criminality problem of the GoG, and decide on the best lines of action to take, a geospatial analysis of the area and its maritime criminality was performed using a COTS geographic information system (ArcGIS). The piracy and armed robbery assault data was acquired from the monthly IMO reports on acts of piracy and armed robbery against ships, from January 2012 until December 2014 and from the US Navy Office of Naval Intelligence worldwide threat to shipping reports from January to May 2015.

2. The Golf of Guinea

The GoG comprises a geographic area that goes from Cape Verde and Senegal in the north along the West African coast down to Angola in the south. For the purpose of this paper only the littoral countries were considered: Cape Verde, Senegal, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroons, Equatorial Guinea, S. Tomé & Príncipe, Gabon, Republic of the Congo, Democratic Republic of Congo and Angola. These countries are members of several organizations that have been discussing the security of the GoG, namely the African Union, the Economic Community of Central African States (ECCAS), the Economic Community of Western African States (ECOWAS) and the Gulf of Guinea Commission (GGC).

The GoG area shipping (Halpern & Walbridge, 2008) follows two major routes. One goes down to the Cape of Good Hope and around Africa (outbound) and the other follows the coast of the GoG countries and dissipates as it reaches Nigeria (fig. 1). The GoG maritime routes to Europe and the USA are of great value for there are no chokepoints between their coasts, and sailing distances are shorter than the ones to the Middle East great oil producing countries. These factors are major in transportation costs and security attractiveness.

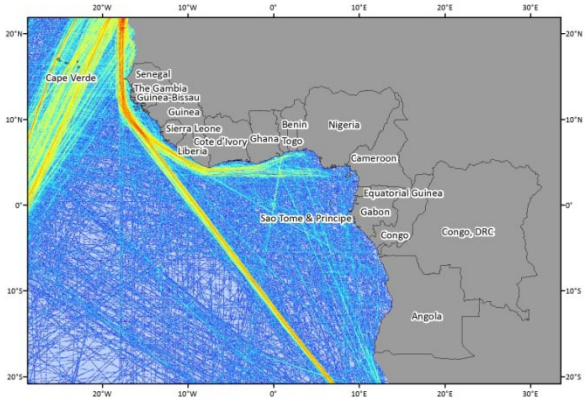

Fig. 1: GoG shipping, 2005

The maritime illicit activities are to be dealt differently according to littoral countries sovereignty and jurisdiction areas. All GoG countries have signed the United Nations Convention on the Law of the Sea (UNCLOS). Although UNCLOS sets a maximum width of the territorial sea to 12 nautical miles from the base lines, Togo still claims a width of 30 NM and Benin a width of 200 NM (fig. 2). This fact has implications in the classification of maritime illicit activities such as piracy or armed robbery assaults, and in the way an event can be dealt with by local authorities and the international community.

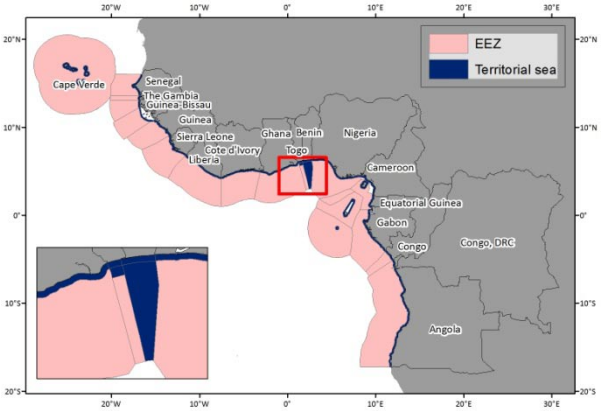

Fig. 2: GoG maritime boundaries

The Exclusive Economic Zone (EEZ) of the GoG litoral countries sums up 3.3 million km^2, first ranking Cape Verde, Angola and Equatorial Guinea. The territorial seas add about 208 thousand km^2 and the continental shelf claims, so far presented to the United Nations, represent an area of about 1.1 million km^2.

In 2014 the GoG littoral countries sum up about 287 million people (fig. 3), representing about one third of the African's continent. Nigeria is at the same time the most populated and the country with the highest population density (CIESIN & CIAT, 2005).

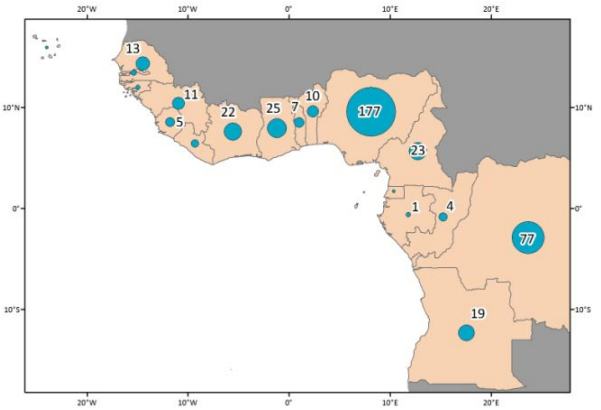

Fig. 3: Population (millions)

In 2014, the gross domestic product (GDP) was highest in Nigeria (1058 million $), followed by Angola (175,5) and Ghana (109,4) (fig. 4).

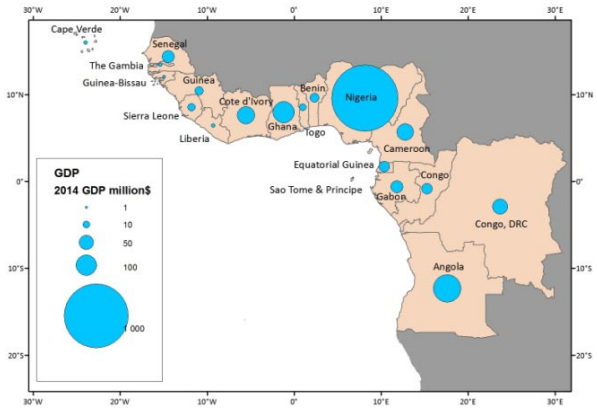

Fig. 4: GDP, 2014

Equatorial Guinea ($32.600) and Gabon ($21.600) had the highest GDP per capita, between 2,5 and 4 times higher than Angola ($8.200), the third in rank (fig. 5).

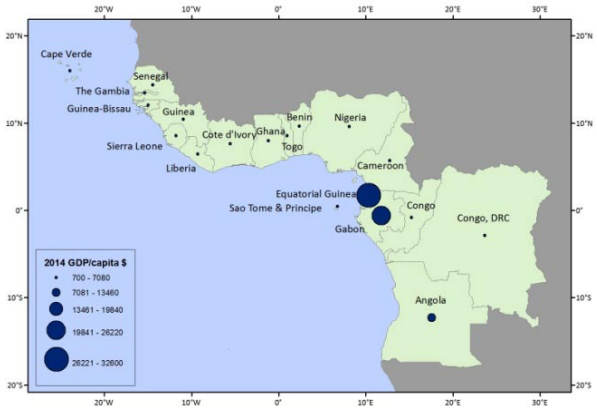

Fig. 5: GDP per capita, 2014

In 2013 Africa produced 10.1% of world's oil and 6.0% of gas (British Petroleum, 2014). Africa's proven reserves of oil and gas represent 7.7% and 7.6% of the world's, most of them located in the GoG area. In 2013 Nigeria produced a daily average of 2322 thousand barrels of oil and Angola reached 1801 (fig. 6). These figures and the fact that there are no major international conflicts between GoG countries have led several analysts to flag a growing strategic role of the GoG in the energy market. Also, the grade of GoG oil is very good. Crude oil is evaluated according to its sweetness (sulphur content) and weight (API gravity degree). The best value for money from crude oil distillation is achieved from sweet and light oil. GoG oil is sweet and light.

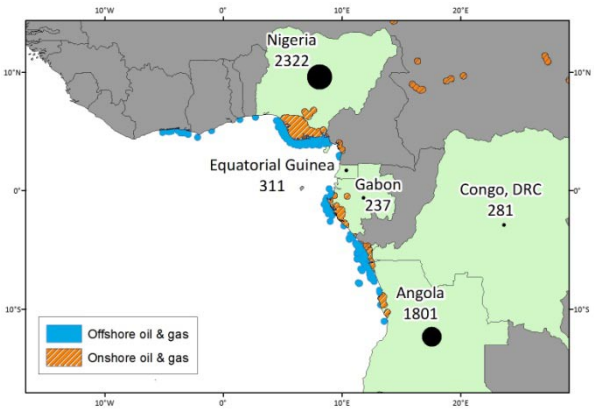

Fig. 6: Oil fields & production, 2013

For oil and gas production, in 2009, there were 801 fixed platforms off the GoG countries (Saldanha Bay IDZ, 2012, p. 15), and it is expected that this number is higher today. Pipelines and floating units are used to store and transport crude and gas from the platforms to terminals and to shore. In 2014, 37 of the world's 151 oil floating production storage and offloading units were operating in the GoG. To dig new wells, the offshore oil and gas industries use rigs. In 2014, the GoG rig fleet was of about 100 vessels and platforms, which had a utilization rate of 65%. Altogether it is a very significant and expensive infrastructure.

Some authors refer that, in the GoG countries, only political and economical national leaders have been benefiting from the oil and gas industries (Fidelis Allen, 2012), implying that the revenues have not been applied to the common social, economic and environmental policies. According to the Resource Governance Index (Revenue Watch Institute, 2013), Nigeria (40th), Angola (41st) and Republic Democratic of Congo (44th) have "weak" natural resources revenues governance scores while Cameroons (47th) and Equatorial Guinea (56th) are considered to be "failing" in their revenues governance. Only Ghana (15th) and Liberia (16th) have a classification of "partial satisfactory" (fig. 7). No GoG country is classified in the "satisfactory" rank of natural resources revenues governance.

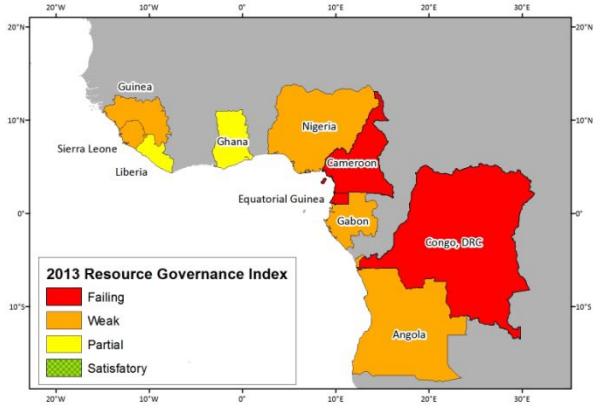

Fig. 7: Resource Governance Index

International, regional and local criminal activities are intrinsically related with the incapacity of states to make and/or enforce their laws. This was clear when Somalia government collapsed and maritime piracy went off the roof. The fragile states index is published annually and it ranks the world countries regarding their collapse probability (Fund for Peace, 2014). This index takes into account, among other indicators, the demographic pressure, group grievance, uneven development, poverty and economic decline, human rights and security apparatus. The political reality in the GoG is generally evaluated as fragile due to regime challenge or instability, generalized poverty and high levels of criminality. In the GoG countries there are five that figure within the 20th most fragile states in the world. Democratic Republic of Congo is the 4th most fragile, being included in a set of countries in very high alert. Guinea, Ivory Coast and Guinea-Bissau are in the high alert list and Nigeria, in the 17th place, is in the simple alert list (fig. 8).

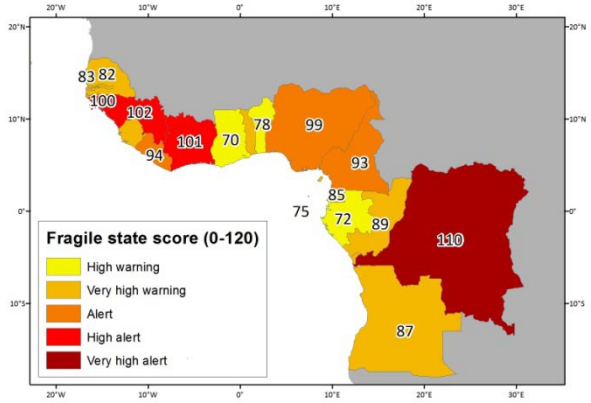

Fig. 8: Fragile states index

Among the GoG countries, Angola is the one with the most uneven development, followed by Equatorial Guinea and Nigeria. Guinea, Guinea-Bissau and Sierra Leone are the ones with more poverty. Democratic Republic of Congo, Equatorial Guinea and Nigeria are the worst evaluated considering human rights.

Despite its richness in natural resources, the GoG area is experiencing maritime safety and security problems that might affect future investments in the oil and gas industries. Security in the GoG is a major problem, namely due to ship robbery, kidnapping or host taking and oil theft.

The number of piracy and armed robbery attacks in the GoG, from 2012 until May 2015, reached a total of 172 (fig. 9), in many of which hostages were taken. In 2013, the GoG piracy and armed robbery assaults estimation of primary economic costs to stakeholders were between $565 million and $681 million (Oceans Beyond Piracy, 2014, p. 55). These numbers still differ significantly from the 2013 Somali piracy economic costs that were estimated between $3.000 million and $3.200 million (ibidem, p. 7).

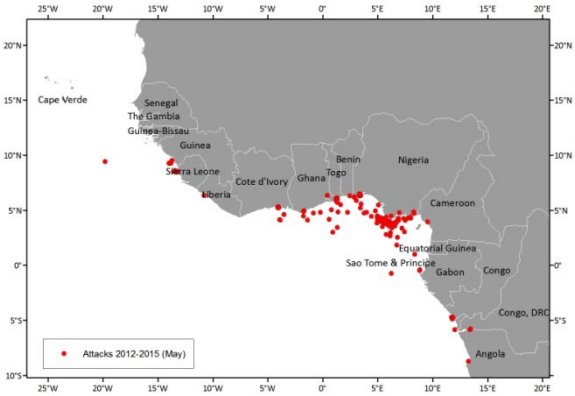

Fig. 9: Piracy and assaults 2012-2015(May)

The shipping industry is not completely innocent in the GoG criminality schemes. Some crews also participate in irregular activities selling some unaccounted oil for private benefit, or transferring stolen oil from the black to the clean oil market. For this reason, some attacks are not reported to authorities and the official maritime related crime numbers are considered con-

servative.

The GoG is an area of open waters in the Atlantic, and attacks to ships are mainly made inside or near the countries' territorial seas, when they are anchored or slow moving. In Somalia, attacked ships and their whole crew are taken for ransom and can be held hostage for very long periods of time, sometimes years. In the GoG, criminals select high value crew members (i.e. the captain and the head of engineering) and take them to land for ransom. Ships are not held for more than a few days, just enough to transfer the oil into a ship enrolled in the black market or to a store site ashore. Attackers in the GoG are more violent than in the Indian Ocean. They also are very well armed and have some capability to directly fight law enforcement authorities.

When analyzing the maritime illicit activities in the GoG there are two major enablers: the limited authority capabilities of coastal states and the resources governance. The first includes limited cooperation between states, limited maritime situational awareness and limited navies and coast guards capabilities. The latter includes all the factors that affect fragile states, corruption and low natural resources revenue transparency.

The problems that arise from the maritime illicit activities can be grouped in five different areas: illegal, unreported and unregulated fishing that damages local economies and contribute to the degradation of natural resources sustainability; environment degradation by toxic waste dumping; trafficking & smuggling of drugs, arms and people; damaging of the oil & gas infrastructures for oil theft, specially pipelines (which is also a source of major inland and near shore oil spills); and shipping that is affected by robbery, crew kidnapping for ransom, oil theft and oil smuggling that is sold to the oil black market.

Data mining and analyzing the GoG piracy and armed robbery assault database one can verify that attacks are more frequent from February to September (fig. 10).

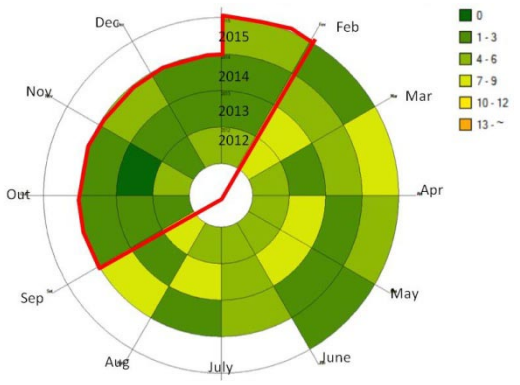

Fig. 10: Attacks "years by months"

Considering the maritime areas where the 172 attacks occurred, 88 took place inside the countries' territorial or interior waters (33 in 2012, 23 in 2013, 23 in 2014 and 9 in 2015) and 84 outside. Of all these attacks, 65 were attempts that for some reason had no consequences on ships, their crew or cargo (fig. 11).

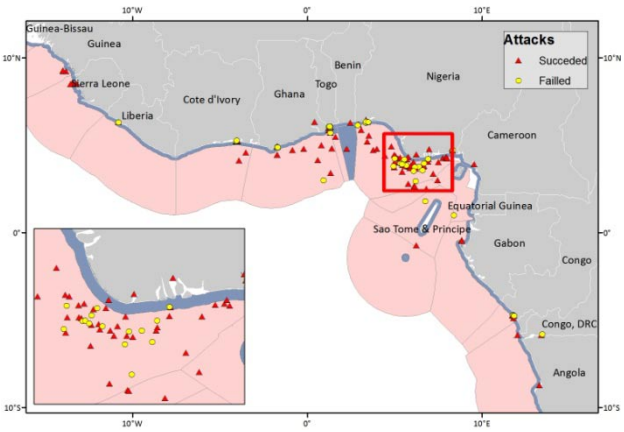

Fig. 11: Success of attacks

The worst types of attacks are the ones that include kidnapping, injuries or the death of crew members, hijacking a ship and stealing its cargo. Other minor consequences include stealing ship and crew valuables, temporary taking of hostages and the destruction of material, normally the ship's communication systems. One attack may include more than one type of consequences. The majority of successful attacks is focused in stealing ship valuables (46) and crew valuables (32). Ship hijacking occurred 18 times and 8 attacks resulted in the death of crew members

(fig. 12), 7 of which occurred in Nigerian waters.

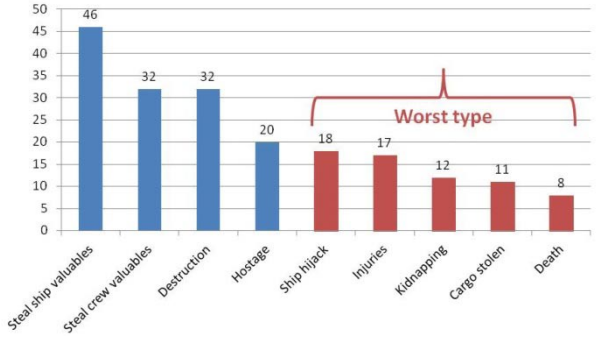

Fig. 12: Attacks outcome

The number of attacks to ships that had major consequences has fallen down in the period between 2012 and 2014 (18, 12, 9), but by May 2015 the number of these occurrences was already 7, reflecting a tendency to increase.

Of all GoG maritime attacks to ships, about 46% (79) occurred in the Nigerian EEZ, territorial sea or interior waters. Most of these attacks occurred in the Lagos anchorage site or between the two major oil and gas exploring areas off the Bayelsa state (fig. 13).

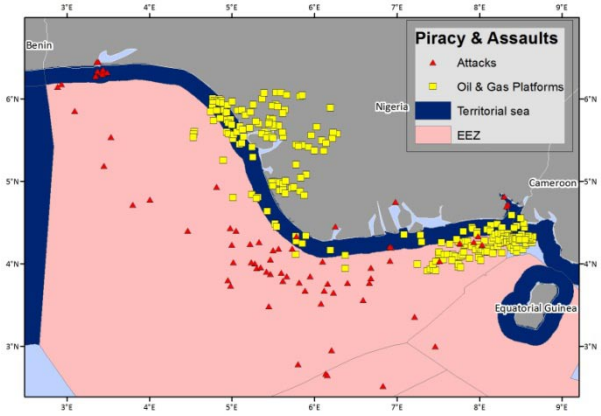

Fig. 13: Attacks in Nigerian waters

In order to better understand the geographic tendencies of the attacks, a spatial density analysis was performed for each year and also the whole period from 2012 until May 2015.

Figure 14 shows the density analysis of the attacks in 2012. The highest concentration is in the Togo anchorage off Lomé, followed by the Nigerian waters offshore Bayelsa and the Ivory Coast anchorage of Abidjan, the Nigerian anchorage of Lagos and the Congolese anchorage of Point Noir.

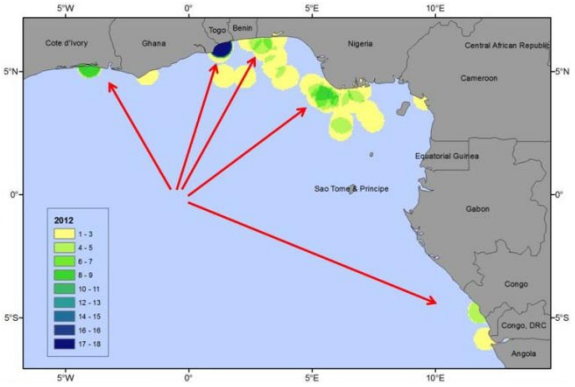

Fig. 14: Density of attacks in 2012

In 2013 the highest density of attacks occurred on the waters off the Nigerian Bayelsa state, followed by the Togo anchorage of Lomé and the Nigerian anchorage of Lagos (fig. 15). The figures at Abidjan and Point Noir anchorage sites didn't change much from the previous year.

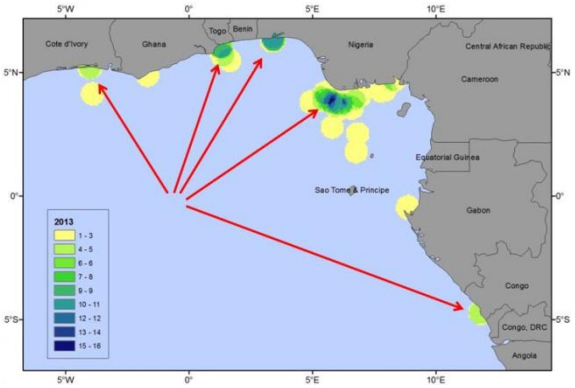

Fig. 15: Density of attacks in 2013

In 2014 two areas presented very high concentration of attacks: the Point Noir anchorage site and the waters off the Nigerian state of Bayelsa (fig. 16). The Lagos anchorage site presents a lower, but still noticeable, value.

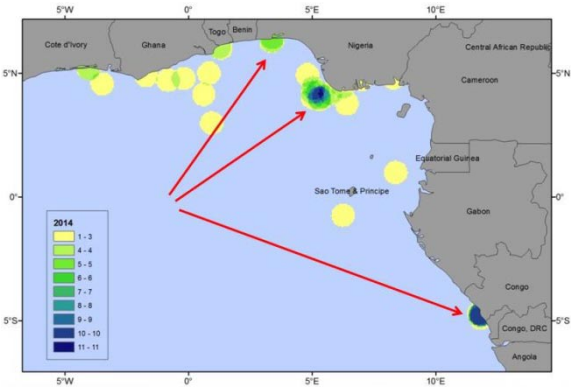

Fig. 16: Density of attacks in 2014

In 2015 (January to May) the higher con-

centration of attacks took place at the Lagos anchorage site and the waters off the Akwa Ibom Nigerian state, near the border with the Cameroon, where there is a very large number of oil and gas industry infrastructures (fig. 17).

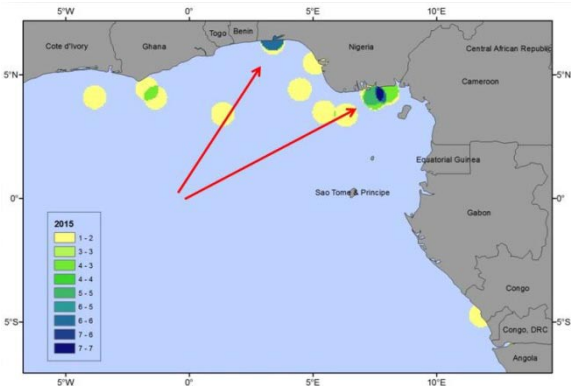

Fig. 17: Density of attacks in 2015

Considering the period from 2012 to May 2015, the density of attacks analysis shows that the hotspots of the GoG piracy and armed robbery assaults are four anchorage sites (Abidjan, Lomé, Lagos and Point Noir) and the waters off the Nigerian state of Bayelsa (fig. 18).

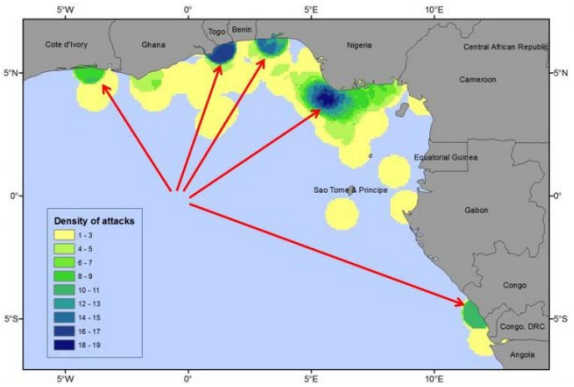

Fig. 18:Density of attacks 2012-2015

One of the major concerns related to oil theft is that at some point in time the Islamic group Boko Haram, which terrorizes the north of Nigeria, could be able to get control of some parcels of land in the south and finance its activities with oil. This would lead to a different scale of insecurity in the region and the establishment of links with other terrorist organizations. Figure 19 shows the Boko Haram attacks in the period between 2009 and 2013, as well as the piracy attacks off Nigeria in the period 2012-2015. In the background one can also see the dominant religion in the different areas of the GoG (Muslims, Christians and Tribalists). The map shows a very big geospatial gap between the locations where the two different types of attacks occur. Also it is visible that, at this time, Boko Haram has a particular focus on Nigerian states of Muslim religion and that the Christian states represent a geospatial break in its territorial activities.

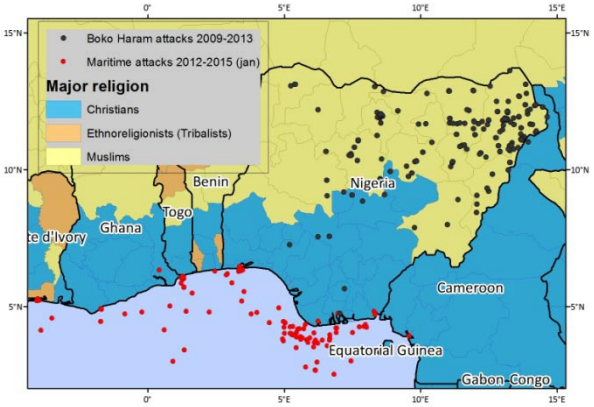

Fig. 19:Terrorism & piracy

3. Conclusions

The strategic value of the GoG is growing due to its richness in natural resources, especially oil and gas. For the last few years, the shipping activity in the GoG has been targeted by piracy and armed robbery assaults.

There were 172 reports of piracy and armed robbery attacks in the GoG in the period from 2012 until May 2015. About 38% of these attacks didn't result in any damages to ships, their crew or cargo. The number of attacks has decreased between 2012 and 2014. In 2015 it is noticeable an increasing tendency, especially in attacks that resulted in ship hijacking, crew kidnapping or cargo stolen. Crew members died in eight attacks, seven of which occurred in Nigerian waters. The number of piracy attacks (outbound the territorial seas) and armed robbery assaults (inbound the territorial seas) is very similar (84/88).

The spatial distribution and density analysis of the attacks show that the anchorage sites of Abidjan, Lomé, Lagos and Point Noir and the waters off the Nigerian state of Bayelsa are the hotspots for the GoG

maritime criminality.

The illicit maritime activity in the GoG has the main objectives to steal the cargo from tankers, to sell it in the oil black market, and to kidnap high valued crew members for ransom.

The geospatial gap between Boko Haram attacks and maritime attacks is very big. This gap suggests that, for the time being, there is no connection between the two phenomena.

The use of a geographic information system for the GoG maritime criminality analysis was very useful to discover both temporal and spatial patterns and tendencies of the attacks.

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