We Are All Khaled Said:
Revolution and the Role of Social Media

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Abstract: Online social networks like Facebook and Twitter have made headlines recently as a powerful tool for the Middle East and North Africa protestors. Protest and revolution are still born of the same decision-making process, but social networks have allowed protestors to connect and see atrocities in a way that was not possible before social media. These online social networks have been analyzed as a type of social capital, but only recently have they revealed their immense value for political dissent. This paper is an attempt to combine complementary elements of sociological and economic traditions in order to analyze social online networks as productive social capital and the implications for how we model revolution.

Keywords: revolution, social capital, social networks, social network sites, social media

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1. INTRODUCTION

The public choice literature is filled with theories of revolution and the use of media in political dissent. Probably the most influential is Kuran's (1987) theory of tipping points in public opinion, which addresses information cascades. He suggests a role for preference falsification in order to obtain utility from changes in individual reputation and integrity. Kuran and Sunstein (1999) also consider the effect of availability cascades and suggest that the availability of information has an effect on individual perceptions and reputational factors. Recently, Coyne and Leeson (2010) proposed that mass media is a mechanism for institutional change. They define three effects that media can have on institutions: (1) the gradual effect, where media contributes to marginal changes in current institutions; (2) the punctuation effect, where media contributes to a rapid overhaul of current institutions; and (3) the reinforcement effect, where changes in media reinforce current institutions. The role of social capital in general and social media in particular in facilitating revolution has been relatively underexplored in the literature. My contribution to the literature is to examine the use of social media, particularly social network sites, by revolutionaries to organize protests and increase support for the revolution.

In the wake of massive protests and revolutions throughout the Middle East and North Africa, the role of social media in these revolutions has claimed the headlines of newspapers around the world. The media has sensationalized these uprisings as Facebook revolutions led by the young and driven by technology. Past studies have established that social media increases social capital through the creation of new ties, especially weak ties (acquaintances). Social network sites lower the cost of information through this bridging effect. While protests and revolutions are still borne of the same decision-making process as before, social network sites

have allowed protestors to connect and see atrocities in a way that was not possible before social media. The overall effect of social media is to break the government's monopoly on information and empower the people to share information and coordinate their efforts against oppressive government regimes.

This paper proceeds as follows. First, I review the economic theories of revolution and the literature in sociology on social capital. Second, I suggest a theoretical model that blends both traditions. Third, I present evidence of the substantial influence that social network sites had on the Middle East and North Africa protests, specifically the Egyptian Revolution, highlighting the role of information sharing and coordination efforts. I also introduce quantitative evidence analyzing the frequencies of tweets calling for protest by hashtag as a proxy for the use of social network sites and their effectiveness in supporting revolutionary efforts. Fourth, I discuss the limitations of this section of data and methods and then I conclude.

2. LITERATURE REVIEW

This section provides a brief overview of the foundational work in both economics and sociology relevant to a discussion of revolutions and social media. Economists are often guilty of undersocialized models while sociologists tend toward an oversocialized concept of human action (Coleman 1988b; Granovetter 1985). By considering the perspectives of both disciplines it is possible to produce an economic model of revolution that takes into account social capital and the "embeddedness of economic action in social networks, culture, politics and religion" (Granovetter 2005: 35).

2.1 Revolution

Economists have offered several models of political decision-making. Gordan Tullock's (1971; 2005) theory of revolution is essentially a cost benefit analysis from the perspective of the individual citizen. Suppose a government that is "vicious, corrupt, oppressive, and inefficient" so that the individual will benefit from the overthrow of the government (2005: 174). The individual is assumed to have three possible choices: (1) Join the revolutionaries, (2) Don't join the revolutionaries, or (3) Do nothing and remain neutral. It is assumed that the probability of revolutionary success increases as more people participate. The result of this simple model is that "individuals will ignore the public good aspects of the revolution in deciding whether to participate and on which side to participate. The important variables are the rewards and punishments offered by the two sides and the risk of injury during the fighting" (Tullock 2005: 177). A regime change is only thought to be favorable if the net benefit of the transition is adequate to cover the costs incurred and individuals will consider private payoffs rather than focus on the public good potential.

This free rider problem presented by Tullock's model of revolution might be overcome by the use of social media, because in these oppressive regimes showing political dissent online (tweeting, facebooking, or blogging) is in fact a costly signal of your commitment to the revolution. It is costly because the government can identify you and send the police your door. Thus, after individuals have committed to join protests on social network sites they are less likely to be affected by the free rider problems associated with not showing up to the protest. In a way, social networks act as a pre-commitment device.

Schelling's (1980) work on focal points and coordination offers insights into rallying points in social action. There is a strong tendency toward precedent and the status quo, but this

"obedience depends on the expectation that others will be obedient in punishing disobedience" (Schelling 1980: 67-68, 74). He proposes that spontaneous revolt may occur "when leaders can easily be destroyed" (Schelling 1980: 74). However, "people require some signal for their coordination, a signal so unmistakably comprehensible and so potent in its suggestion for action that everyone can be sure that everyone else reads the same signal with enough confidence to act on it, thus providing one another with the immunity that goes with action in large numbers" (Schelling 1980: 74). This explanation of spontaneous revolution can be represented using binary choice models with tipping points. Assuming that people are identically situated, each individual's outcome depends not on "how *much* anyone does" but on "how *many* (individuals) make the one choice or the other" (Schelling 2006: 214). The assumption that individuals are identically positioned can be very limiting when arrangement matters. However, tipping points can still be used within subgroups of society to gain considerable insights.

Since individuals need to know what others are doing in order to make their own choices, information will be an important factor in determining the relative position of a tipping point. The visibility of others' choices can improve discipline and enforcement by changing the payoffs. When people can "see and adapt to the choices of others" they often consider the consequences of their own choices and the risk involved (Schelling 2006: 215). For example, suppose that the state controlled the media and reported that revolutionary movements were misguided and a complete and utter failure. Even if these state controlled reports were exaggerated or biased, they may still lead to the failure of a revolutionary movement, unless people learn to discount the state manufactured news or find other more reliable sources of news such as social media. Wittman (1995) would argue that people have rational expectations and

would discount the state-controlled, biased media appropriately.[1] Earl, Martin, McCarthy, and Soule (2004) discuss the selection bias inherent in newspaper data about social movements. Social media may overcome this flaw by providing a broader view point from the members of the movement.

It seems likely that social media, particularly in the form of social network sites like Twitter and Facebook, would increase the visibility of the revolution and thus change the perceived consequences for individual citizens of joining the revolutionaries. In addition to decreasing the cost of information and coordination efforts, social network sites are able to demonstrate that massive support for revolution exists. Twitter and Facebook act as a direct link for individual citizens to information about protest efforts, participation, police harassment, and arrests going on at that moment, some of the information is even geographically coded. As the protests become more visible, the tipping point will begin to shift back due to the increased social capital revolutionaries acquire from social network sites. The implication being that, ceteris paribus, spontaneous revolutions will happen more often when social network sites are employed.

Kuran's (1989) theory of unanticipated revolution extends Schelling's spontaneous revolution concept. His model of revolution builds on Tullock's (1974) model by adding a variable to capture integrity and imposing a cost to preference falsification. Political parties are competing over the social order. The power of rule rests on this collective sentiment. "A revolution… involves a sudden and massive shift in collective sentiment, which results in a huge transfer of power" from one incumbent party to another opposition party (Kuran 1989: 46).

[1] There have been many challenges to the assumption that individuals have rational expectations. Many studies in the field of experimental economics have demonstrated that subjects do not behave rationally all of the time. In fact, individuals often make decisions using simple heuristics and even behave irrationally. Caplan (2005, 2008) presents a theory of rational irrationality and offers a substantial critique of Wittman's (1995) championing of democracy.

In the same vein as Tullock (1974), the decision does not include the utility of the social order itself because the individuals influence over this outcome is infinitesimal. By including integrity in the model, Kuran proposes that "an individual does not move over to the revolutionary camp until the reputational advantages of supporting the opposition exceed those of supporting the government by a sufficiently wide margin" (Kuran 1989: 47). For simplicity, Kuran assumes that all non-activists have the same point expectations of the parties' shares of support and the same reputational and integrity functions. While this assumption is limiting and less realistic, it does make the model more tractable. In a manner similar to Schelling's work on tipping points, Kuran employs threshold functions which assign a range of private preferences for which supporting the revolutionaries is considered optimal for each possible expectation of support shares.

Kuran's main conclusion is that a "privately hated regime may enjoy widespread public support because of people's reluctance to take the lead in publicizing their opposition" (Kuran 1989: 42). This leaves the regime susceptible to even the most minor shocks. "A suitable shock would put in motion a bandwagon process that exposes the panoply of social conflicts, until then largely hidden" (Kuran 1989: 42). It seems reasonable that social media has the potential to be such a shock. Kuran (1989) emphasizes the importance of leaders as "individuals with an exceptional ability to detect and to help expose the incumbent regime's vulnerability" and argues that revolutionary regimes "invariably undertake campaigns of repression and indoctrination" motivated by fears of a counter-revolutionary movement (42). Granovetter (1973) asserts that "[t]rust in leaders is integrally related to the *capacity to predict and affect their behavior*… Thus, network fragmentation, by reducing drastically the number of paths from any leader to his potential followers, would inhibit trust in such leaders" (1374). This suggests that by providing

more paths to revolutionary leaders, social network sites may increase support or opposition based on the information that citizens receive.

2.2 Social Capital and Social Networks

Coleman (1988) presents the foundation of rational choice sociology and offers a successful marriage of the strengths of both economics and sociology.[2] He asserts that social capital is "defined by its function. It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate the certain actions of actors… within the structure" (Coleman 1988b: S98). Social capital is "productive, making possible the achievement of certain ends that in its absence would not be possible" (Coleman 1988b: S98). It is "not completely fungible but may be specific to certain activities. A given form of social capital that is valuable in facilitating certain activities may be useless or even harmful for others" (Coleman 1988b: S98). Social capital is distinct from other forms of capital because it "inheres in the structure of relations between actors and among actors. In is not lodged either in the actors themselves or in the physical implements of production" (Coleman 1988b: S98).

[2] This paper will mostly follow Coleman's theory of social capital, but other noteworthy definitions of social capital exist in the economic sociology literature. Bourdieu (1985) defines social capital as "the aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (248). Portes (1993, 1998, 2000) defines social capital as "those expectations for action within a collectivity that affect economic goals and goal-seeking behavior of its members, even if these expectations are not oriented toward the economic sphere" (Portes and Sensenbrenner 1993: 1323). Portes (1998) allows for negative social capital with consequences including: "exclusion of outsiders, excessive claims on group members, restrictions on individual freedoms, and downward leveling norms" (15). Putnam's (1993, 1995, 2000) conception of social capital is presented as a feature of different communities. He defines social capital as "features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit" (Putman 1993: 35). Putnam distinguishes between bridging and bonding social capital. He claims that technology is driving a wedge between our individual and collective interests and that this wedge is causing social capital to decline in America. Portes (1998: 200) has criticized Putnam for his circular logic and, like Coleman, emphasizes the importance of focusing on the benefits for the individual rather than the community.

Social capital exists in different forms that depend on the trustworthiness of the environment, information channels, and norms or sanctions. For the purpose of social media, information channels are arguably the most important because they provide a "basis for action" (Coleman 1988b: S104). Coleman states that one "means by which information can be acquired is by the use of social relations that are maintained for other purposes," which is descriptive of social network sites like Facebook and Twitter (Coleman 1988b: S104).

Social networks facilitate social capital. "All social relations and social structures facilitate some forms of social capital; actors establish relations purposefully and continue them when they continue to provide benefits" (Coleman 1988b: S105). However, there is also a public goods aspect to social capital, which results in many forms of social capital being "created or destroyed as by-products of other activities" (Coleman 1988b: S118). In the case of a zealot, returns from an "intervening action" can also come in the form of the "encouragement of others" or norms and sanctions (Coleman 1988a: 53-54). Social networks with more closure (i.e. connected or closed social relationships) have an "increased potential for amplifying the returns to the actor" (Coleman 1988: 57). [3]

Empirically, social capital has been associated with many positive social outcomes (Adler and Kwon 2002; Lin 2001). Social capital can provide resources in the form of information, relationships, or the ability to organize groups (Paxton 1999). Social capital is also thought to influence psychological well-being (Bargh and McKenna 2004; Helliwell and Putnam 2004; Marrow 1999).

[3] Definition of closure from Coleman (1988b: S105-S106).

2.3 Social Media

Granovetter (1973, 1983, 2005) emphasizes the strength of weak ties as bridges. Weak ties are crucial for the spread of ideas. Individuals without weak ties will be "deprived of information" and find it "difficult to organize or integrate into political movements" (Granovetter 1983: 202). The result is that "social systems lacking weak ties will be fragmented and incoherent" (Granovetter 1983: 202). Studies have shown that "people rarely *act* on mass-media information unless it is also transmitted though personal ties" (Granovetter 1973: 1374; Katz and Lazarsfeld 1955; Rogers 1962). Coleman highlights the organization of political dissent as social capital. In his example, he asserts that activist groups themselves "constitute a form of social capital… that appears valuable for facilitating opposition in any political system intolerant of dissent. Even where political dissent is tolerated, certain activities are not" (Coleman 1988b: S99). These groups "constitute a resource that aids in moving from individual protest to organized revolt" (Coleman 1988b: S101). By making these activities possible the organization is a powerful form of social capital.

Empirically, many studies have considered the effect of Internet use on social capital and the results are mixed. Putnam's time displacement hypothesis and assertion that social capital declining are supported by some studies (Kraut et al. 1998; Nie 2001; Coget et al. 2002; Williams 2006). However, these conclusions have been greatly criticized (Bargh and McKenna 2004; Hampton et al. 2011; Paxton 1999; Thompson 2005; Wang and Wellman 2010). Internet use is multifaceted (Shah et al. 2001; Barg and McKenna 2004; Zhao 2006) and many uses are positively correlated with forms of social capital, including political participation and community involvement (Boase et al. 2006; Hampton and Wellman 2003; Kavanaugh et al. 2005; Kobayashi et al. 2006; Rainie et al. 2011; Vanenzuela et al. 2009). Studies suggest that online interactions

supplement rather than displace other types of communication (Wellman et al. 2001; Quan-Haase et al. 2002; Quan-Haase and Wellman 2004; Russell et al. 2008; Vergeer and Pelzer 2009).

In fact, the Internet may facilitate the creation of networks and new forms of social capital previously unavailable offline (Lin 1999; Wellman et al. 2001; Resnick 2002). Electronic networks are "computer-mediated spaces where individuals working on similar problems can self-organize to help each other and share knowledge, advice, and perspectives" and in the process "produce an on-line public good of knowledge" (Wasko et al. 2009: 1). Social network sites like Facebook and Twitter are prime examples. Boyd and Ellison (2007) define social network sites as an electronic social space that enables individuals to "(1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and transverse their list of connections and those made by others within the system" (211). Lynn and Witte (2011) have updated the definition of a social network site as a subset of this broader concept. "Users of SNSs select from many types of social media to connect to other users with whom they have recognized, identified, defined, or in some other way articulated a connection within a system that might encompass much or all of one's online and offline social networks" (3).

Many studies have verified positive associations between social network sites and social capital (Ellison et al. 2007; Lamp et al. 2008; Steinfield et al. 2008; Valkenberg et al. 2007; Valenzuela et al. 2009; Ji et al. 2010). Other studies have proposed that social network sites affect bridging social capital and maintaining weak ties (Donath and Boyd 2004; Ellison et al. 2007; Lewis and West 2009). There is also new evidence that social network sites are used to maintain both strong and weak ties (Lynn and Witte 2011). Some of the most recent studies

focus on social networks and the Internet. Fisher and Boekkooi (2010) provide evidence that the Internet plays a useful role in mobilizing participants in protests. Even more interestingly, they find that participants who heard about the protest movement through social networks and the Internet were more likely to show up to the protest than those who heard about it through social networks alone.

3. MODEL OF REVOLUTION

My model attempts to blend economic and sociological foundations and offer a model of revolution that accounts for the effects of social capital acquired through the use of social media, specifically social network sites. The model will closely follow Tullock's (1971) theory of revolution. The individual has three possible choices: (1) Do nothing and remain neutral, (2) Join the revolutionaries, or (3) Don't join the revolutionaries. It is assumed that the probability of revolutionary success increases as more people participate. In addition, this it is assumed that more people participate when revolutionaries use social network sites (SNS). The individual utilities associated with each choice are modeled as follows.

Table 1: Definition of Terms

Symbol	Definition
U_{IN}	Total utility for inaction.
U_J	Total utility for participation in revolt of the side of revolutionaries.
U_N	Total utility for participation in revolt of the side of existing government.
B_i	Private reward to individual if his/her side wins.
C_i	Private penalty to individual if his/her side loses.
I_r	Injury suffered in action.
ΔP_{Vi}	Change in probability of revolution as success result of individual participation.
$P_{Vi}(N, SNS)$	Likelihood of revolutionary victory, assuming subject is neutral.
N	Number of individuals participating in revolt of the side of revolutionaries.
P_I	Likelihood of injury through participation in the revolution (for or against).
G	Public good generated by successful revolution.
P_r	Private cost imposed on defenders of government if revolt succeeds.
V_E	Entertainment value of participation.
V_I	Value of integrity.

V_R	Value of reputation.
$SC(SNS)$	Value of social capital to revolutionary efforts gained with SNSs.
$IC(SNS)$	Decline in information costs to revolutionary efforts gained with SNSs.

If the individual remains neutral, then he or she will receive the following payoff:

$$U_{IN} = G \cdot P_{Vi}(N, SNS) + V_R + V_I$$

If the individual participates in the revolution, then he or she will receive the following payoff:

$$U_J = G \cdot [P_{Vi}(N, SNS) + \Delta P_{Vi}] + B_i \cdot [P_{Vi}(N, SNS) + \Delta P_{Vi}] - C_i \cdot \left[1 - [P_{Vi}(N, SNS) + \Delta P_{Vi}]\right] - I \cdot P_I + V_E + V_R + V_I + IC(SNS) + SC(SNS)$$

If the individual does not join the revolution and sides with the government, then he or she will receive the following payoff:

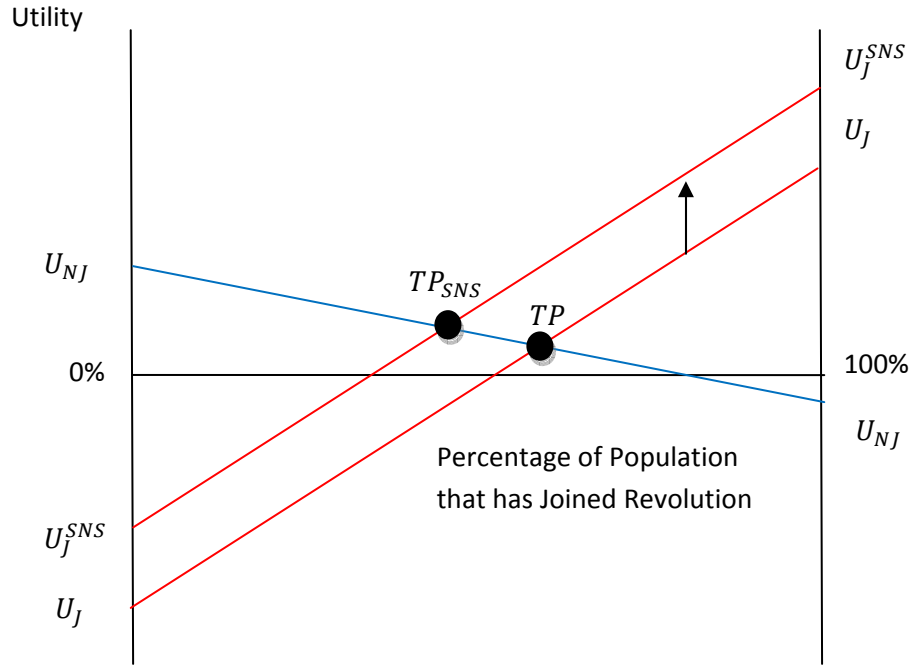
$$U_N = G \cdot [P_{Vi}(N, SNS) - \Delta P_{Vi}] + B_i \cdot [P_{Vi}(N, SNS) - \Delta P_{Vi}] - C_i \cdot \left[1 - [P_{Vi}(N, SNS) - \Delta P_{Vi}]\right] - I \cdot P_I + V_E + V_I + V_R$$

The implication is that ceteris paribus the availability of social network sites will lead to more revolutions, maybe even more successful revolutions. This is a very strong claim, but it logically follows from the assumptions of the model if social media in the form of social network sites does in fact lowers information costs and increase the social capital available to the organizing revolutionaries by making it easier for individuals to gauge public sentiment and update their expectations.

This is demonstrated more clearly perhaps by the theory of tipping points and spontaneous revolution. The individual's decision to join the revolutionaries is based on how *many* other individuals are joining the revolution. The more people joining the protests, the more likely the individual is to also join the protests. Likewise, as the revolutionary efforts grow, their perceived probability of victory also grows. Essentially, social network sites increase the social capital of revolutionaries by decreasing information costs and making it easier to coordinate their

efforts. Figure 1 demonstrates how social network sites could push back the tipping point under simplifying assumptions.[4]

Figure 1: The Effect of Social Network Sites on Tipping Points



4. EVIDENCE

The Middle East and North Africa have experienced unprecedented waves of protest and revolution recently. The media has sensationalized the revolutions as the product of social network sites and social media, even going so far as to call them Facebook revolutions. During the first few months of 2011, there have been revolutions in Tunisia and Egypt; uprisings in Libya; major protests in Algeria, Bahrain, Djibouti, Iraq, Jordan, Syria, Oman, Yemen; and smaller protests in Kuwait, Iran, Lebanon, Mauritania, Morocco, Saudi Arabia, Sudan, and

[4] This is only a visual aid and should not be regarded as a complete or detailed depiction of spontaneous revolution. It is merely an abstraction for clarification.

Western Sahara. Currently, two heads of state have been overthrown and large political concessions have been made to pacify the people. These protests have gained massive global attention and demonstrate the power of social media as a tool to move and coordinate the people in revolutionary efforts. This section provides both qualitative and quantitative evidence of the relationships between social media and social movements by analyzing case studies of protest and revolution. Specifically, I will address the recent protests and revolutions in the Middle East and North Africa. Qualitative evidence from protest leaders and participants as well as actual tweets will be presented. Further quantitative evidence will use the frequency of tweets by hashtag in support of the protests from community members as a proxy for revolutionary support. While the frequency of tweets is an imperfect proxy, it seems to be reasonable and very tractable.

4.1 Data and Methods

The qualitative and quantitative data within this paper all center around the tweets of the Egyptian Revolution. The data sets utilized were created by exporting past tweets and archiving them by hashtag (i.e. #Jan25) in excel spreadsheets using Searchtastic.com.[5] The data sets contain information about each tweet, including the username, location, followers, total tweets, tweet date, and the actual tweet.

In addition to individual tweets, the qualitative data will also include interview transcripts with leaders of the Egyptian protests. I've chosen to focus on Egypt because it is the most dramatic case and the leaders have stated that Facebook and Twitter were in fact important

[5] I chose to use Searchtastic.com to create my main data set because it was the most inclusive and allowed me to export and archive the data directly appendices also explore additional data analysis of past tweets using Tredistic.com and The Archivist. I also collected data for all of the countries involved in the Middle East and Africa protests, which are available in the appendices due to space constraints.

elements of their revolutionary efforts. I will use this qualitative evidence to establish that social network sites do in fact create social capital and facilitate information sharing, and then I will demonstrate the widespread use of these social networks sites by analyzing the quantitative data, mainly the frequency of tweets by hashtag.

4.2 The Egyptian Revolution

The most dramatic and effective use of social network sites has been in the Egyptian Revolution. Possibly inspired by Tunisian revolutionaries, the Egyptian Revolution formally began following a popular uprising on January 25, 2011. The protests generally adhered to a campaign of civil resistance and implemented strategies including demonstrations, marches, civil disobedience, and labor strikes. However, there were violent clashes with Egypt's Central Security Forces police, many of which protestors shared accounts of through social network sites including Facebook, Twitter, and YouTube. There have been reports of more than 300 deaths and over 6,000 injured (Parker and Al Zohairy). The protestors were comprised of a diverse group of individuals representing many socio-economic and religious backgrounds. Protestors sought several political and legal concessions from the government, including the end of emergency law and police brutality, term limits for presidents, and a fair minimum wage. Among these issues, the revolutionaries most adamantly demanded an end to President Hosni Mubarak's regime. This last demand was met in a mere eighteen days, when President Mubarak resigned from office on February 11, 2011.

On February 13, 2011, the Supreme Council of the Armed Forces announced that the constitution would be suspended, the parliament dissolved, and that the military junta would rule for the next six months until proper elections could be held. The previous cabinet was left

unaltered until more plans for major protest forced the resignation of Prime Minister Ahmed Shafik, who was replaced by Essam Sharaf. The success of the Egyptian Revolution has no doubt been influential for the protests that have followed in other countries.

It is estimated that 3.4 million Egyptians are on Facebook, the majority of which are under twenty-five years old. Egyptians are the number one users of Facebook in the Arab World and Facebook is the third most visited website in the country (Verma). In the face of emergency law and the outlawing of protests, social network sites like Facebook were one of the only forums for political dissent. Possibly the most prominent young leader of the Egyptian protests is Wael Ghonim, a marketing director for Google. Before being arrested and detained for twelve days, Ghonim was an internet activist largely responsible for organizing the January 25 protest that set the revolution in motion. In reference to the Egyptian youth's role in the protests, Ghonim told the Associated Press: "These are young people on the internet revolution and now a revolution for all the people of Egypt" (Karya).

Another young Egyptian that has fueled the revolutionaries' efforts is the martyr Khaled Said who posted a video of local police officers pocketing the spoils of a drug bust on June 6, 2010. He was brutally tortured and killed by Egyptian security forces only hours later after being dragged from an internet café. The official autopsy by the Internal Ministry reported that Said had suffocated after attempting to swallow a bag of drugs in order to hide them from the police. Not long after, shocking photographs of Said's battered body were circulated online. Inspired by the atrocity, Ghonim created the Facebook page "We Are All Khaled Said," which became a virtual forum for protest against policy brutality and human rights violations.[6] The Facebook page allowed users to post endless photographs, videos, and even list the names of corrupt police

[6] Ghomin is also responsible for the ElBaradei Facebook page for the Nobel Laureate opposition leader, Mohammad ElBaradai.

officers. Group membership exceeded 500,000 and it became Egypt's most popular human rights group on Facebook (Verma). After the protests in Tunisia, the group also organized a series of protests in memory of Said's death and called for the massive demonstration in Cairo on January 25, 2011, National Police Day. Ghonim told CNN that Facebook and the internet were responsible for the success of the uprising in Egypt:

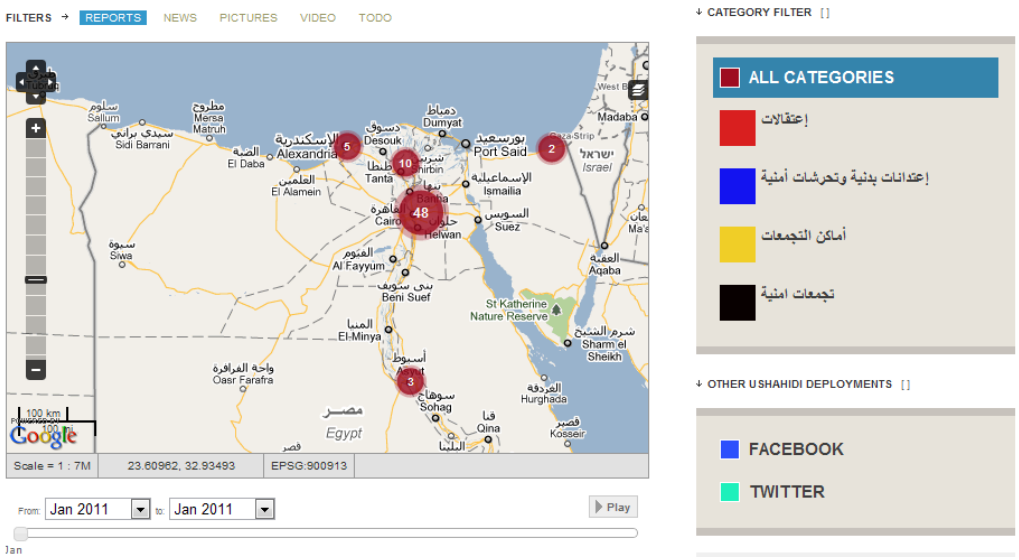
> I want to meet Mark Zuckerberg one day and thank him [...] I'm talking on behalf of Egypt. [...] This revolution started online. This revolution started on Facebook. This revolution started [...] in June, 2010, when hundreds of thousands of Egyptians started collaborating content. [...] we would post a video on Facebook that would be shared by 50,000 people on their walls within a few hours. [...] I've always said that if you want to liberate us, society in Egypt, give them the Internet. If you want to have a free society, just give them the Internet. (11 Feb 2011)

Activists in Cairo echoed this point and reiterated that online social media played a crucial role in structuring the protests. One protester is quoted saying: "We use Facebook to schedule the protests, Twitter to coordinate, and YouTube to tell the world" (Howard). The Facebook page "We Are All Khaled Said" was used to create a Facebook event scheduling the initial January 25 protests more than 78,000 confirmed their participation days before (Amr). Here is a sampling of some of the tweets from January 25:

> RT @ArabCrunch: reports: live ammunition is used on protesters in alexandria #jan25 #freedom
> RT @bencnn Police under orders: exercise restraint, in many instances was the case. Many looked shocked by size, passion of protest. #Jan25
> RT @NadiaE: March toward Azhar Mosque. Police won't let this last for long. I suspect we'll be getting gassed and hosed soon #jan25
> RT @kalaportu: @Dima_Khatib Protesters are reported2break through police barriers&cordons in severalAreas of Cairo #JAN25 #Egypt #Sidibouzid
> RT @3arabawy: There are dozens injured. The police are attacking brutally in Tahrir Sq. #Jan25
> RT @ReemAbdellatif: @alihabibi1 Journalist M.Abdelfattah @mfatta7 been beaten arrested in downtown Cairo, Foad street #Egypt #jan25
> RT @Janeinthesky: http://youtu.be/kWr6MypZ-JU via @youtube Protesters face down water cannon in Cairo: #egypt #jan25

These tweets supplied invaluable information regarding the protests and supplied pictures and videos on YouTube for Egyptians and the world. In addition to individual tweets, the Arabic Network for Human Rights Information even when so far as to create Crowdmap to report geographical updates of protests, arrests, police brutality, and where the protests and police are gathering.

Figure 2: CrowdMap



On January 26, the government attempted to shut down internet access to hinder communication on Facebook and Twitter. However, protestors bypassed this road block and relied on cell phone technology to continue sharing information through social media. Even in the wake of harsh state censorship, Egyptian bloggers and journalists continued to report to protestors and the world. Social network sites like Facebook and Twitter allowed for instant, on-the-ground reports. Ayman Mohyeldin, an Al Jazeera reporter, kept more than 19,000 followers updated on Twitter and broadcasted the Egyptian government's attempts to restrict the media and silence reporters. Here is one of his tweets: @AymanM: Internet sill down in #egypt, will continue to tweet via phone calls when possible #jan25. Others offered ways to get around the government's internet shutdown, for example: RT @AbedNajjar: U don't need access

twitter.com to tweet,use #TweetDeck or #HootSuite or any #Twitter #client, they wrk #Egypt #25Jan #Jan25. Online social media and cell phone technology have made censorship near impossible for oppressive regimes by taking away the government's monopoly on information. Information is power and online social networks are shifting that power to the masses and enabling them to challenge previous expectations and the status quo of corruption and repression.

4.3 Data: The Egyptian Revolution in Tweets

This section analyzes the quantitative data regarding the frequency of tweets sorted by hashtag in support of the protests as a proxy for revolutionary support. The limitations of this choice of a proxy are addressed in the discussion section that follows. The most popular hashtags included the country itself (#Egypt), important dates (#Jan25), cities where protests were planned (#Cairo, #Tahrir), and political figures (#Mubarak).[7] Table 2 offers a quick list of selected days that were influential turning points in the revolution. By looking at these dates (displayed in red) in the frequency graphs (Figures 3-7) that follow, it is clear that the periods of protest (not limited to those selected dates) have much higher tweet frequencies than those after Mubarak's resignation on February 11, after which the tweet frequencies decline substantially. Notice that even with government's attempt to shutdown the Internet, the tweet frequencies quickly rebounded after January 26 for all of the hashtags. The immediate fall in tweet frequencies after the Internet shutdown and the gradual increase that followed support the assertion that Egyptians did, in fact, the compose the majority of tweeters. This is also clear from the data for the various hashtags, where the majority of the locations are listed as cities in Egypt.

[7] The appendices include additional relevant hashtags for the Egyptian Revolution.

Table 2: Important Dates in the Egyptian Revolution

Date	***Description***
25 January 2011	Day of Revolt – Protests Start
26 January 2011	Shutting down the Internet
28 January 2011	Friday of Anger
1 February 2011	March of the Millions
2 February 2011	Battle of the Camel
11 February 2011	Friday of Departure – Mubarak Resigns

Figure 3: Tweet Frequency for #Egypt

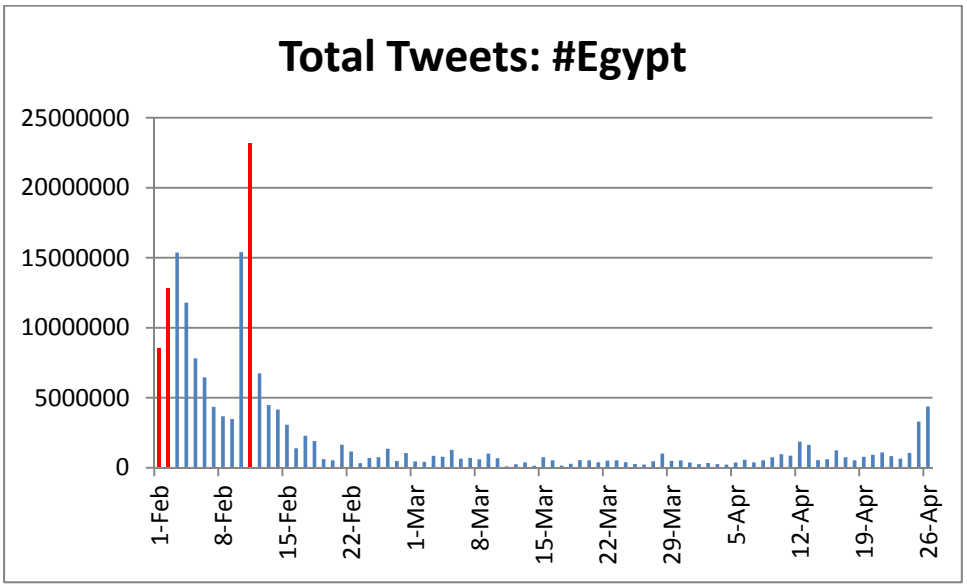


Figure 4: Tweet Frequency for #Jan25

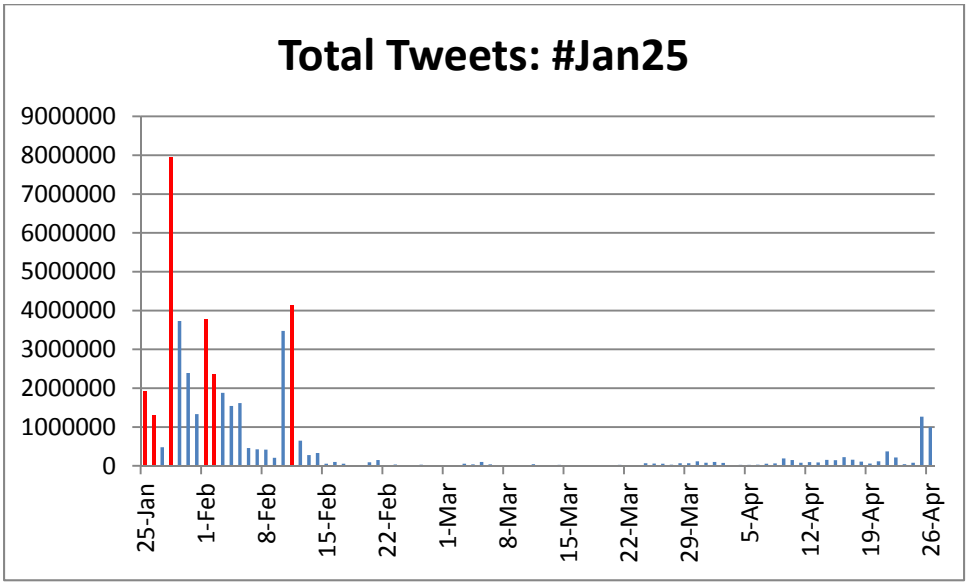


Figure 5: Tweet Frequency for #Cairo

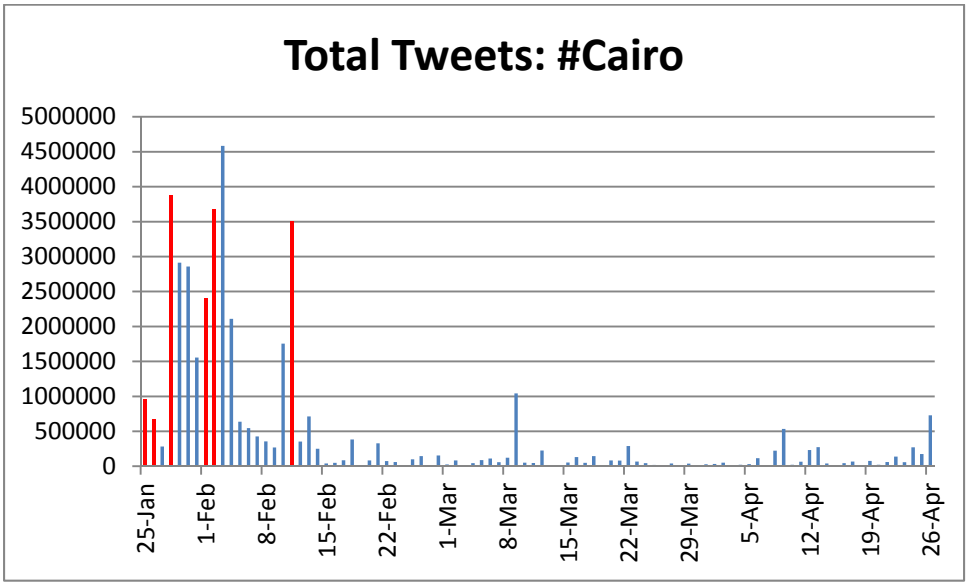


Figure 6: Tweet Frequency for #Tahrir

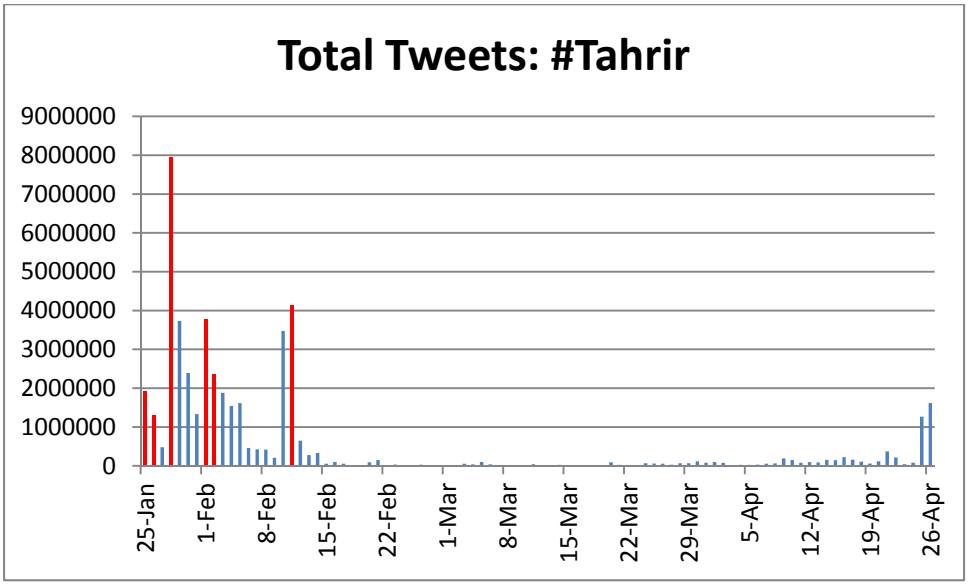
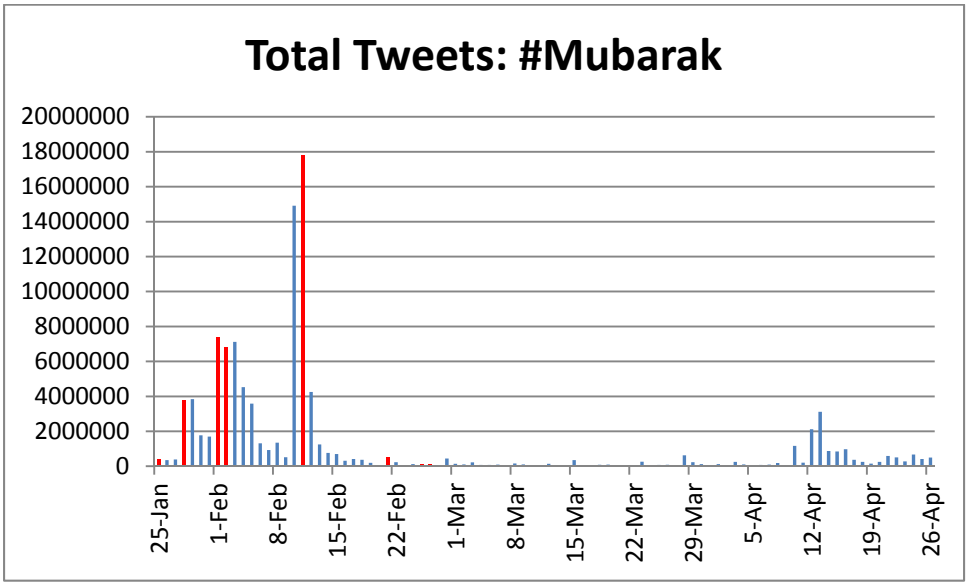


Figure 7: Tweet Frequency for #Mubarak



Similar relationships between tweet frequency and protest can be found by analyzing the frequencies of tweets by hashtags for other countries in the Middle East and North Africa that have been engaged in recent waves of protests and revolution.[8]

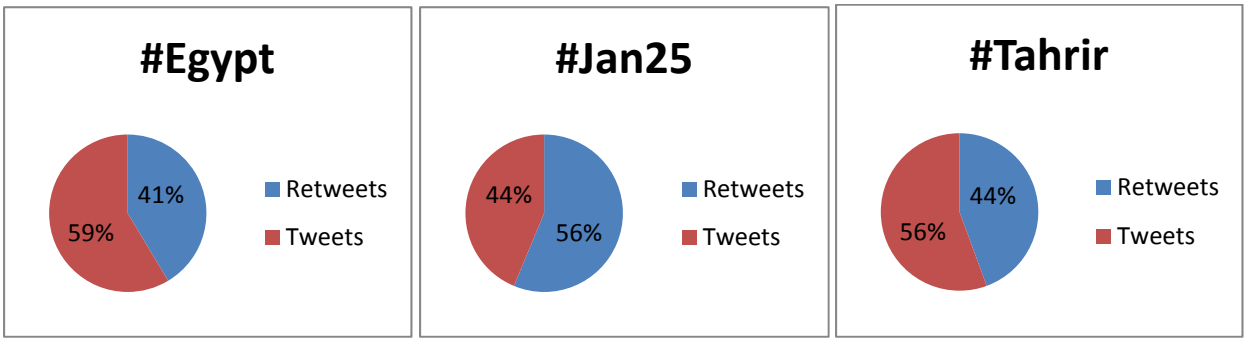
5. DISCUSSION

There are obvious limitations to measuring the frequency of tweets referencing certain hashtags. The first objection being that the tweet frequency might not be a useful proxy to measure the effectiveness of online social networks or the support for the revolution. In response to this criticism, it seems that the frequency of tweets will, at the very least, be a tractable proxy for the amount of activity on social network sites prior to and during protests and revolutions. If there are surges of activity around protest times, it may be reasonable proxy given the statements of opposition leaders and protestors that this increased activity is linked to the use of social network sites to coordinate protests.

Another objection might be that analyzing the frequency of tweets by hashtag does not account for the quality or impact of the tweet. It is definitely true that all tweets are not created equal. Different authors send out more influential tweets than others based on the number of users following them. Intuitively it seems like an original tweet should be more important than someone retweeting the same message. However, the analysis of the data set shows that the frequencies of the original tweet over time were nearly identical to those of the total tweets.[9] It is also important to note that one of the most significant functions of social network sites like Twitter is to facilitate the sharing of information easily over weak ties. From this perspective, retweets are just as important for protestors and revolutionaries.

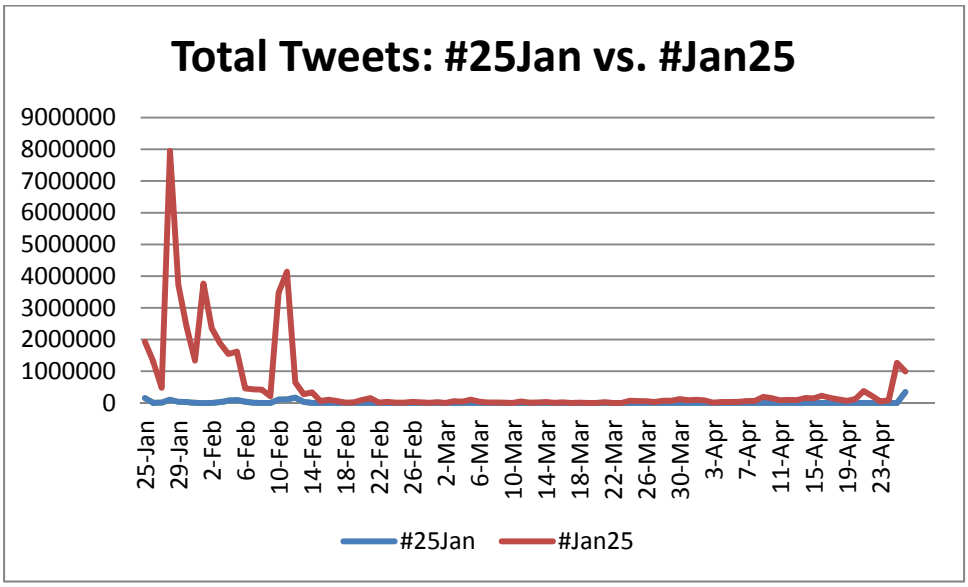
[8] See appendices for tweet frequency graphs for other countries.
[9] See Appendix B in particular for a comparison of original and total tweet frequencies.

Figure 8: Tweets and Retweets



There are also challenges in choosing which hashtags. The first is that the data might be noisy due to typos, for example individuals might type #fev11 instead of #feb11. There are also issues of coordination associated with choosing the popular hashtag. For example, searching for #Jan25 instead of #25Jan can make a huge difference (see Figure 9).

Figure 9: Importance of Choosing the Popular Hashtag



Other limitations of hashtags relate to their broadness. Hashtags alone do not distinguish between users and their purposes. Analyzing tweet frequency does not account for different types of users (newspapers, revolution leaders, and individual protestors) and purposes (reporting, organizing). In addition, there might be correlations between internet access and education,

which may be relevant since political participation tends to increase with relative education (Tenn 2005).

6. CONCLUSION

The preceding investigation of the Egyptian Revolution and analysis of various tweet data sets suggest that social network sites like Facebook and Twitter have acted as a type of social capital for revolutionary movements by lowering information costs and facilitating coordination efforts. As predicted, social network sites have allowed protestors to connect in a way that was not possible before social media. The overall effect of social media is to break the government's monopoly on information and empower the people to share information and coordinate their efforts against oppressive government regimes.

Future research may want to analyze the other countries involved in the Middle East and North Africa protests in more detail than I was able to achieve given the length of this paper (see the appendices). It might also be important to refine the use of tweet frequency as a proxy to measure the effectiveness of online social networks by restricting the data search results not only by hashtag, but also by the type of user or the perceived purpose of the tweet. A comparative study of different types of social media may also add insight to how revolutionary leaders use social network sites differently than other social media tools like blogs in order to build social capital. The research possibilities seem very open for the future.

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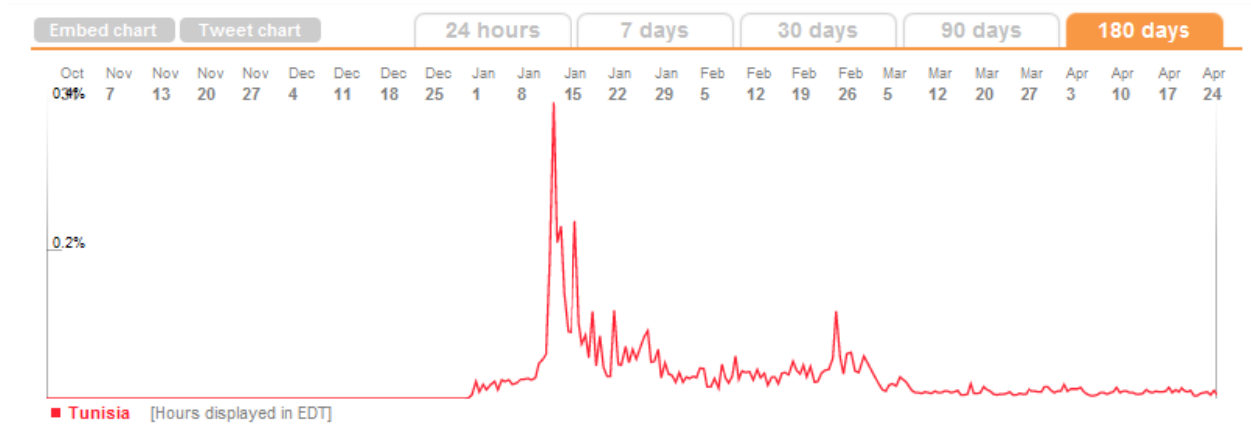
APPENDICES

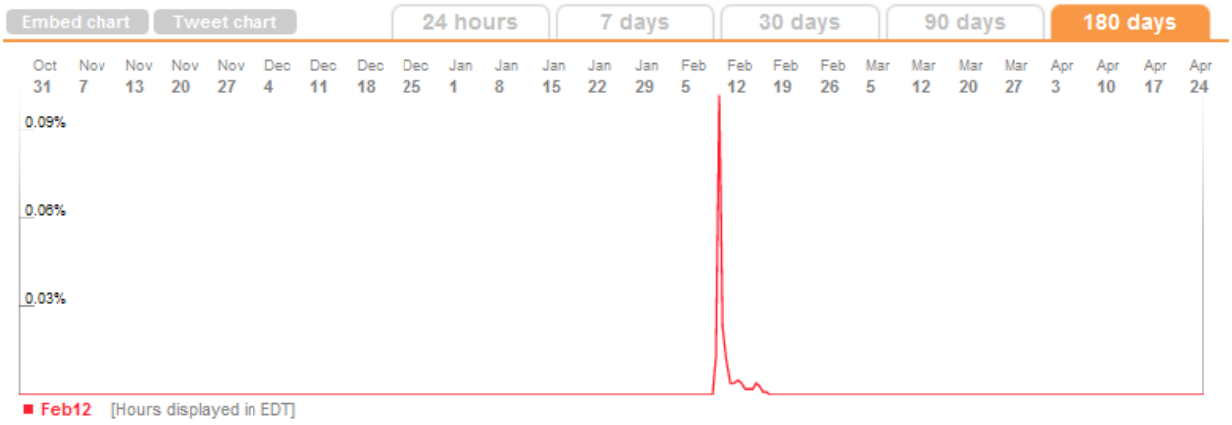
Appendix A: Middle East and North Africa Protests Tweet Frequencies

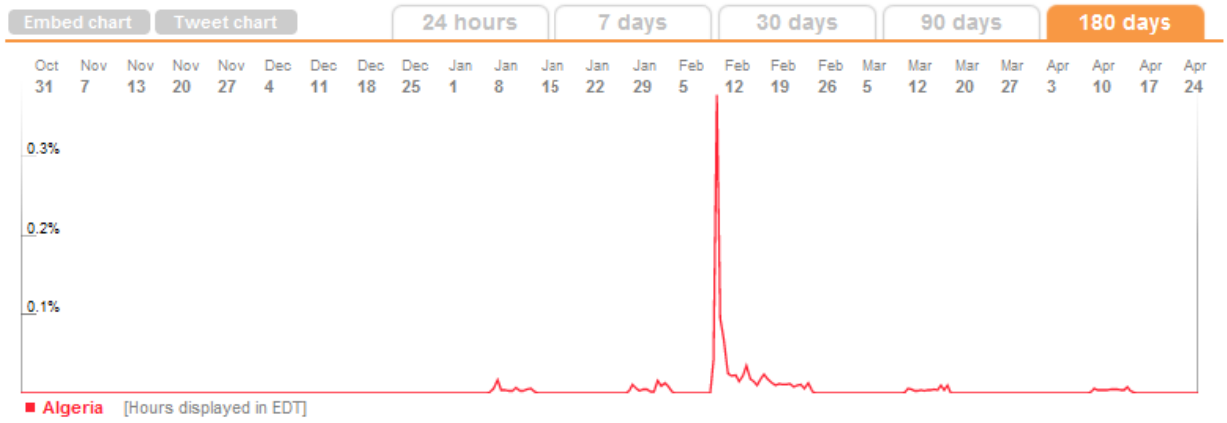
This data was collected and analyzed using Trendistic.com. The following graphs show a selection of relevant tweet hashtags that with a sufficient amount of data available.

<u>Tunisia:</u> 18 Dec 2010

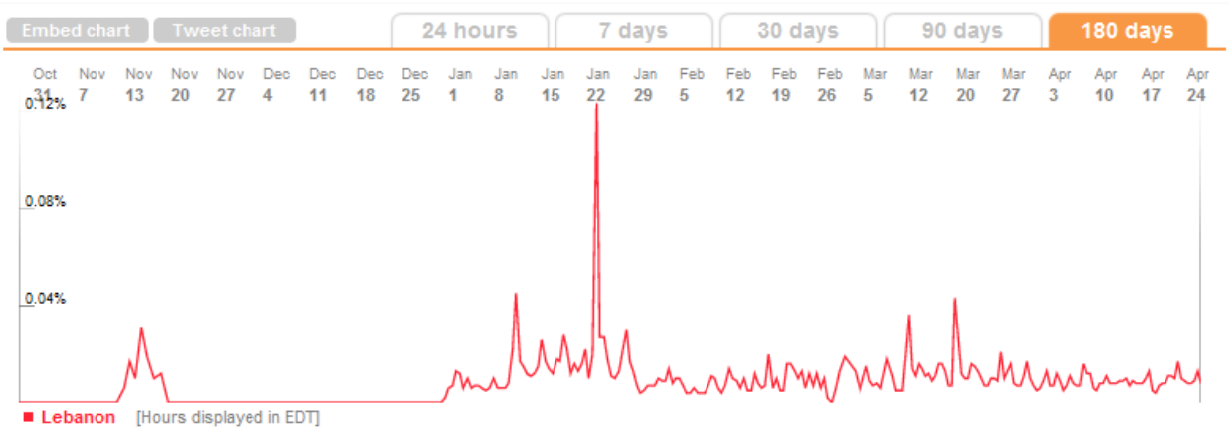


<u>Algeria:</u> 28 Dec 2010

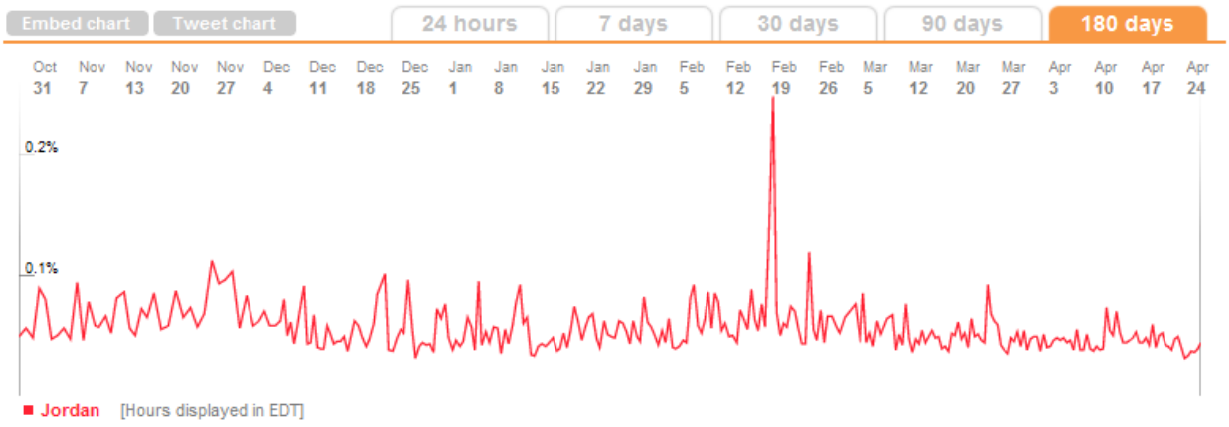




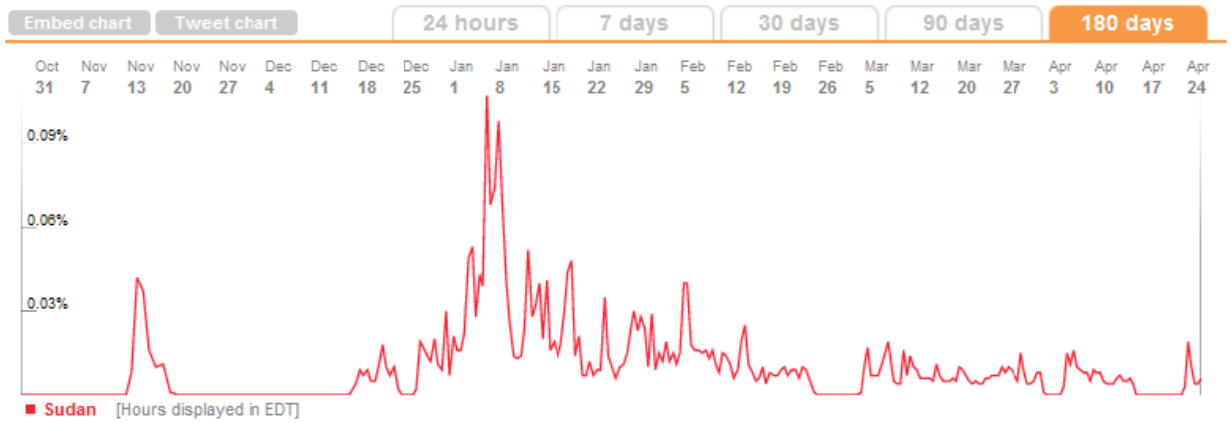
<u>Lebanon:</u> 12 Jan 2011



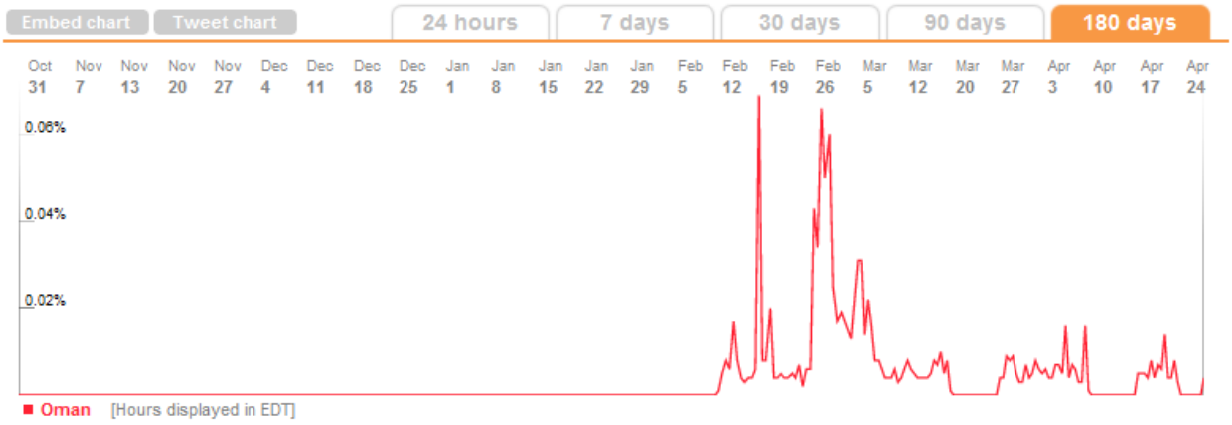
<u>Jordan:</u> 14 Jan 2011



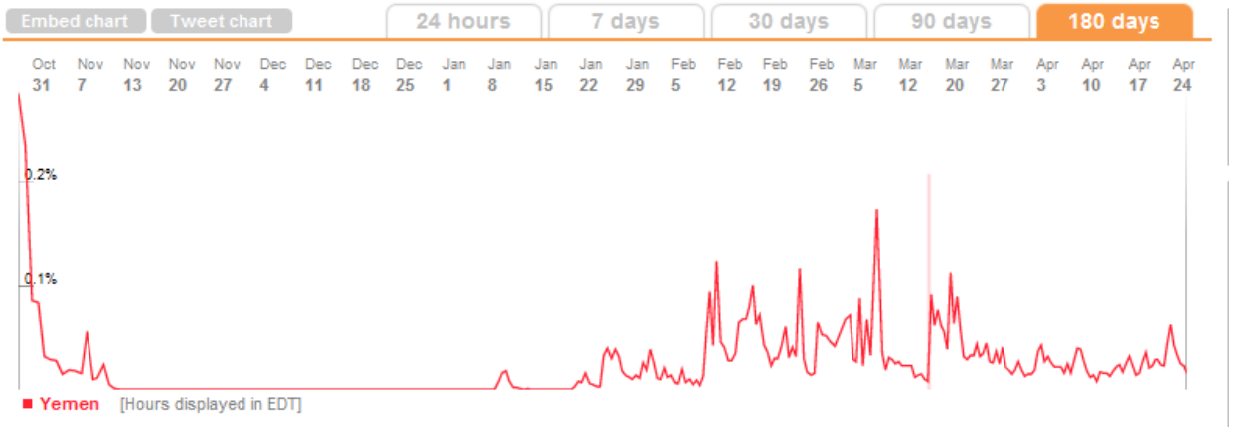
Sudan: 17 Jan 2011

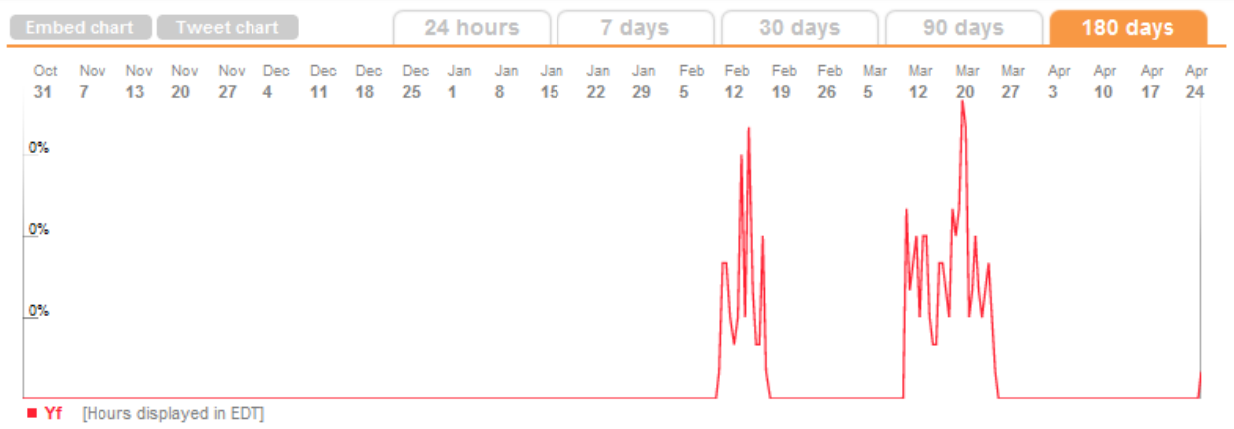


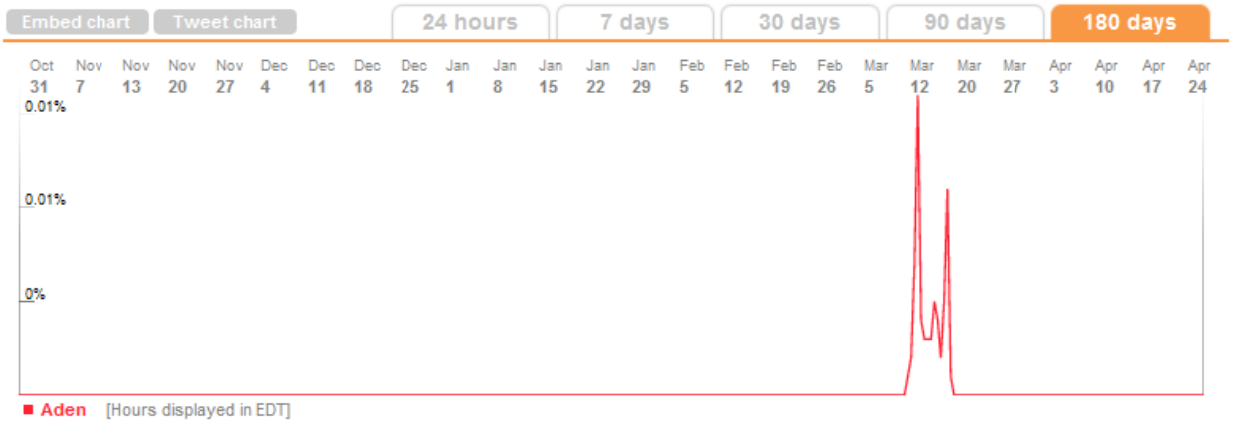
Oman: 17 Jan 2011



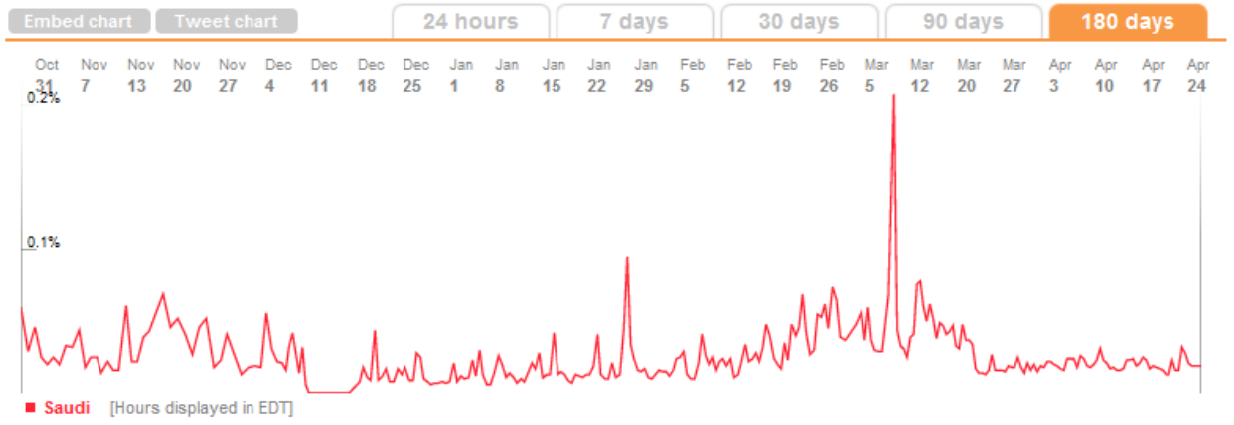
Yemen: 18 Jan 2011



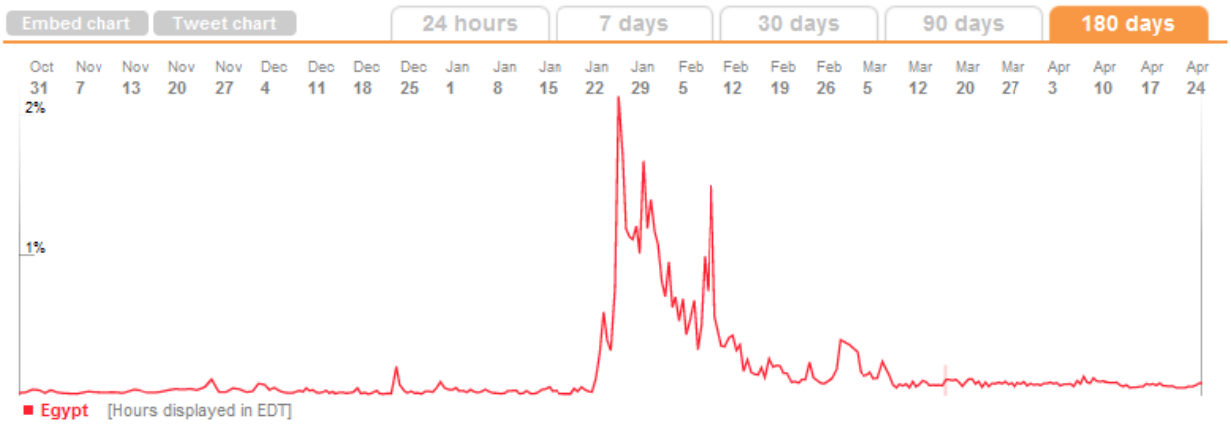


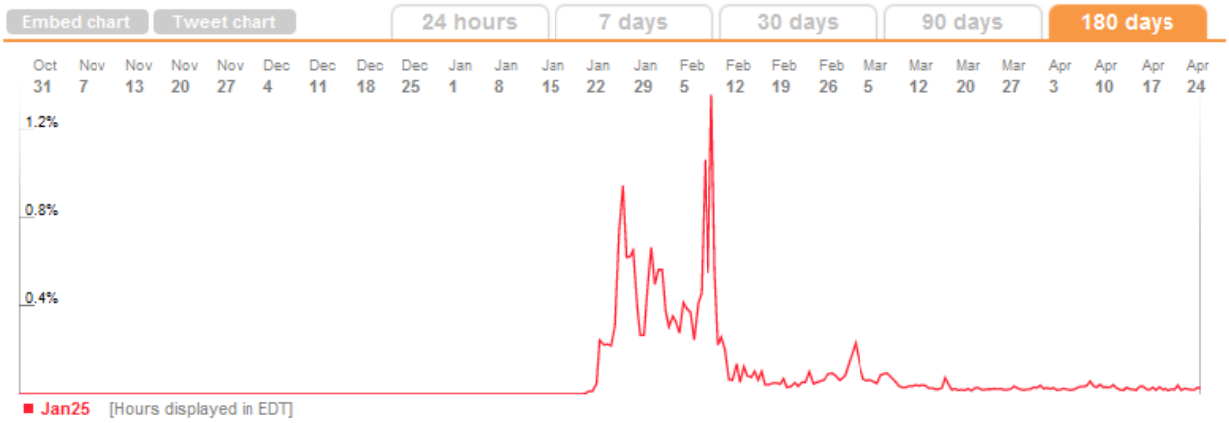


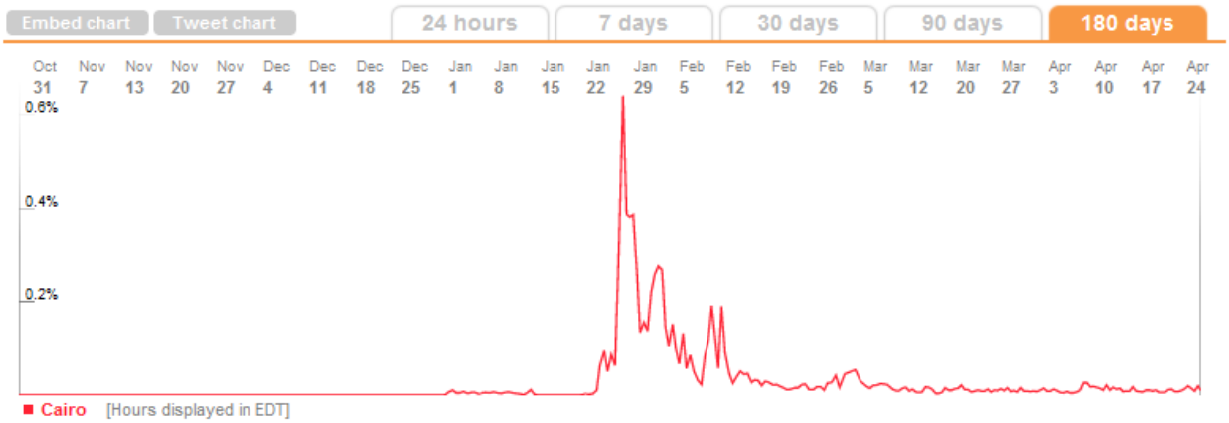
<u>Saudi Arabia:</u> 21 Jan 2011

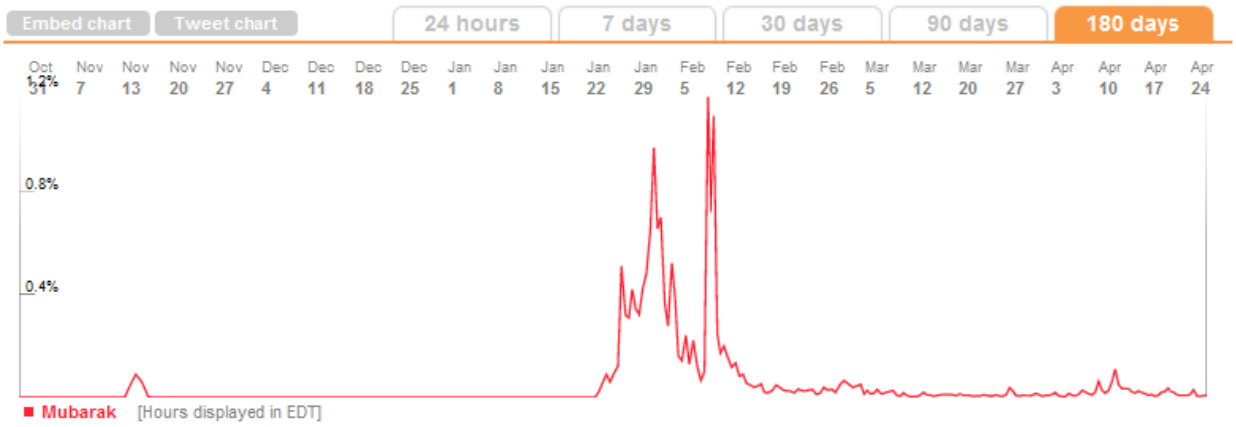


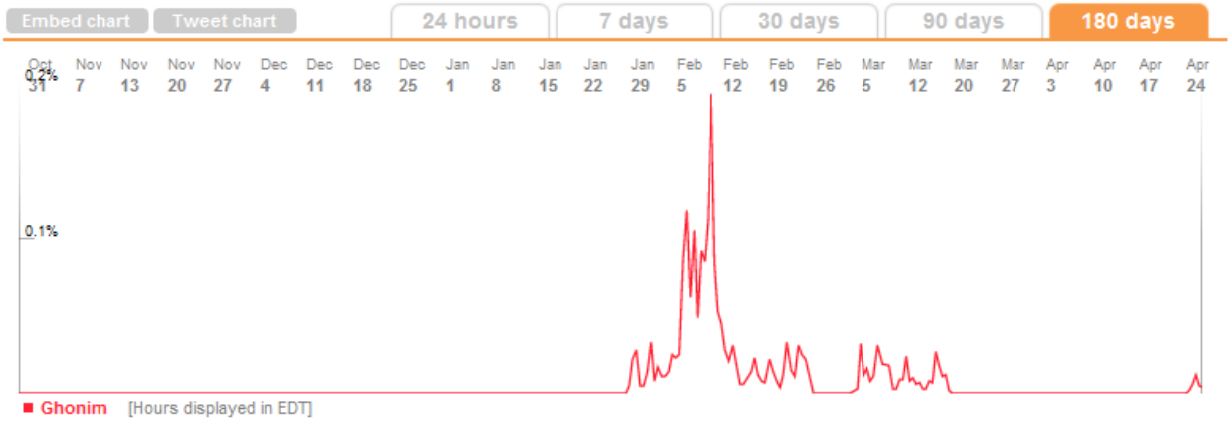
<u>Egypt:</u> 25 Jan 2011



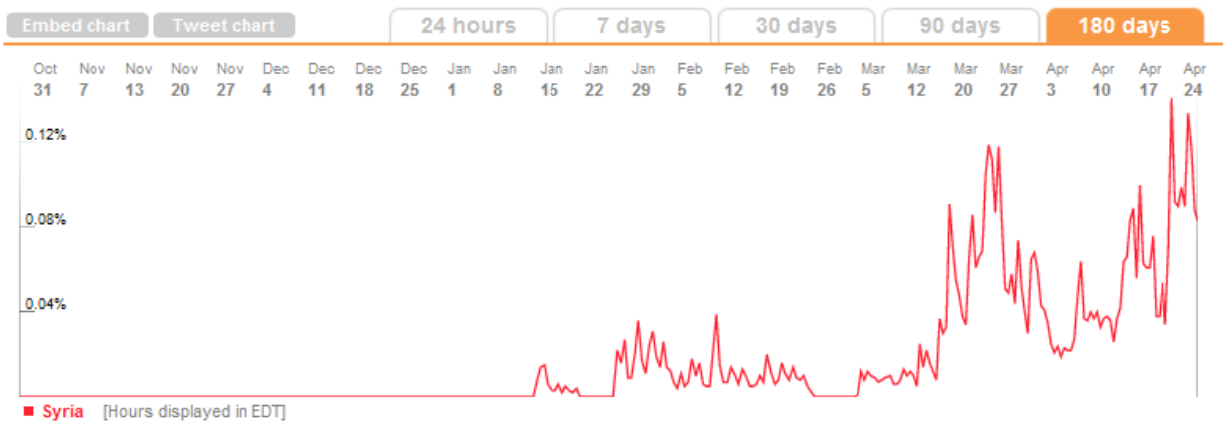


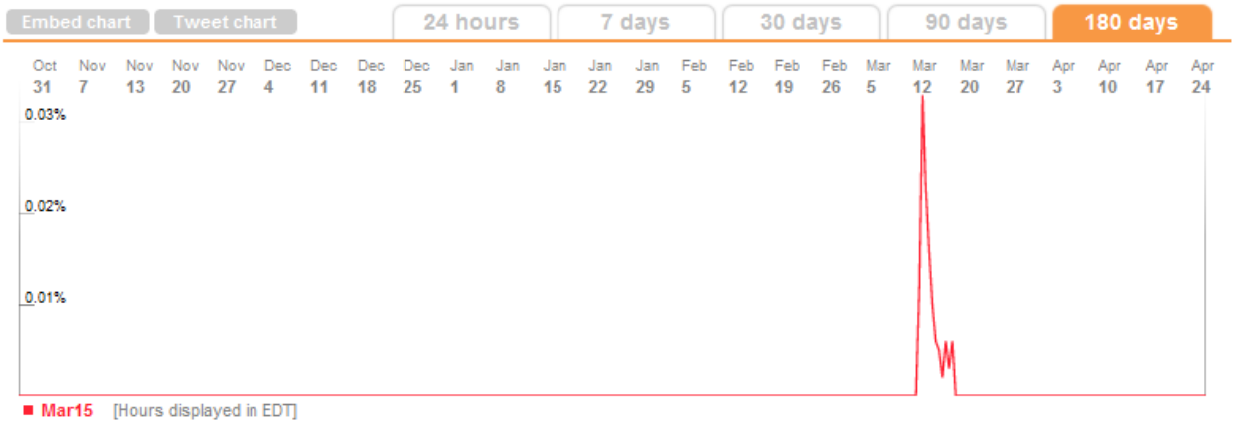


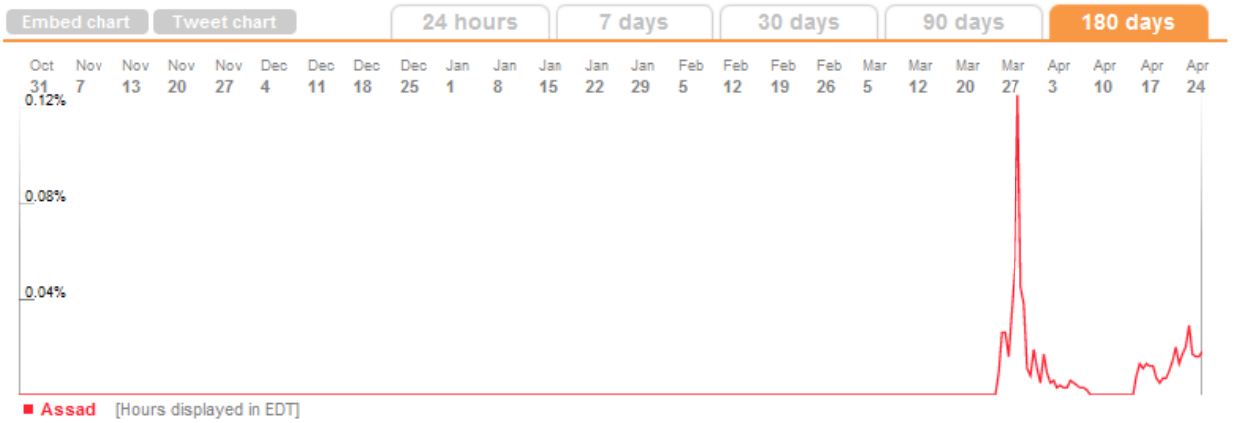


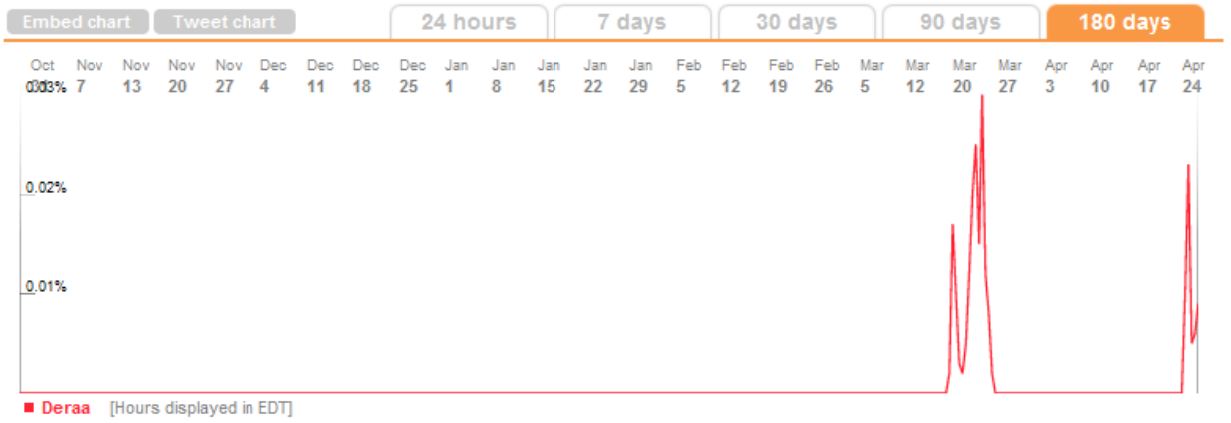


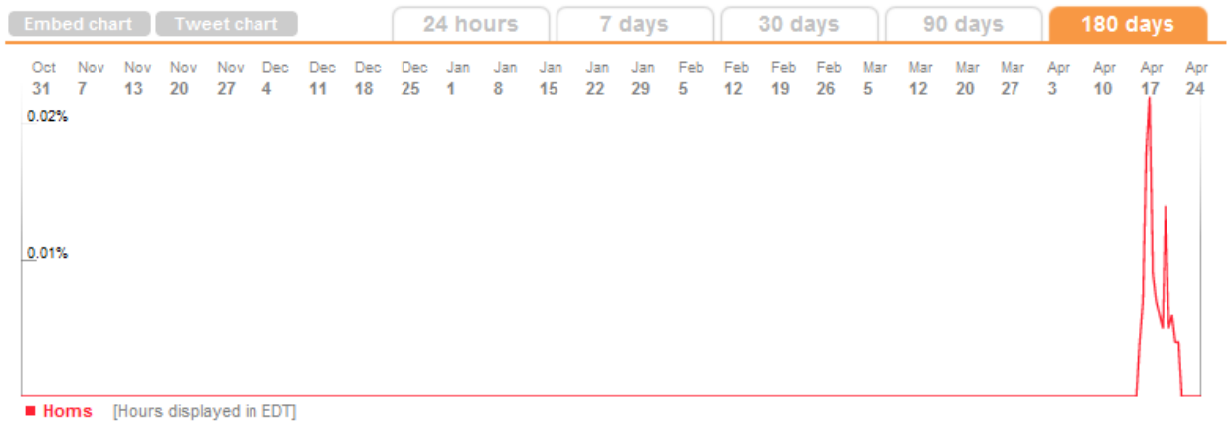
Syria: 26 Jan 2011



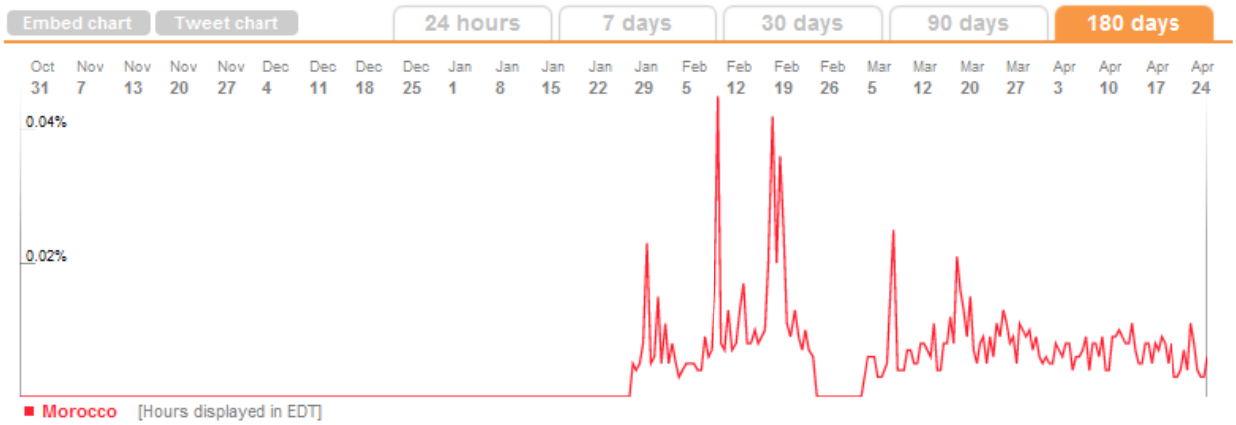

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.03%
0.02%
0.01%
Mar15 [Hours displayed in EDT]


Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.12%
0.08%
0.04%
Assad [Hours displayed in EDT]

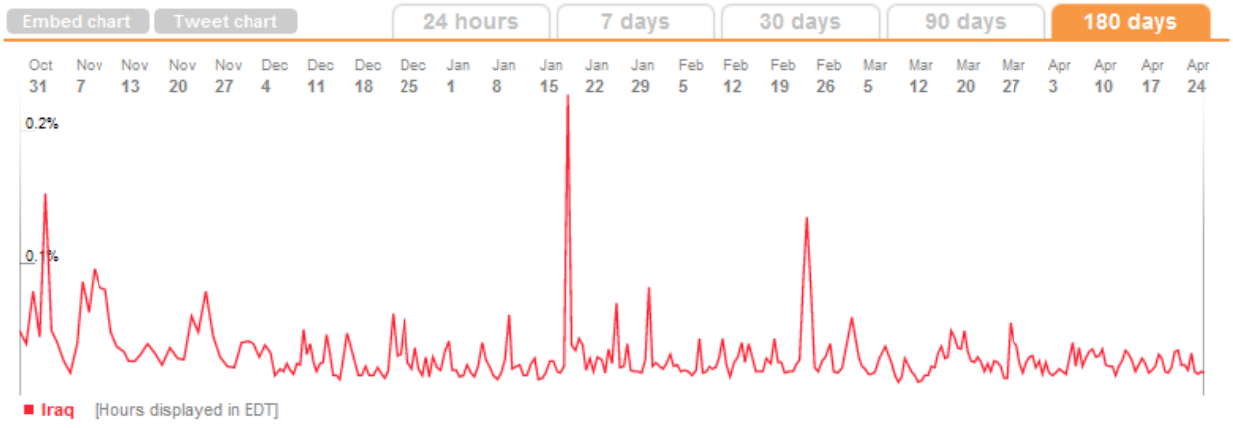

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.02%
0.01%
Deraa [Hours displayed in EDT]



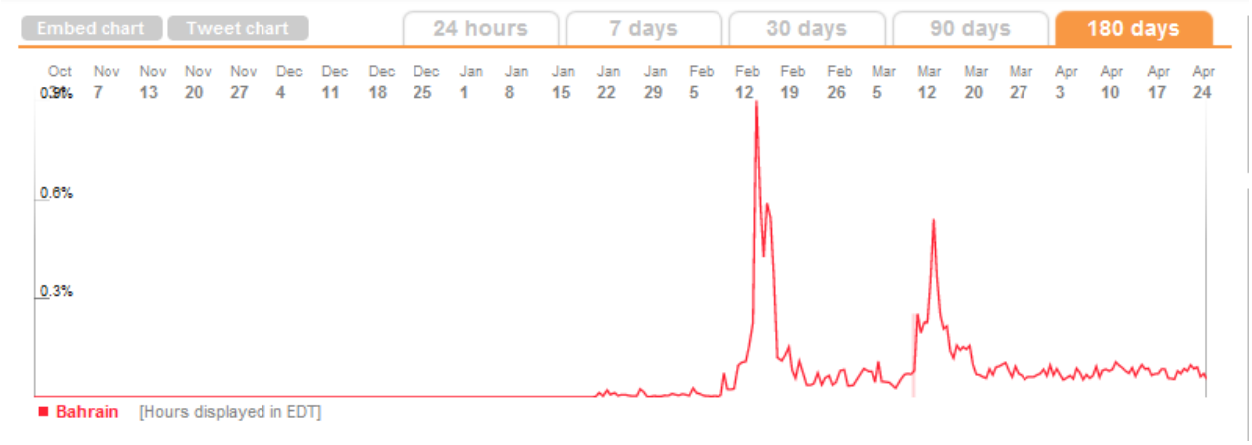
<u>Morocco:</u> 30 Jan 2011

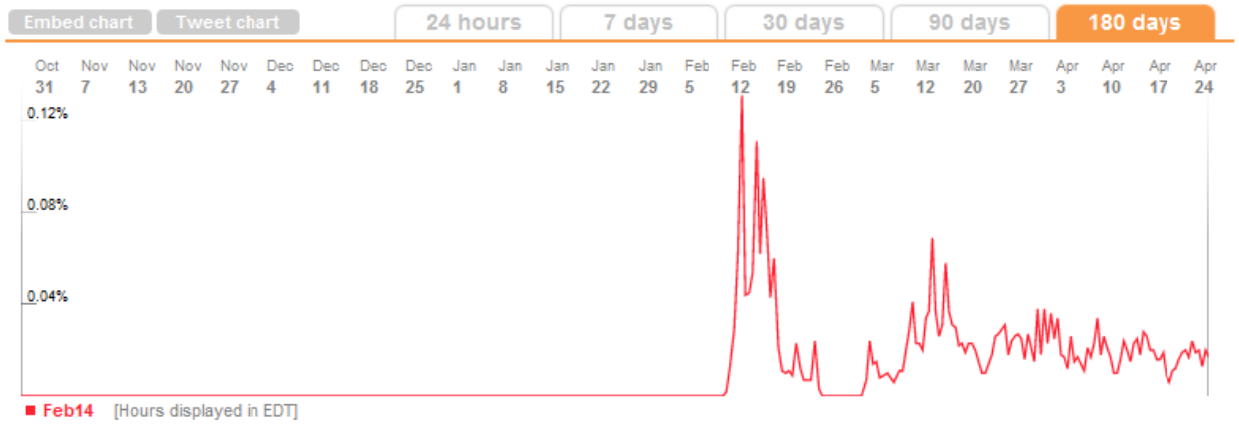


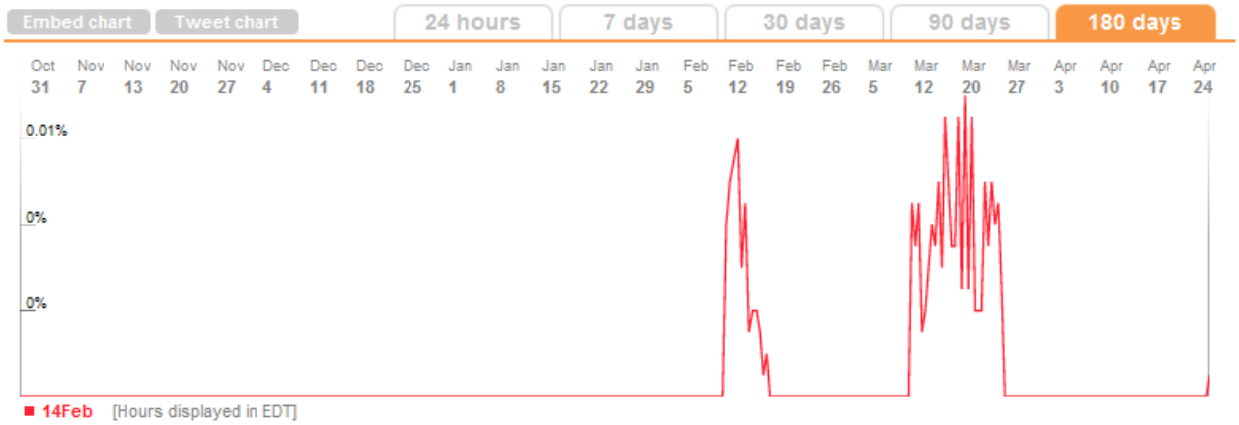
<u>Iraq:</u> 10 Feb 2011



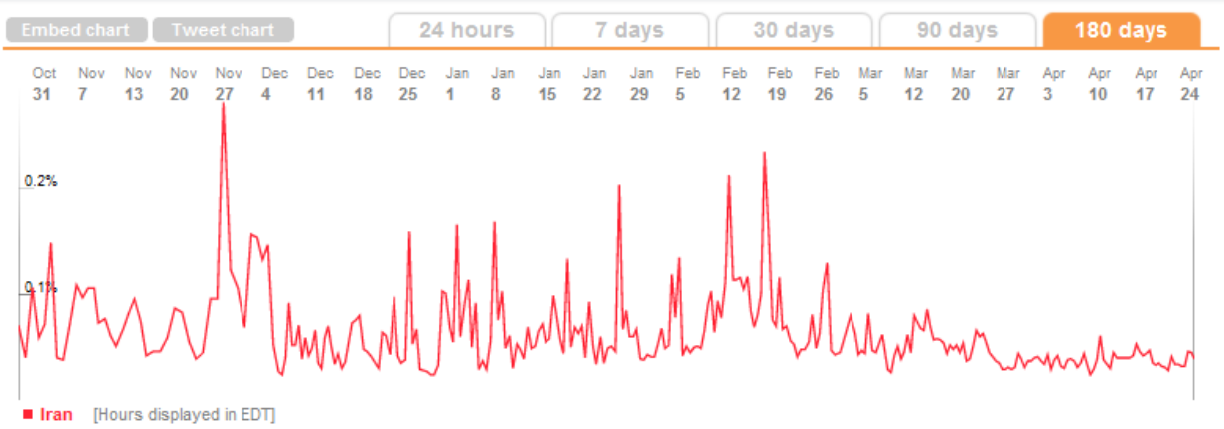
<u>Bahrain:</u> 14 Feb 2011

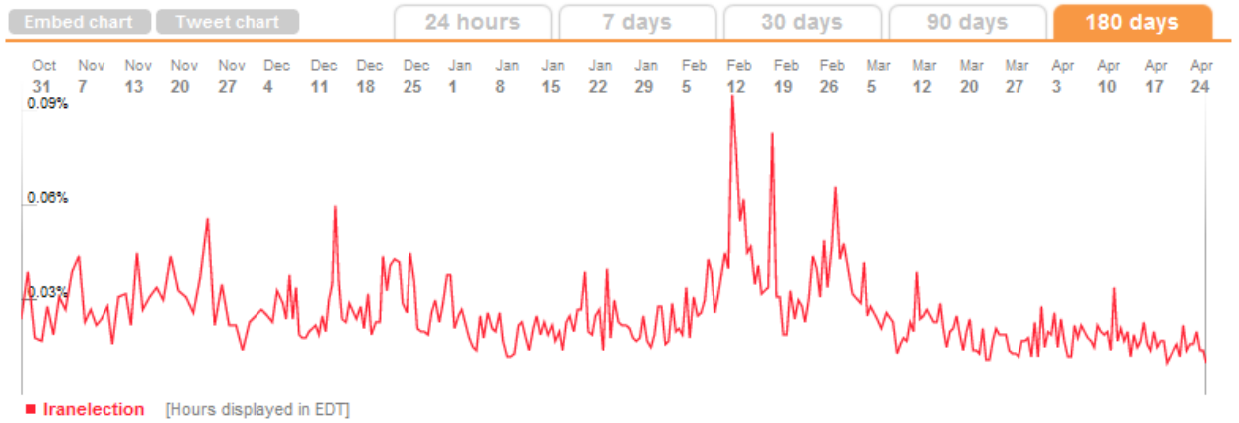

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.6%
0.3%
Bahrain
[Hours displayed in EDT]

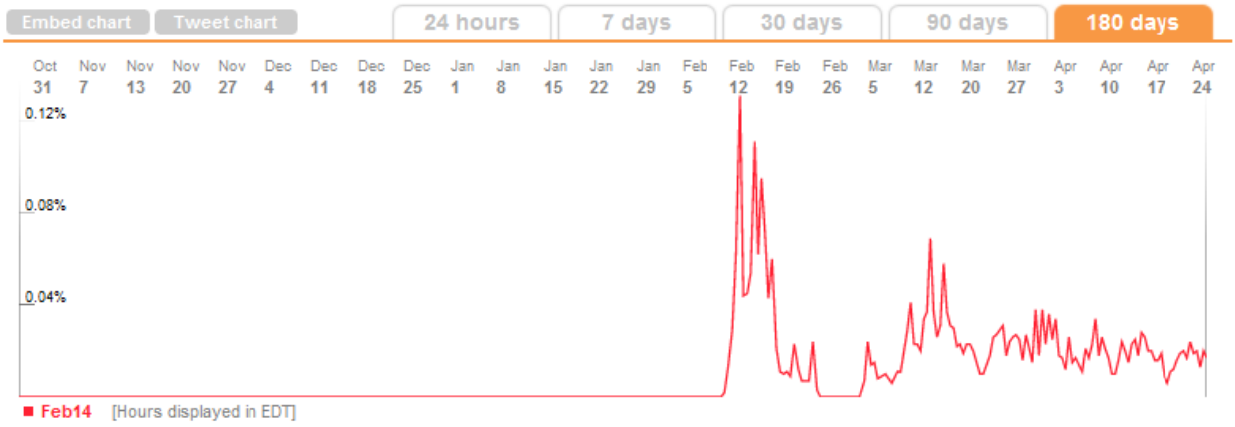

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.12%
0.08%
0.04%
Feb14
[Hours displayed in EDT]

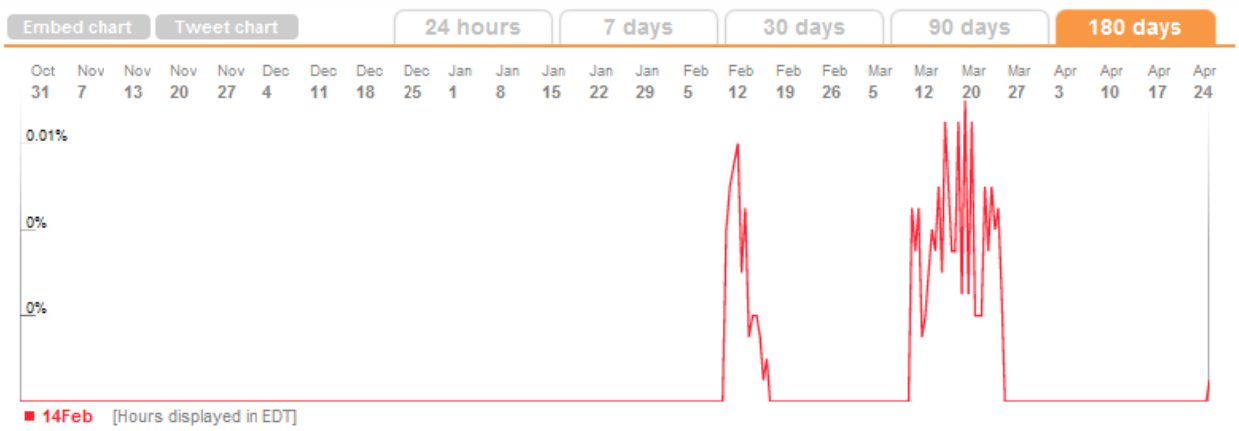

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.01%
0%
0%
14Feb
[Hours displayed in EDT]

Iran: 14 Feb 2011

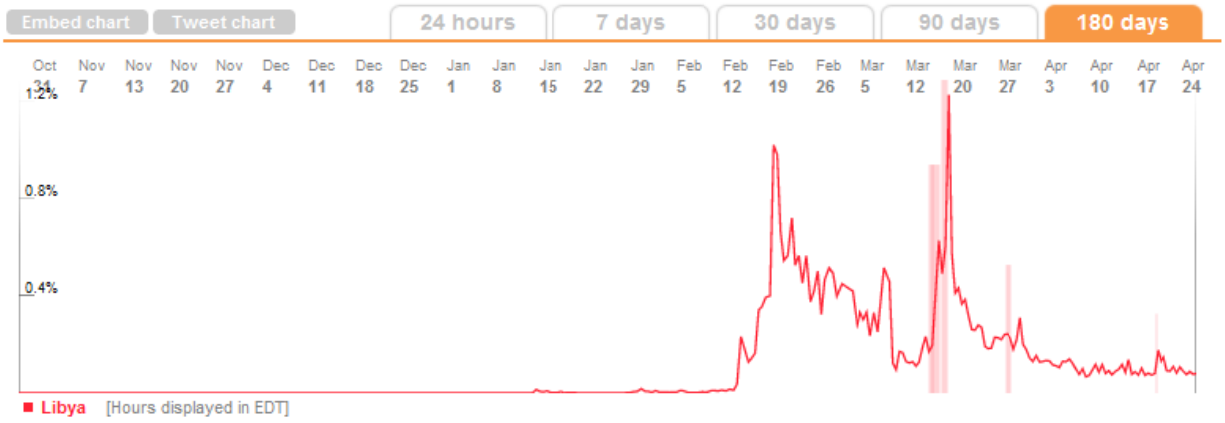


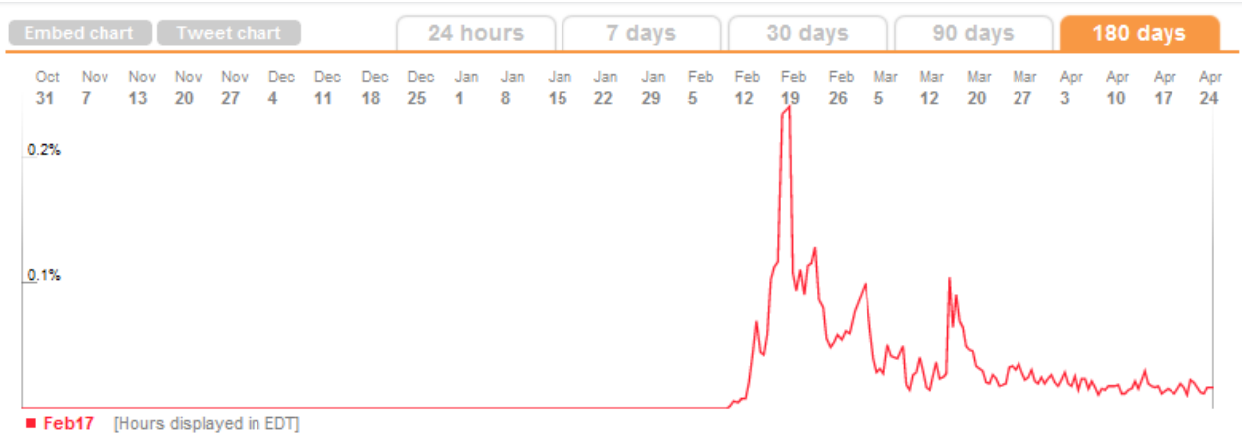


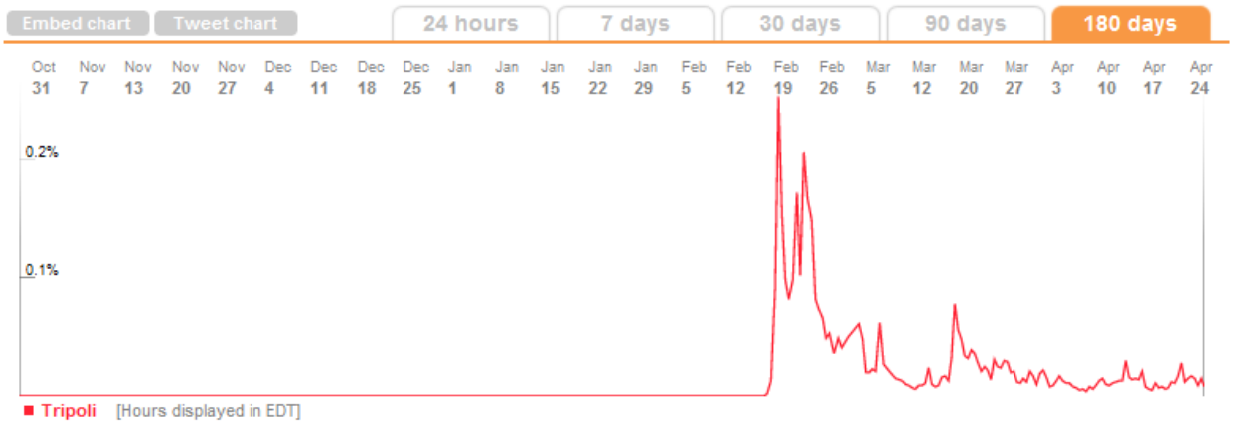


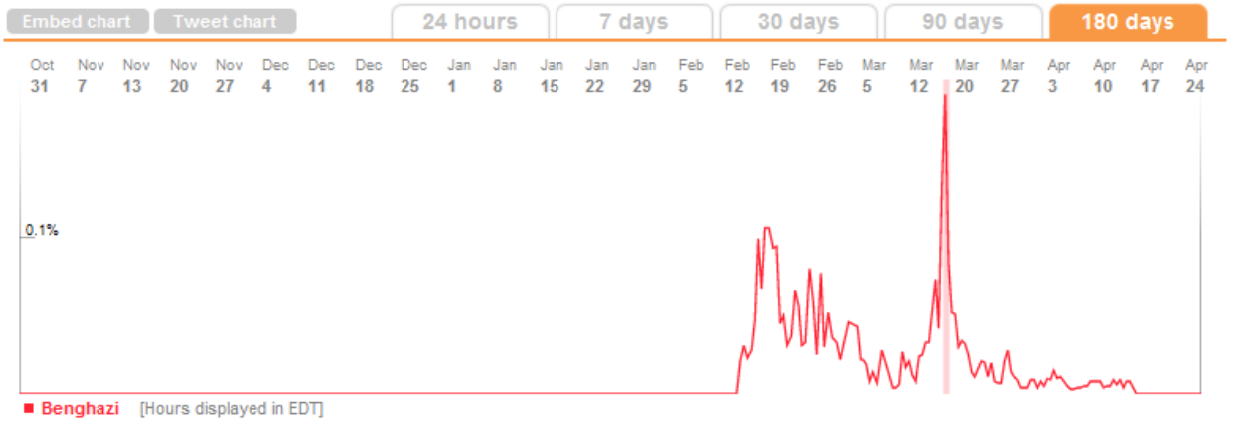


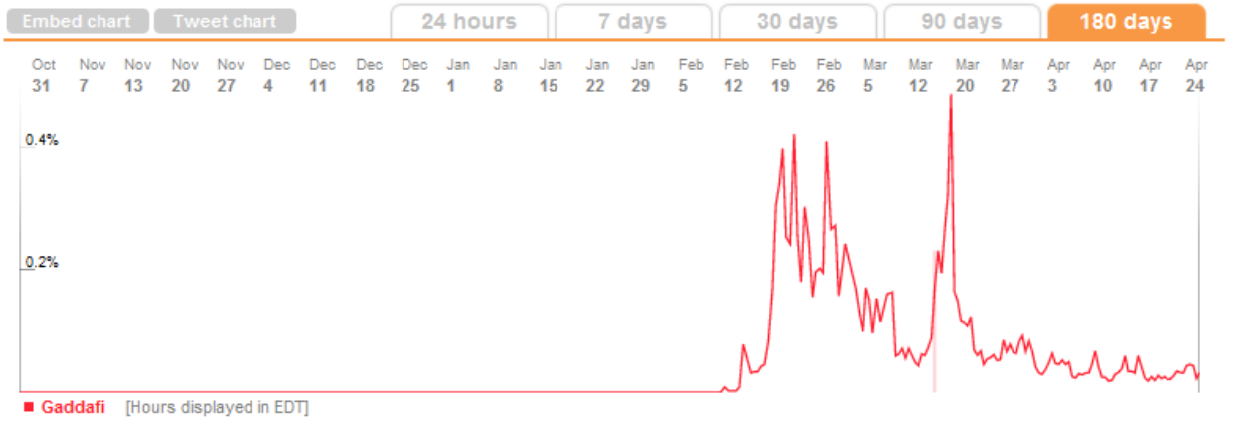
Libya: 15 Feb 2011



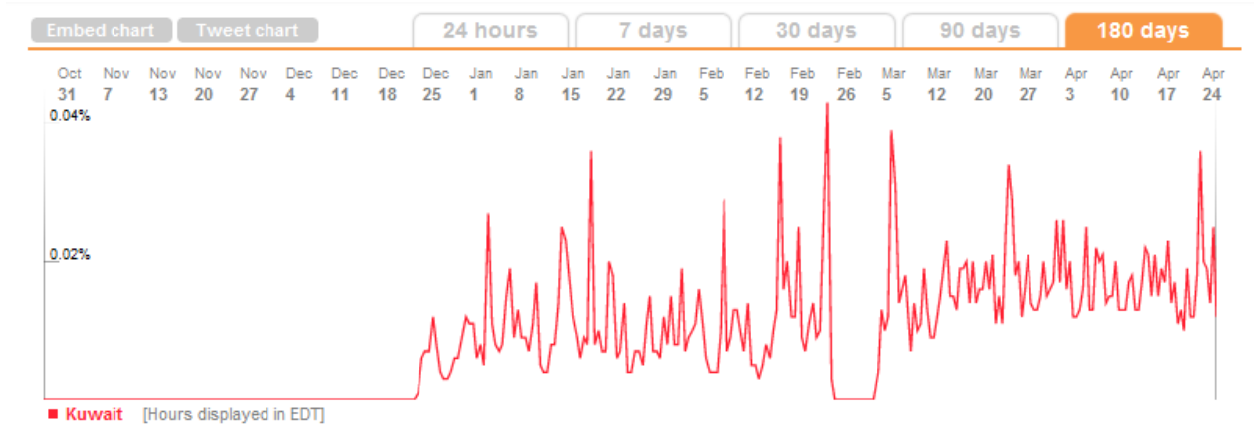



Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.2%
0.1%
Tripoli
[Hours displayed in EDT]

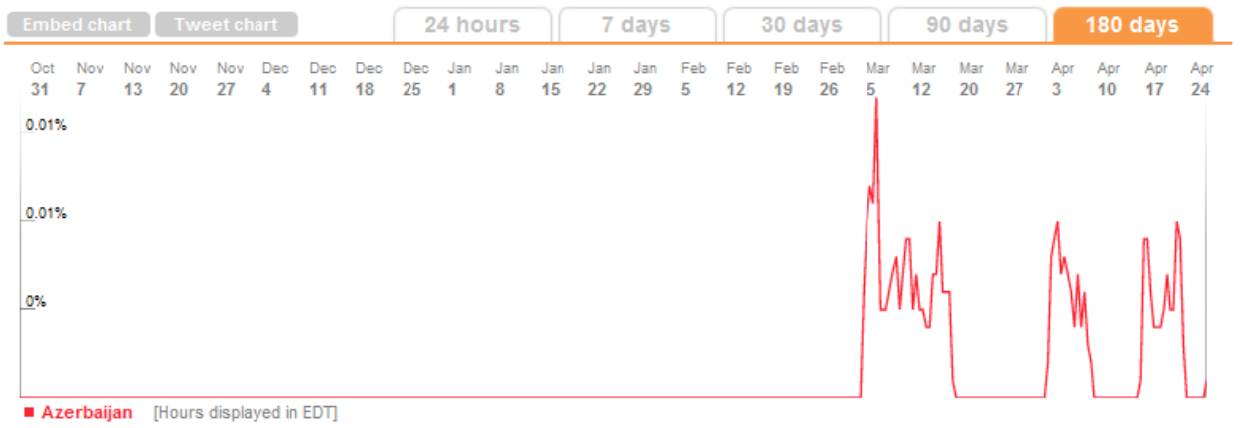

Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.1%
Benghazi
[Hours displayed in EDT]


Embed chart
Tweet chart
24 hours
7 days
30 days
90 days
180 days
Oct 31 Nov 7 Nov 13 Nov 20 Nov 27 Dec 4 Dec 11 Dec 18 Dec 25 Jan 1 Jan 8 Jan 15 Jan 22 Jan 29 Feb 5 Feb 12 Feb 19 Feb 26 Mar 5 Mar 12 Mar 20 Mar 27 Apr 3 Apr 10 Apr 17 Apr 24
0.4%
0.2%
Gaddafi
[Hours displayed in EDT]

<u>Kuwait:</u> 18 Feb 2011



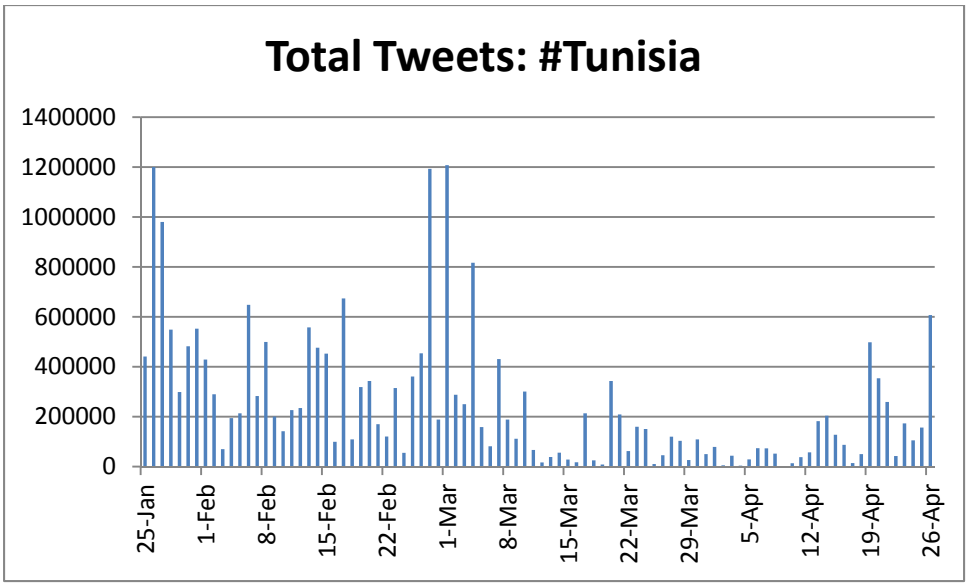
<u>Azerbaijan:</u> 11 March 2011

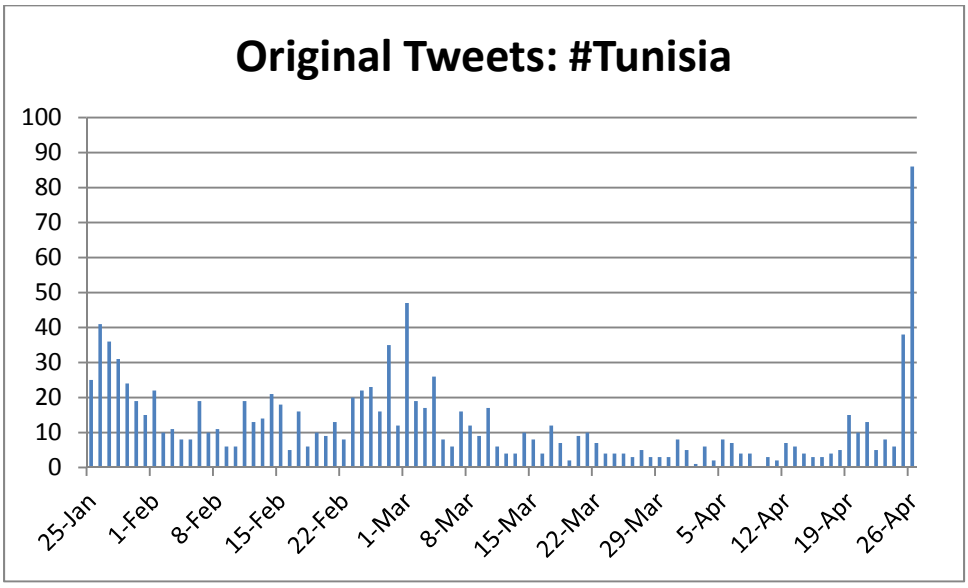


Appendix B: Searchtastic Hashtag Tweet Data

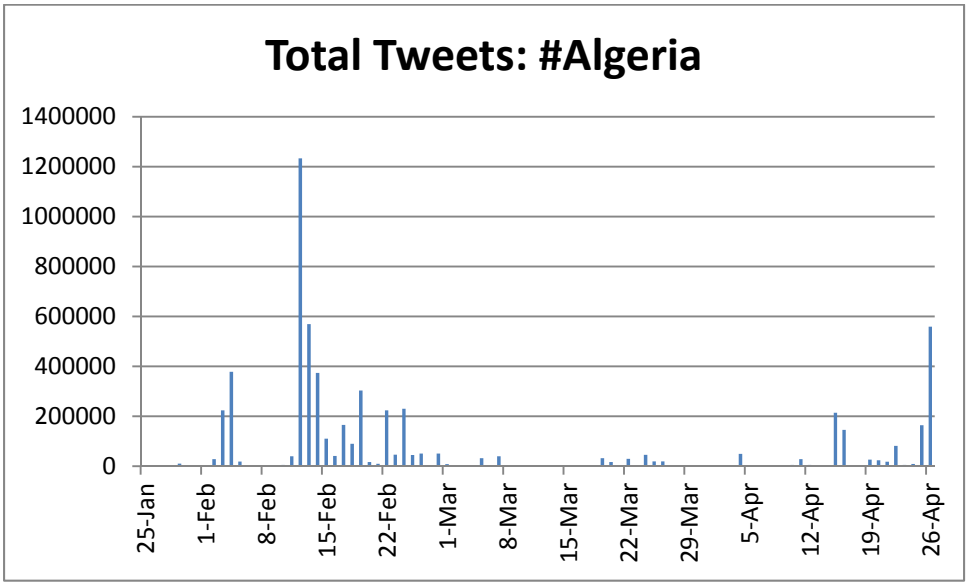
Analysis of data exported from Searchtastic.com. Specifically the results for hashtags related to the Egyptian Revolution.

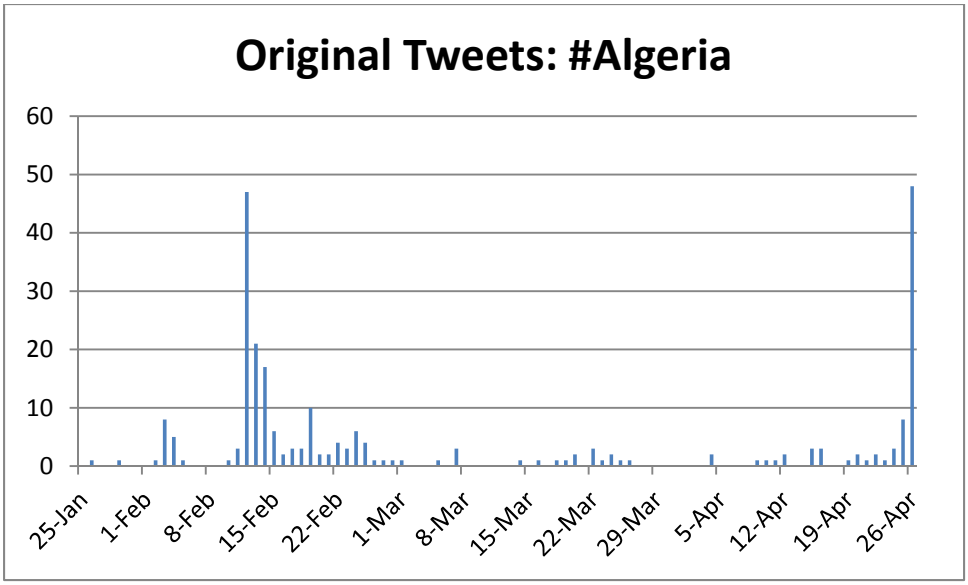
<u>Tunisia</u>: 18 Dec 2010

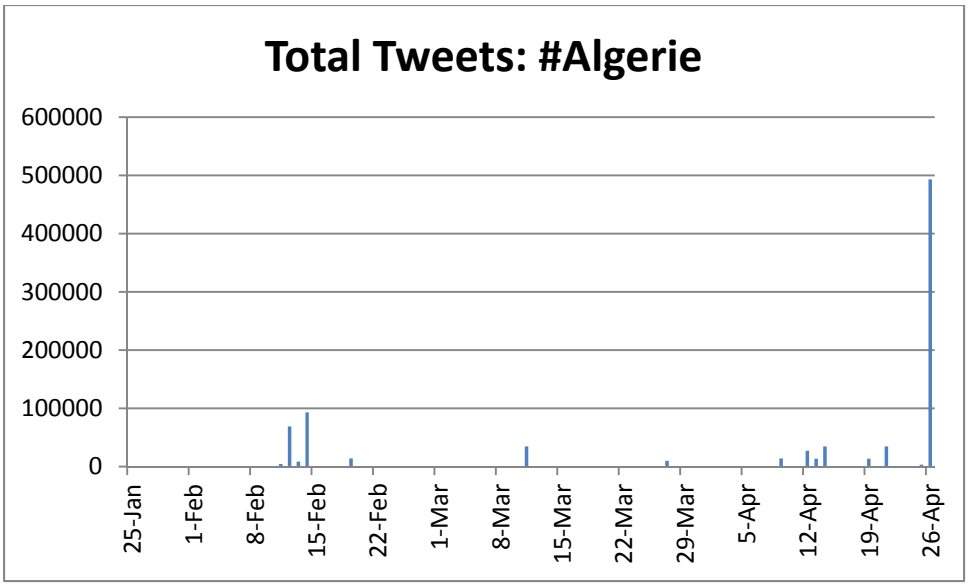


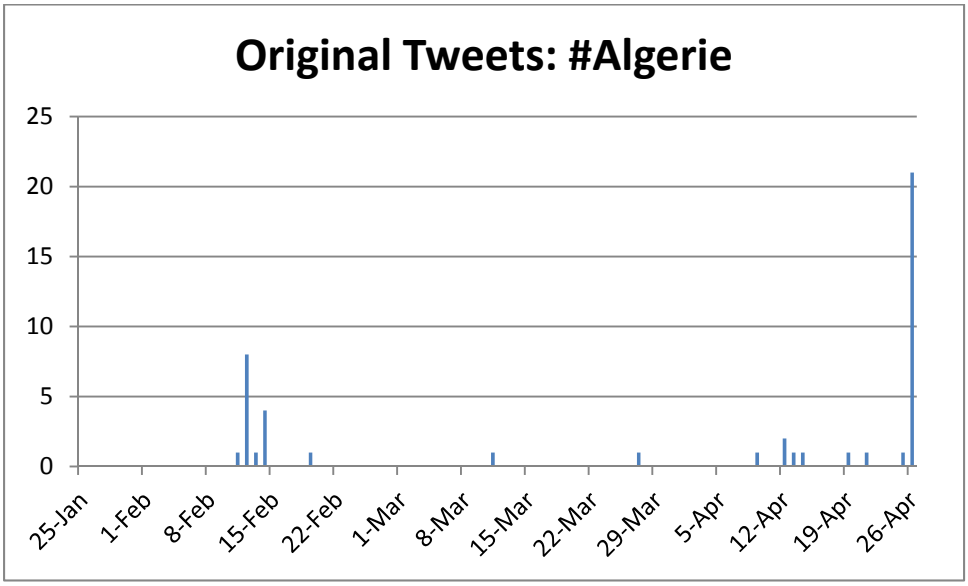


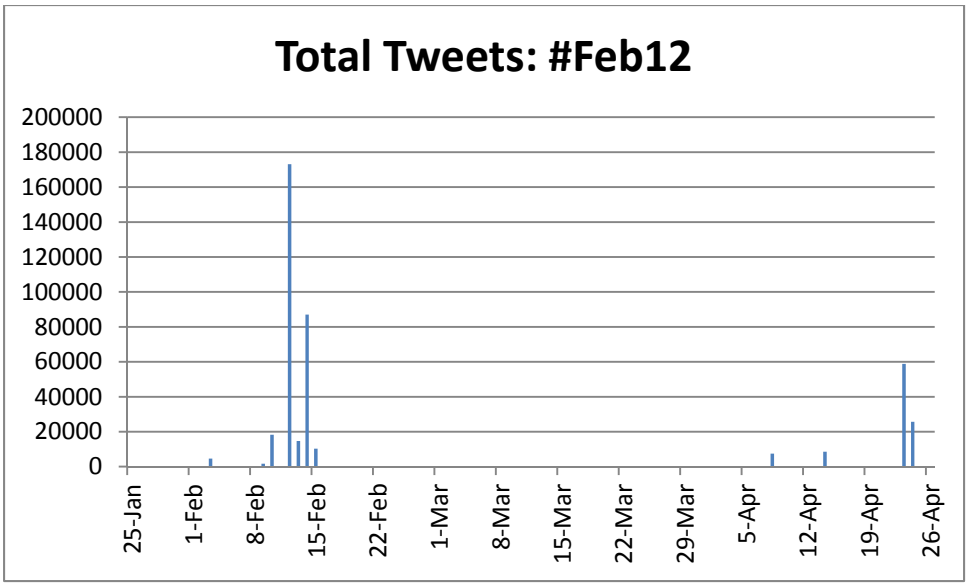
Algeria: 28 Dec 2010

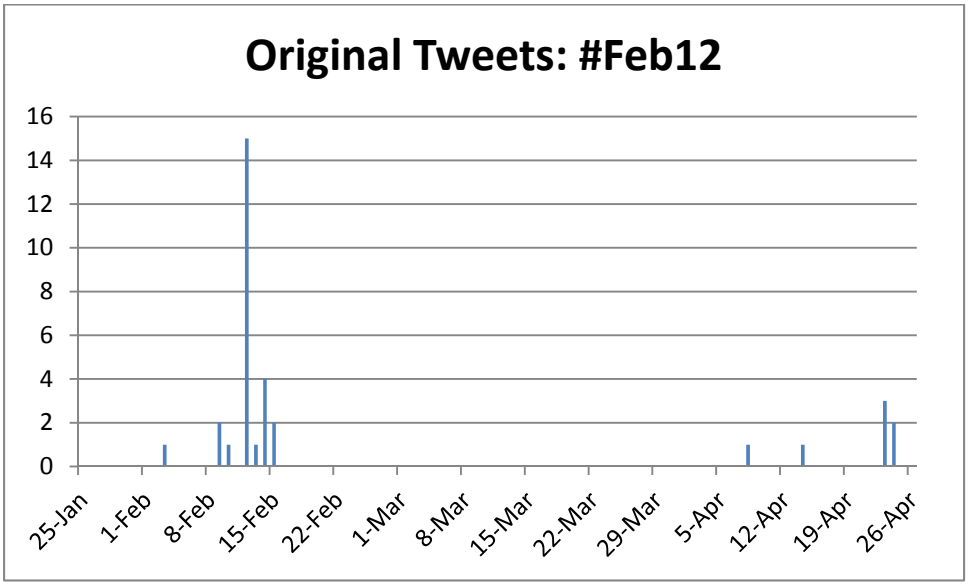




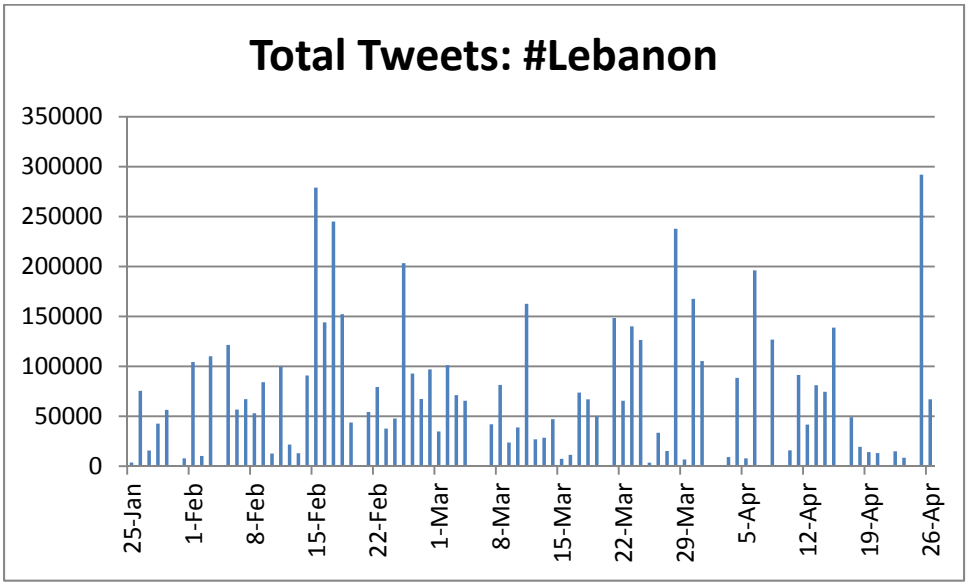

Total Tweets: #Algerie
600000
500000
400000
300000
200000
100000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

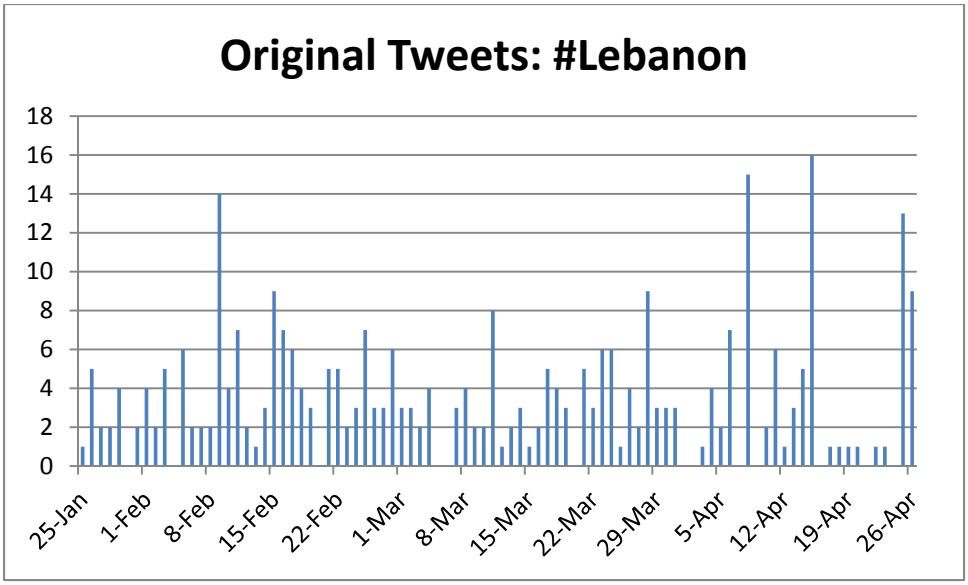

Original Tweets: #Algerie
25
20
15
10
5
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr


Total Tweets: #Feb12
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

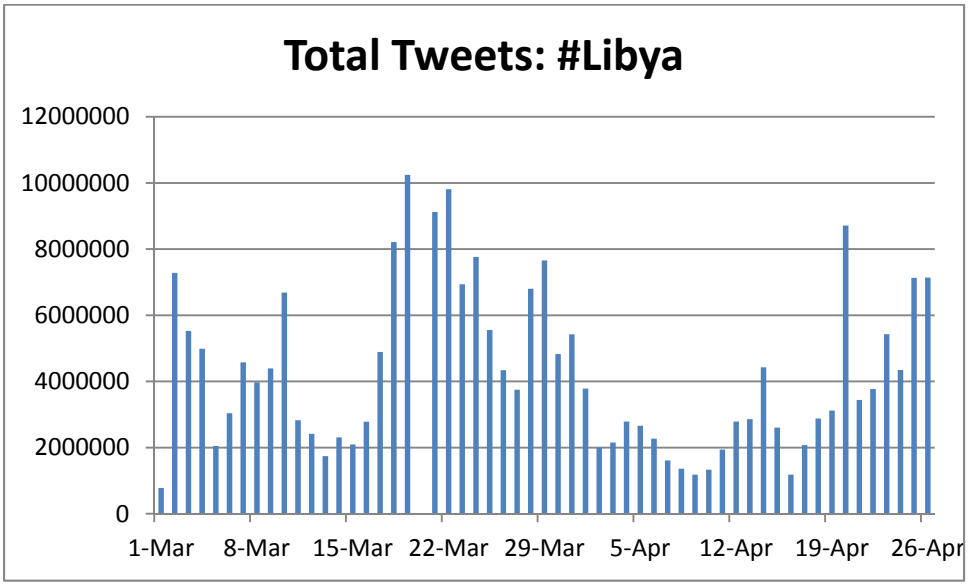

Original Tweets: #Feb12
16
14
12
10
8
6
4
2
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

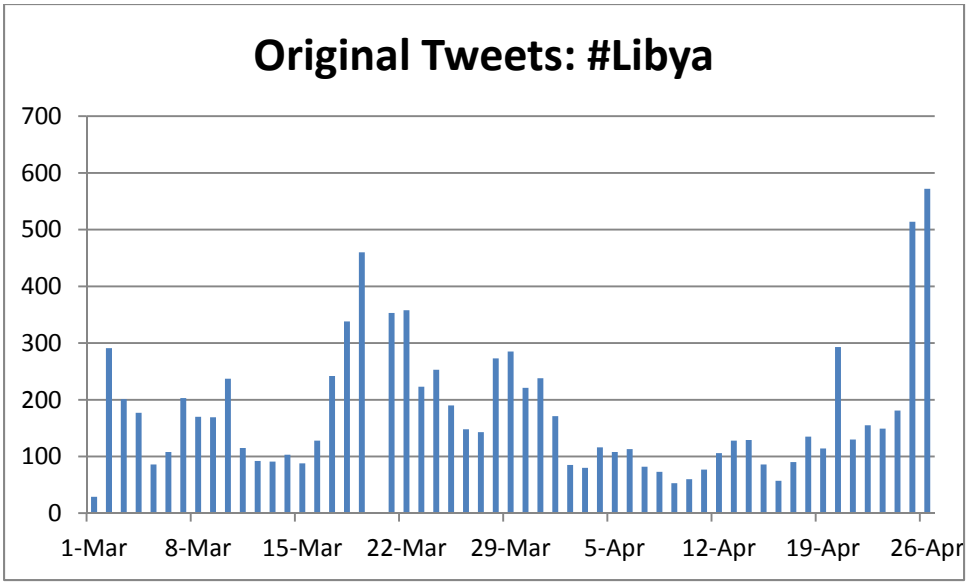
Lebanon: 12 Jan 2011

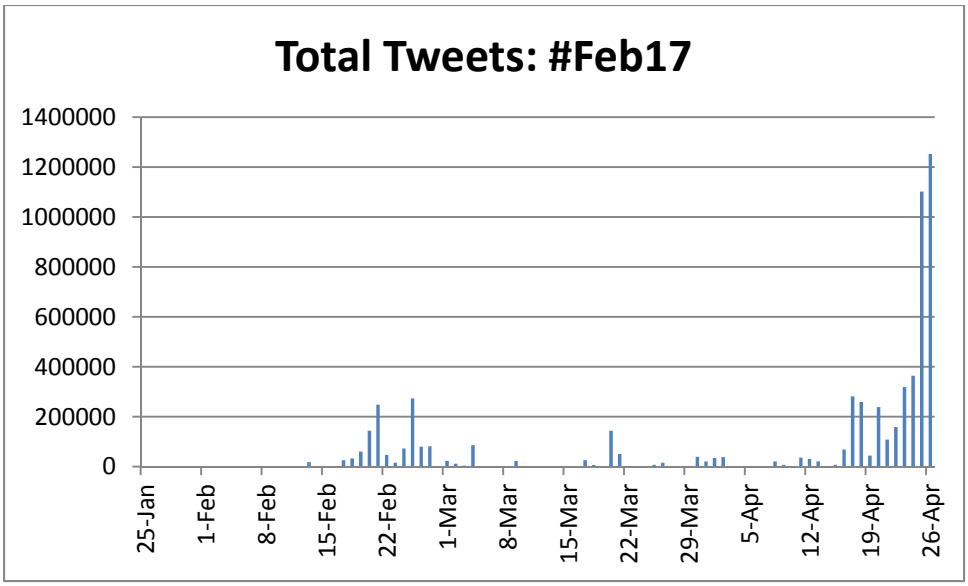




Libya: 13 Jan 2011



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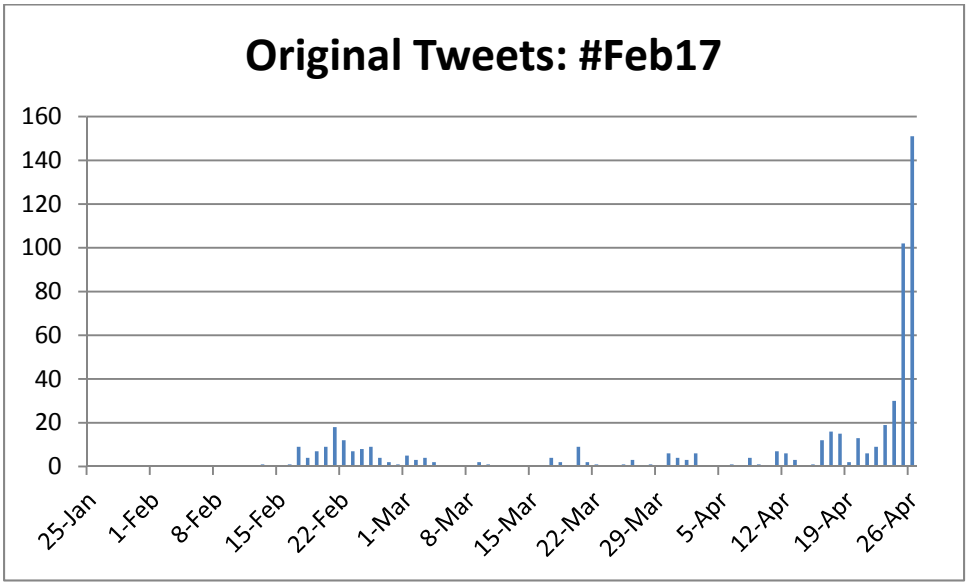
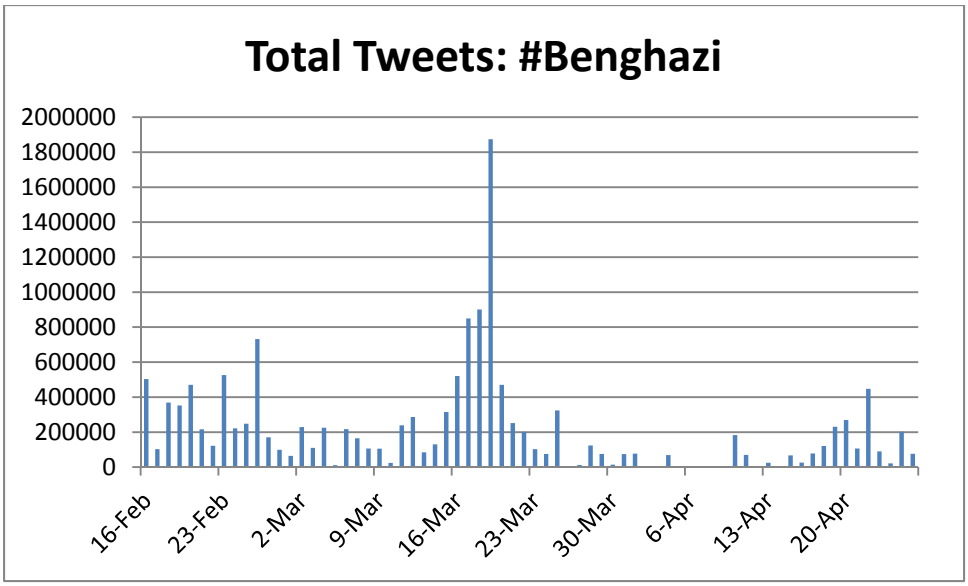
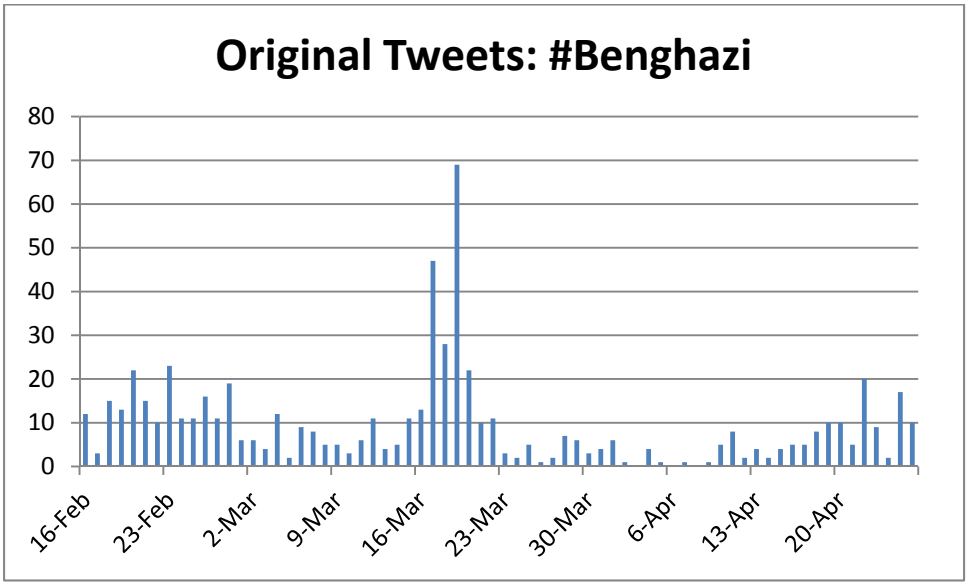
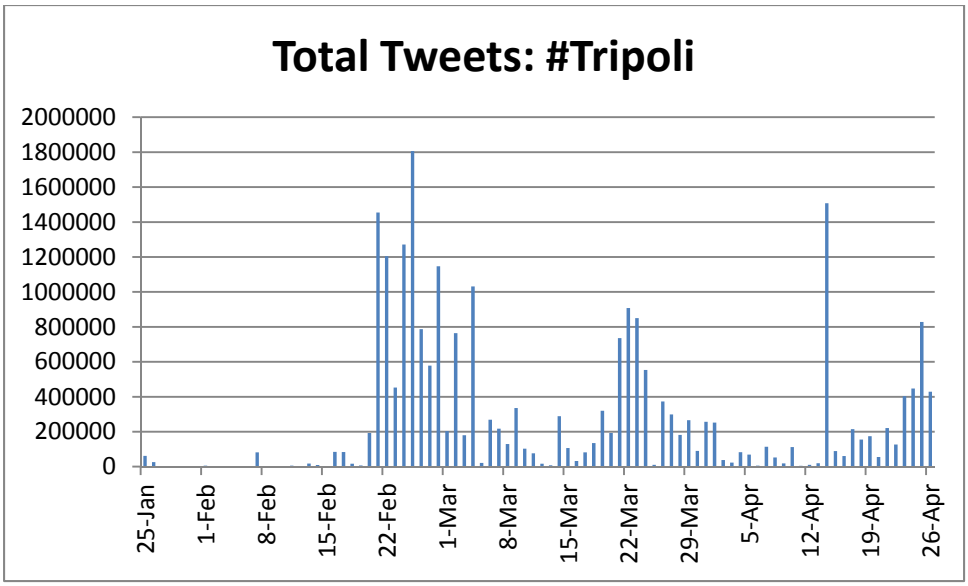
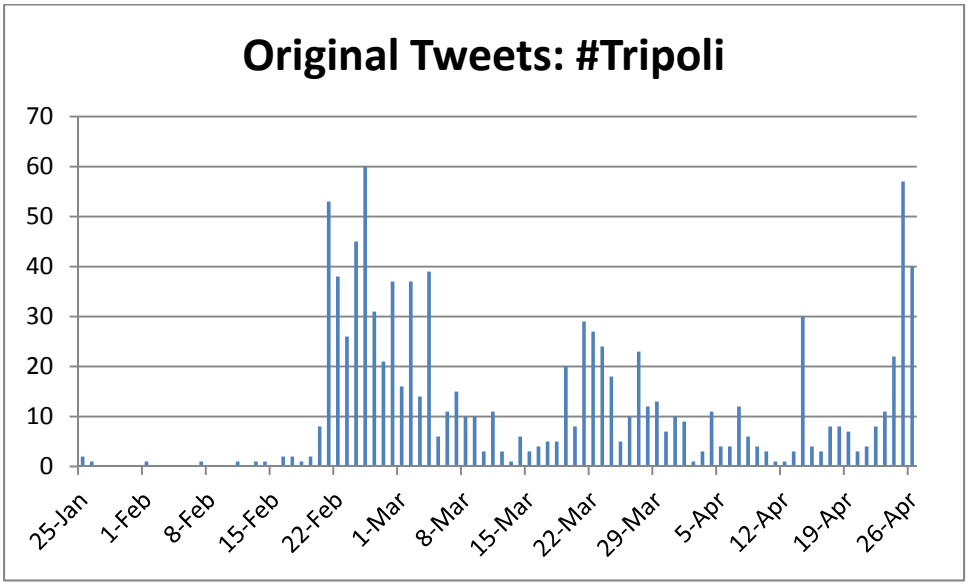
1400000
1200000
1000000
800000
600000
400000
200000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

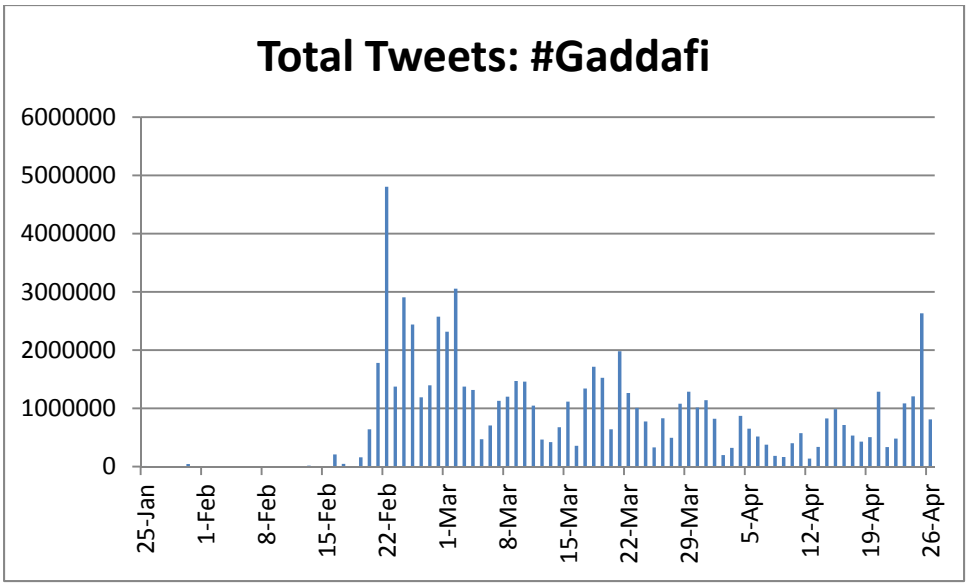

Original Tweets: #Feb17
160
140
120
100
80
60
40
20
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

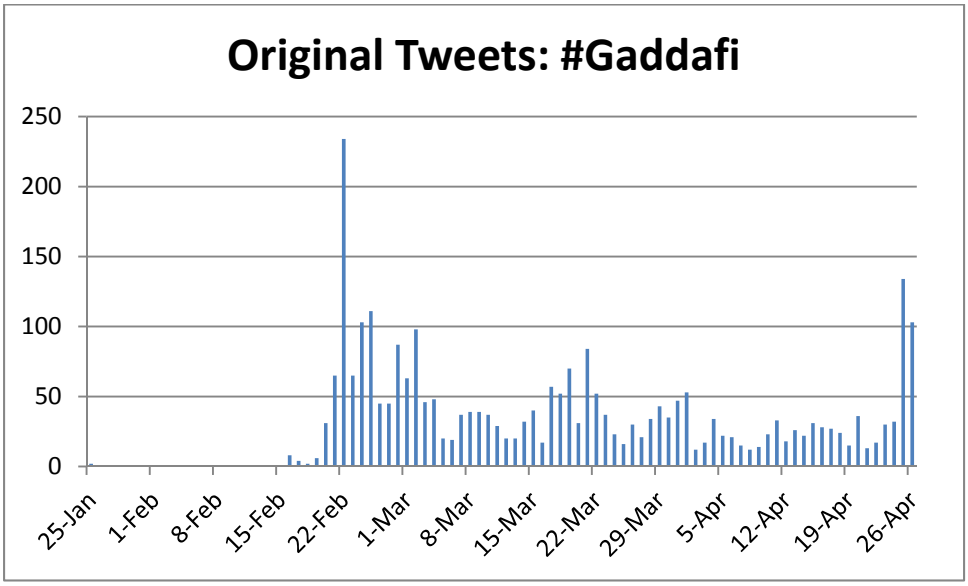

Total Tweets: #Benghazi
2000000
1800000
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
16-Feb
23-Feb
2-Mar
9-Mar
16-Mar
23-Mar
30-Mar
6-Apr
13-Apr
20-Apr


Original Tweets: #Benghazi
80
70
60
50
40
30
20
10
0
16-Feb
23-Feb
2-Mar
9-Mar
16-Mar
23-Mar
30-Mar
6-Apr
13-Apr
20-Apr

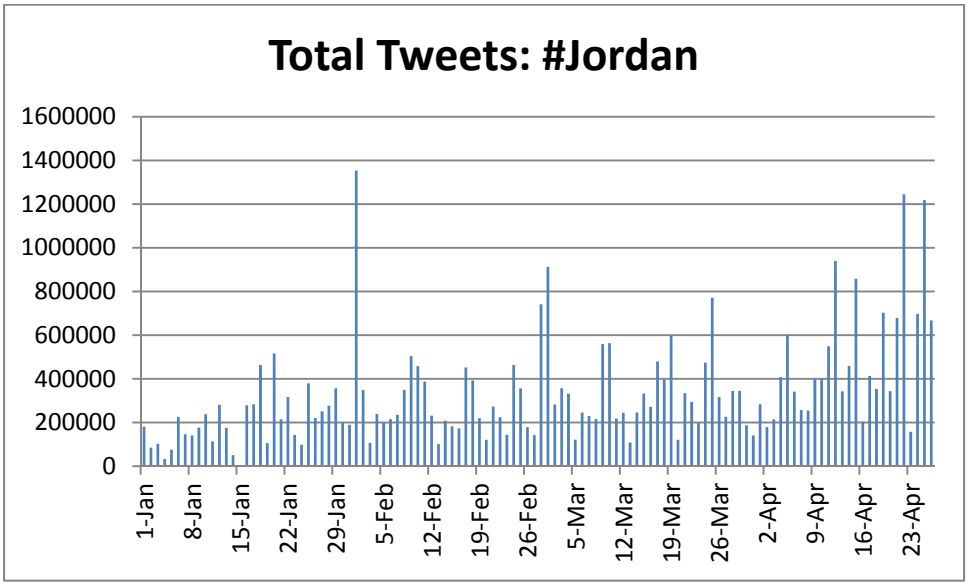

Total Tweets: #Tripoli
2000000
1800000
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

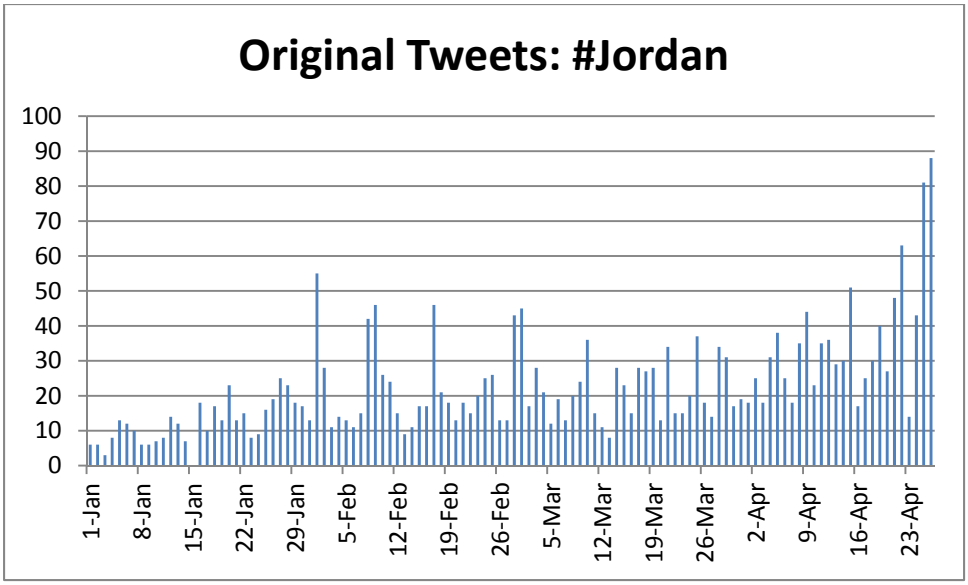

Original Tweets: #Tripoli
70
60
50
40
30
20
10
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr


Total Tweets: #Gaddafi
6000000
5000000
4000000
3000000
2000000
1000000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

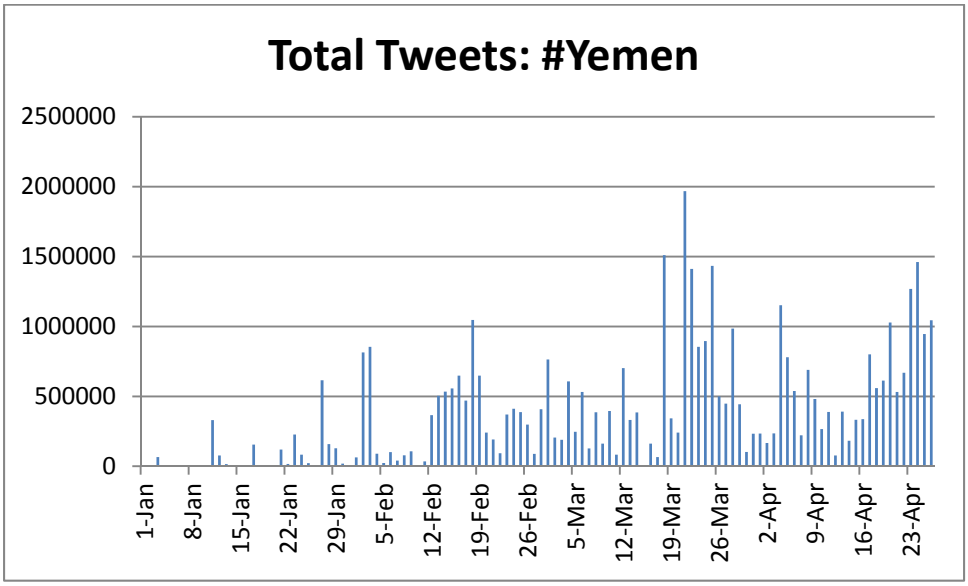

Original Tweets: #Gaddafi
250
200
150
100
50
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

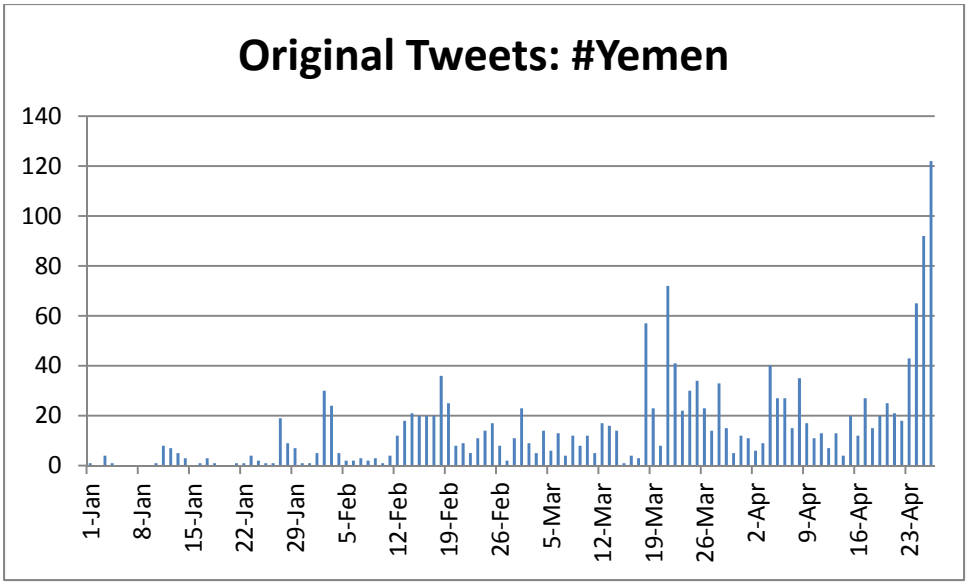
Jordan: 14 Jan 2011

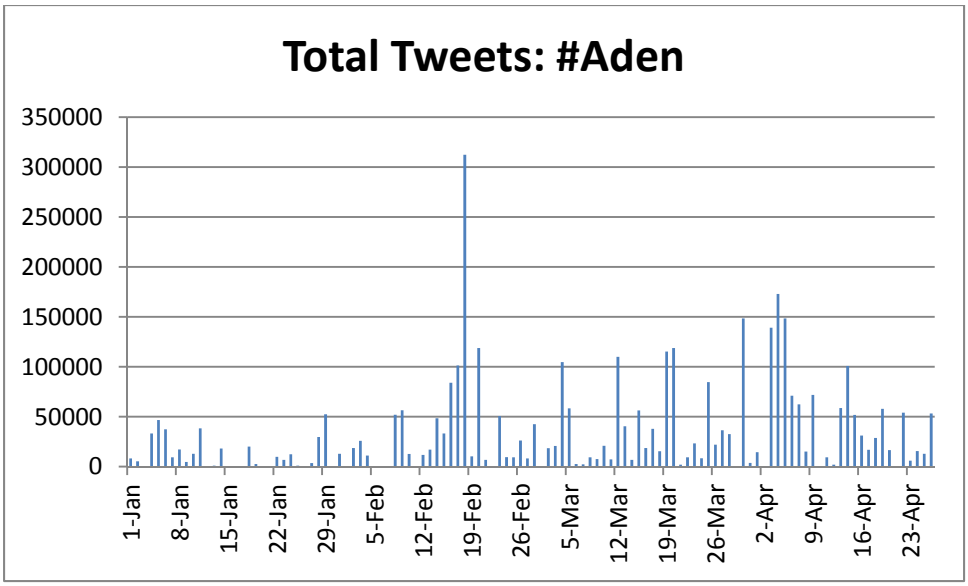


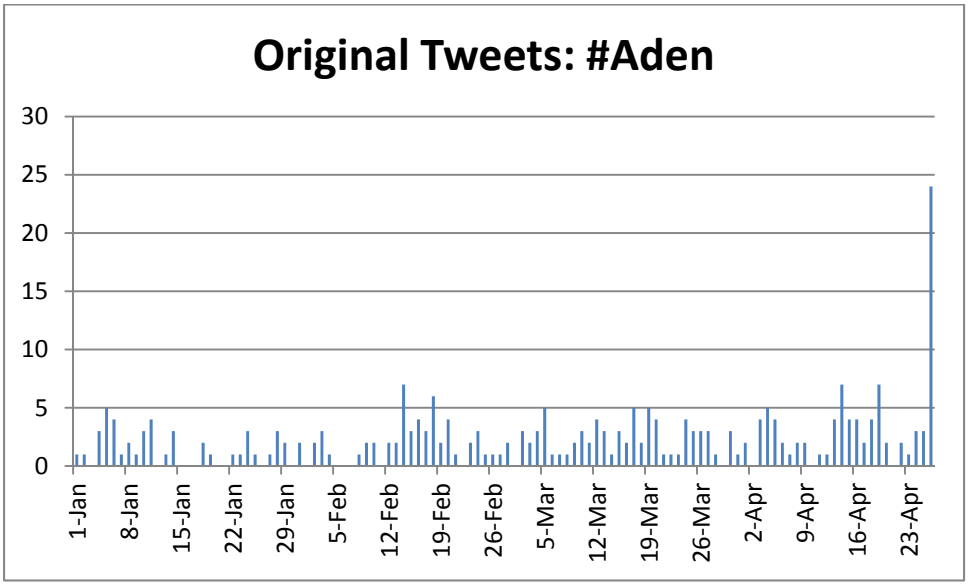


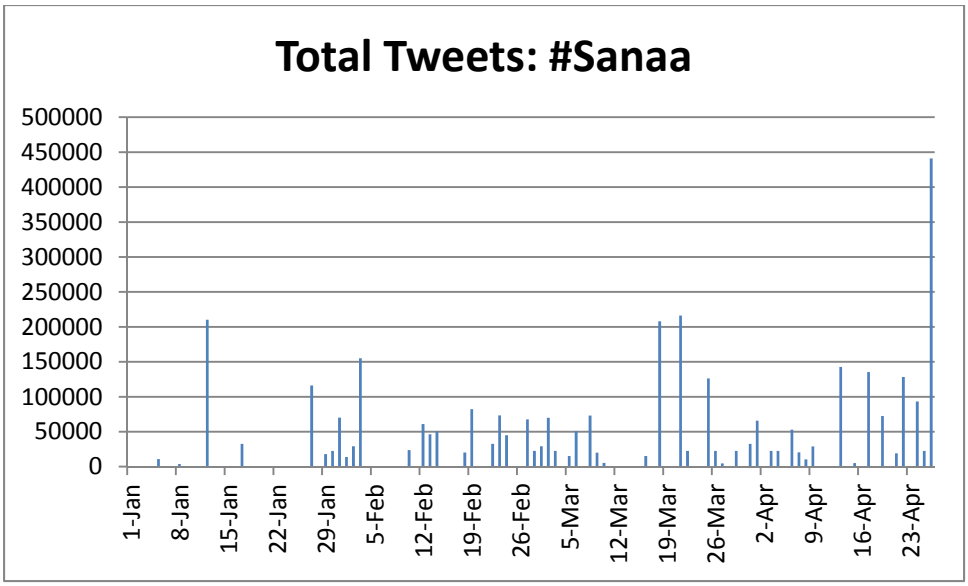
Yemen: 18 Jan 2011

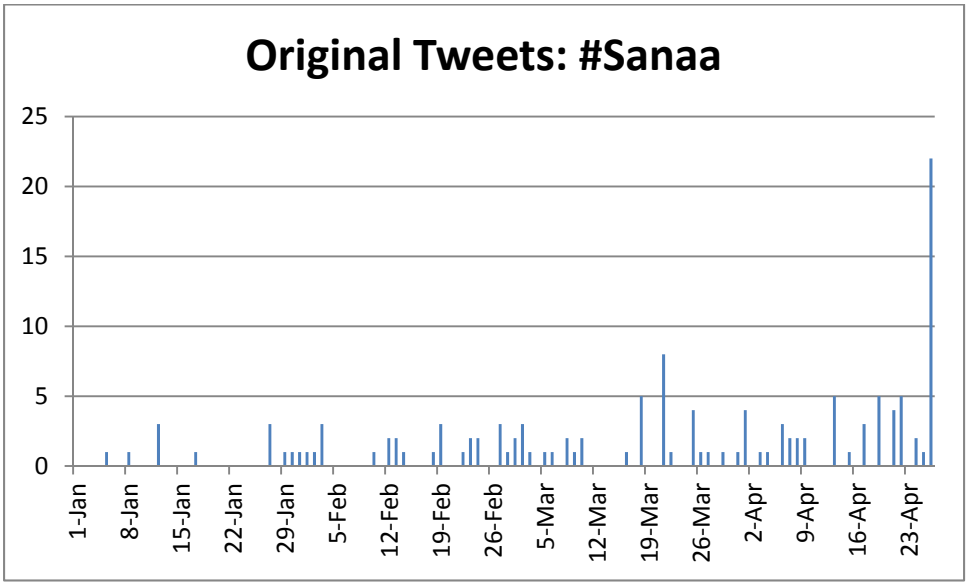


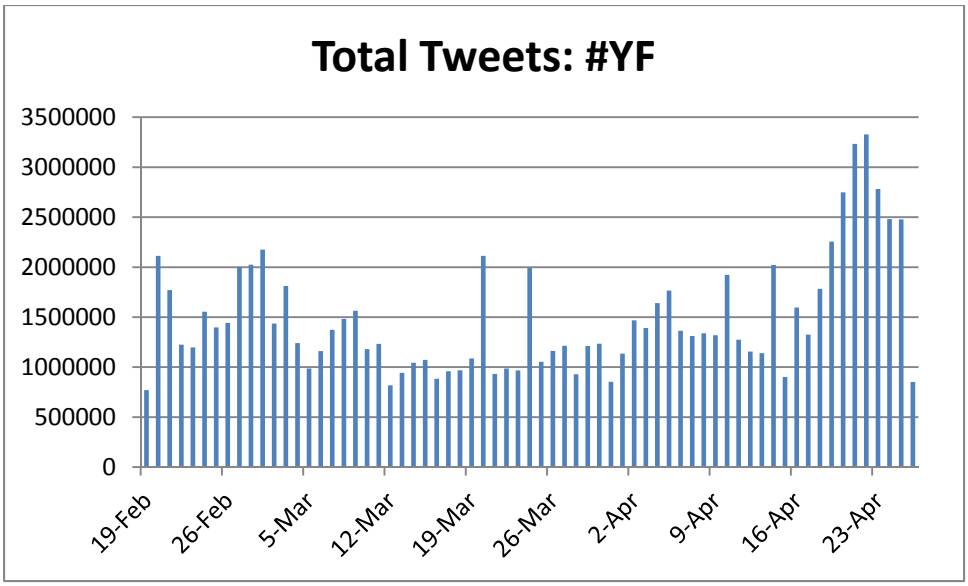


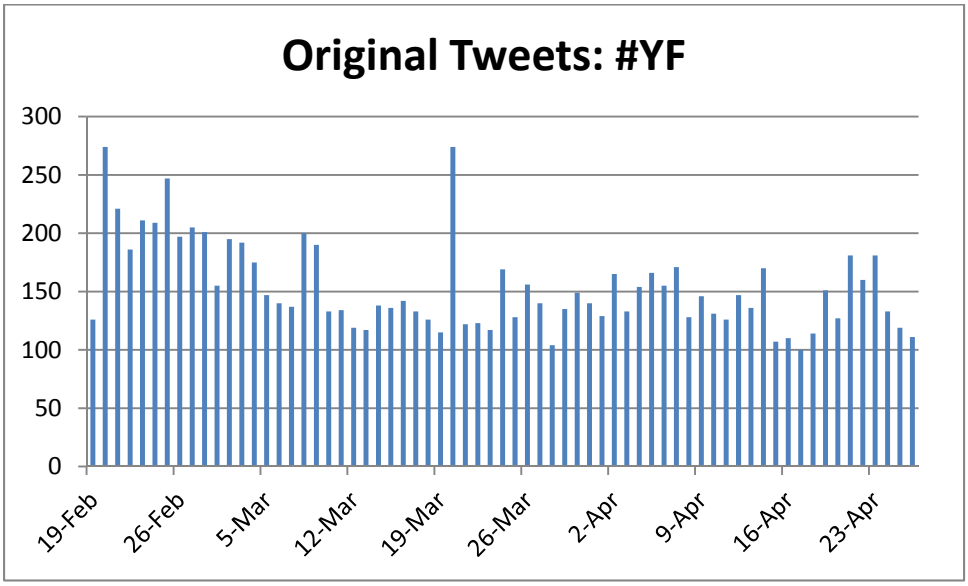

Total Tweets: #Aden
350000
300000
250000
200000
150000
100000
50000
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr


Original Tweets: #Aden
30
25
20
15
10
5
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

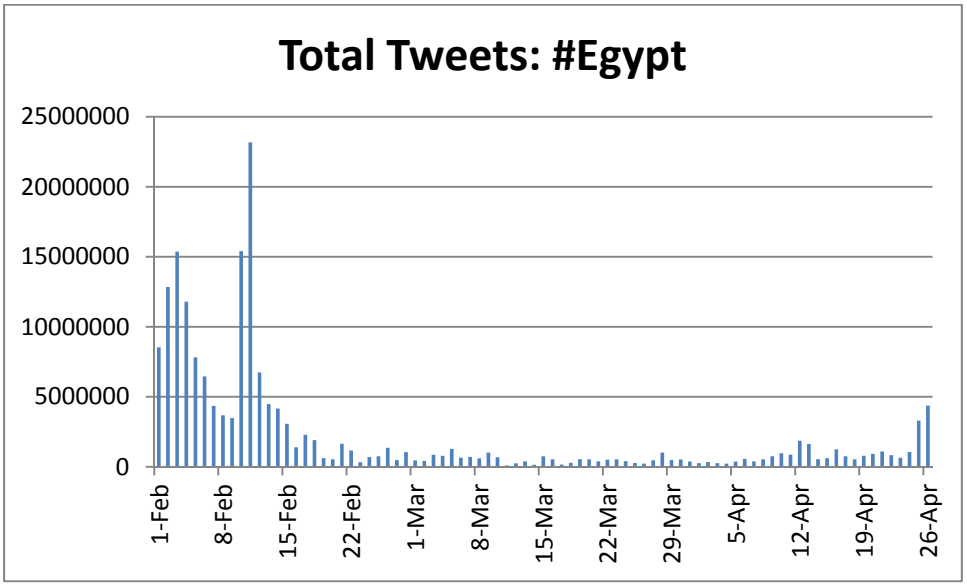

Total Tweets: #Sanaa
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

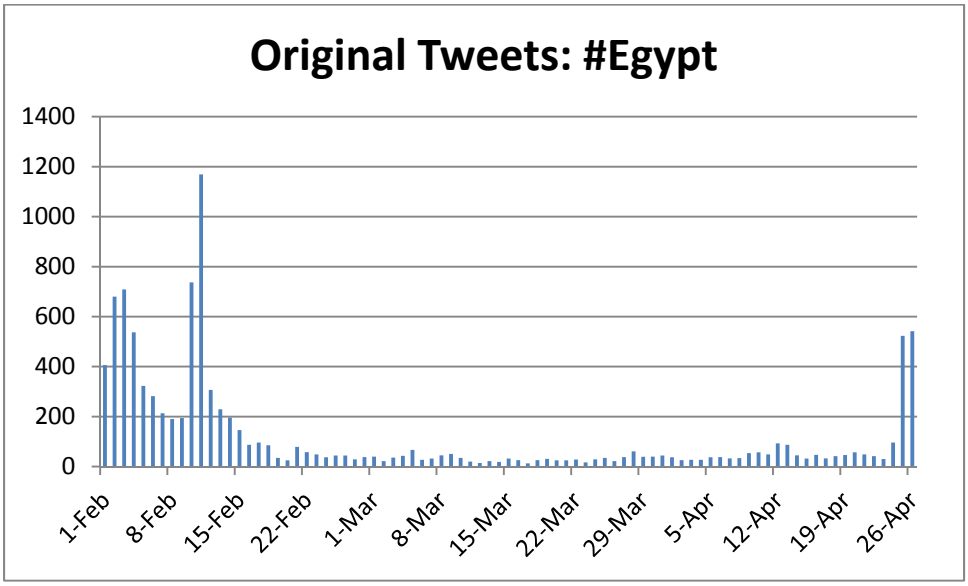

Original Tweets: #Sanaa
25
20
15
10
5
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

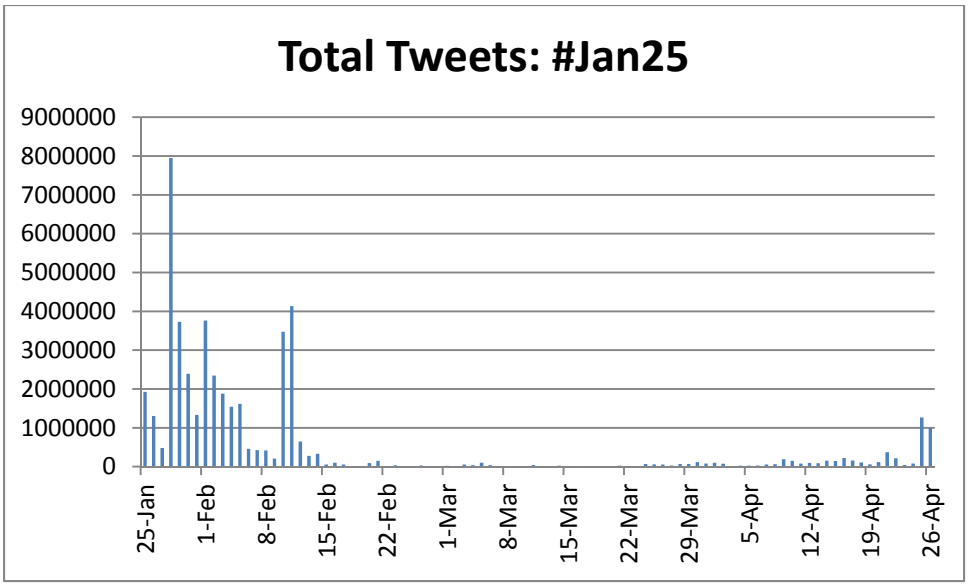

Total Tweets: #YF
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

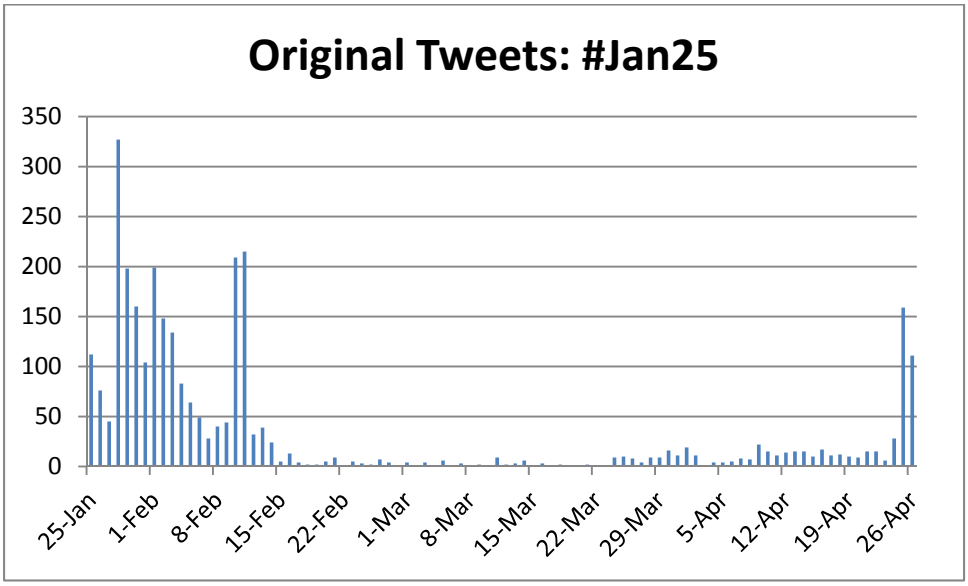

Original Tweets: #YF
300
250
200
150
100
50
0
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

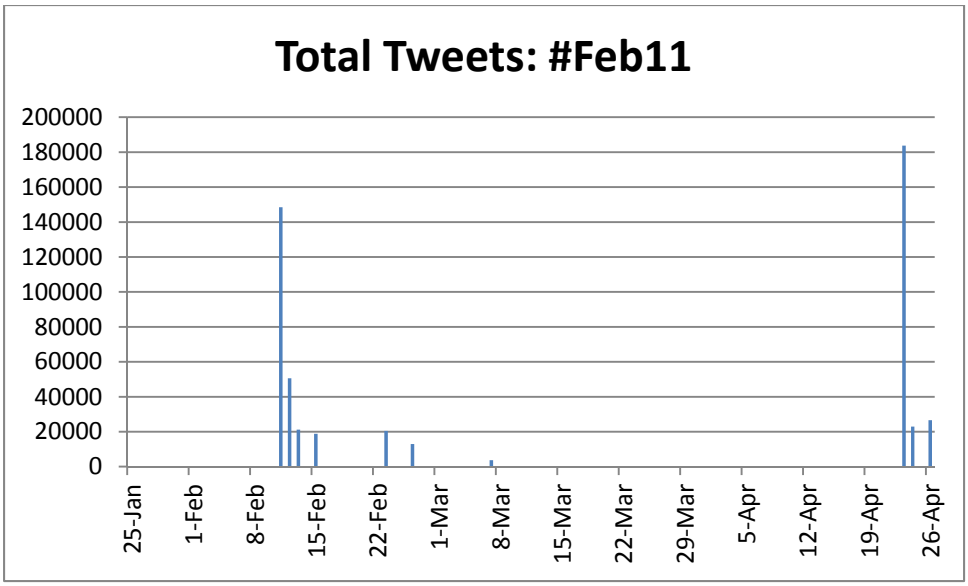
Egypt: 25 Jan 2011

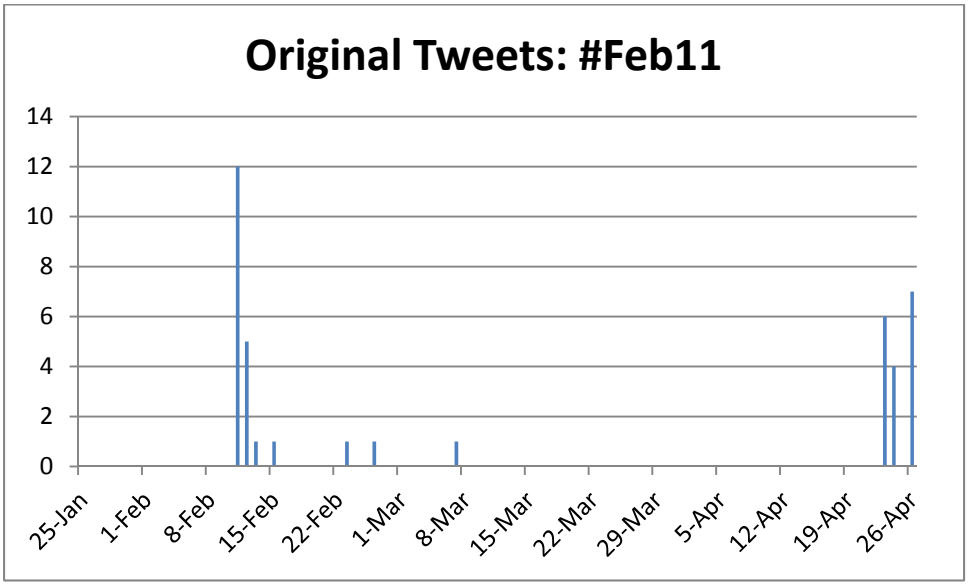


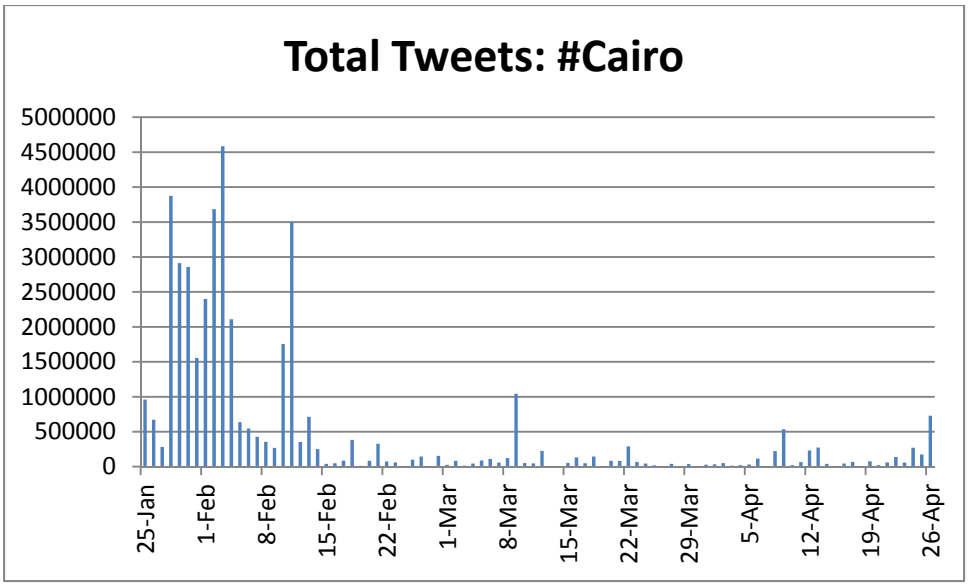


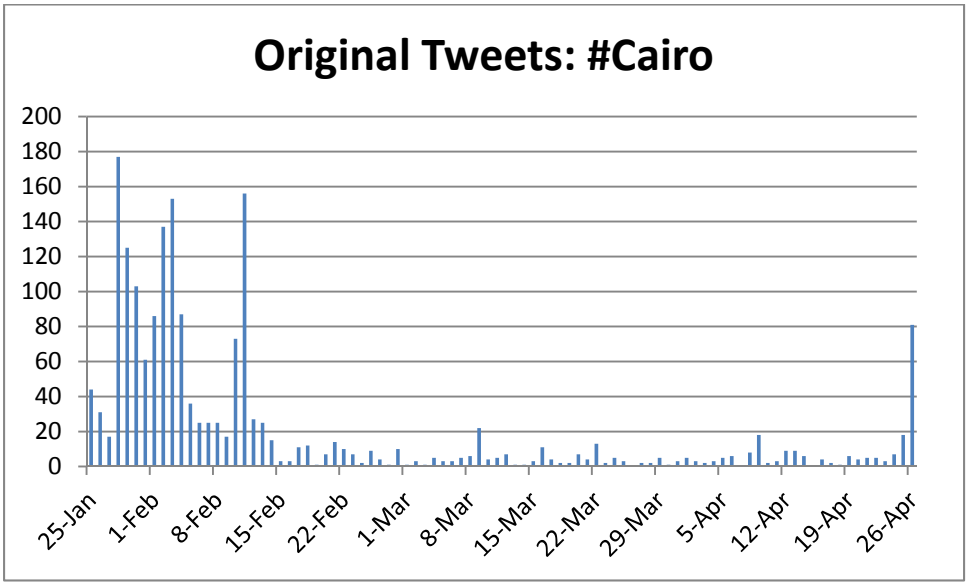

Total Tweets: #Jan25
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

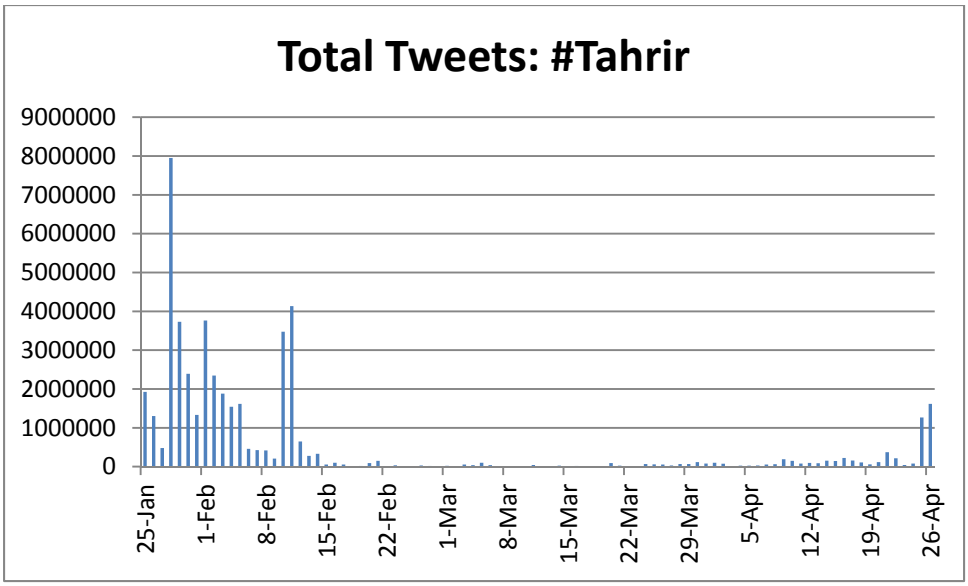

Original Tweets: #Jan25
350
300
250
200
150
100
50
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

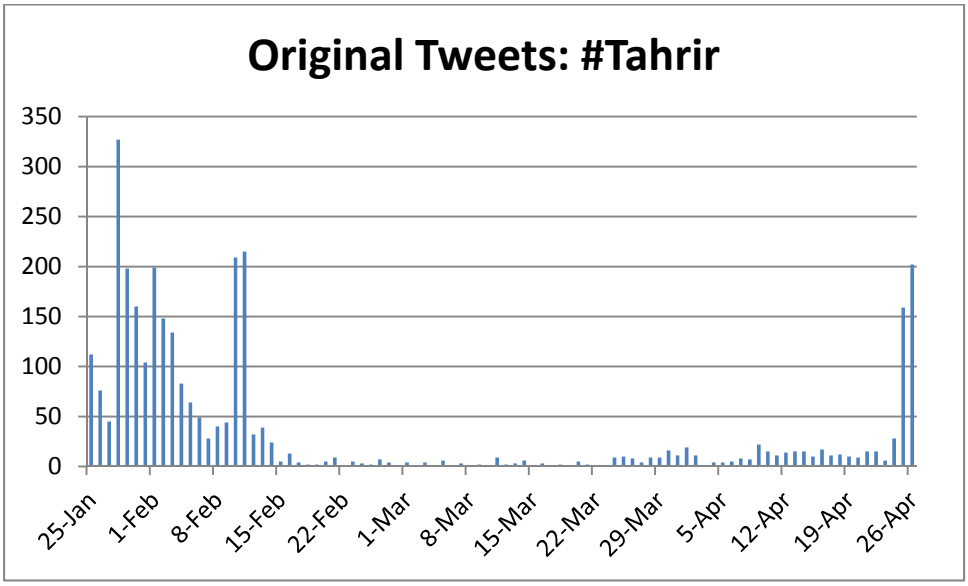

Total Tweets: #Feb11
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

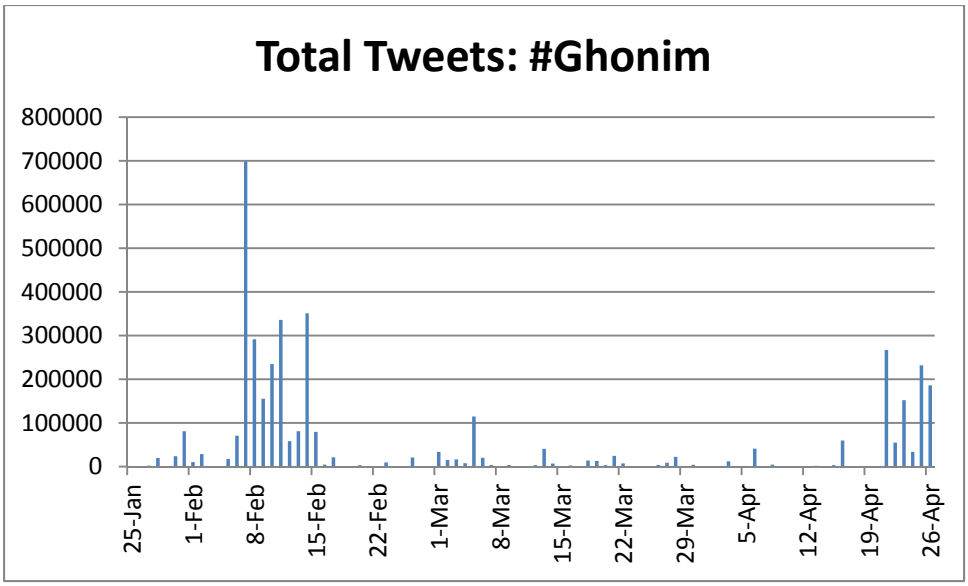

Original Tweets: #Feb11
14
12
10
8
6
4
2
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

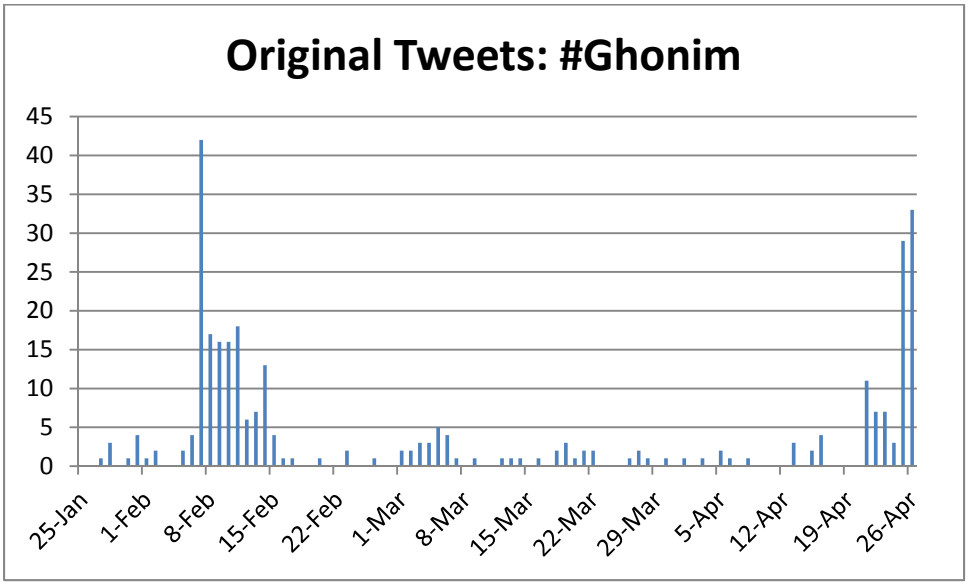

Total Tweets: #Cairo
5000000
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

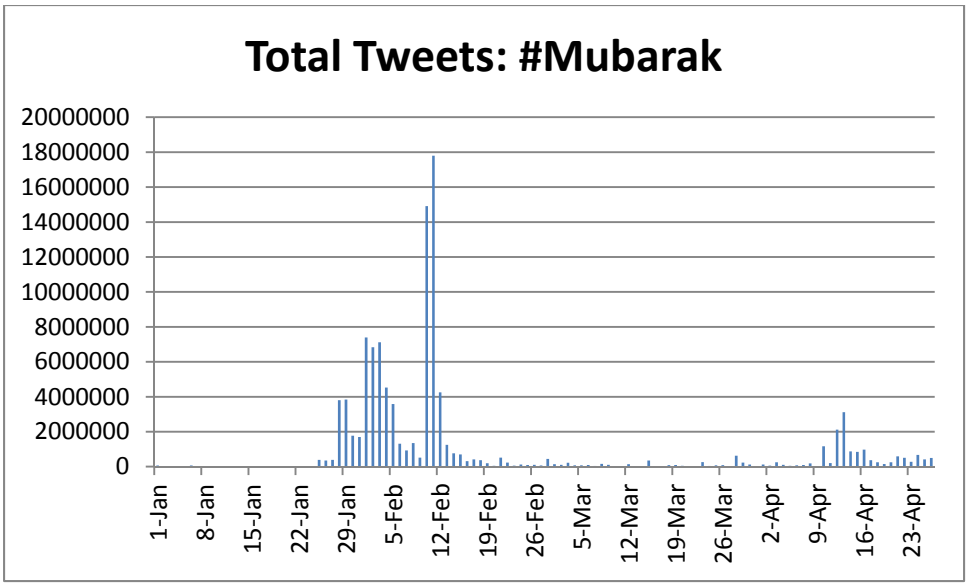

Original Tweets: #Cairo
200
180
160
140
120
100
80
60
40
20
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

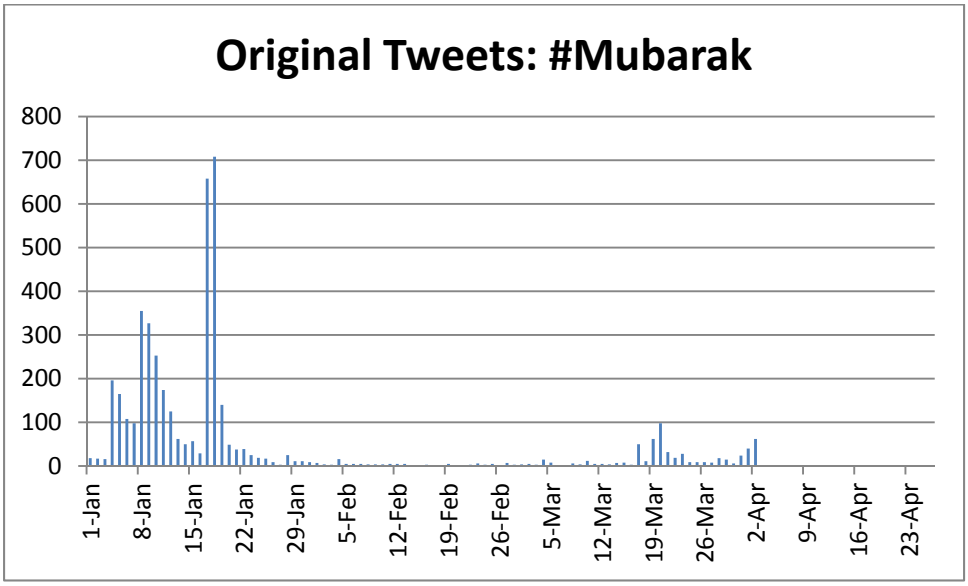

Total Tweets: #Tahrir
9000000
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr


Original Tweets: #Tahrir
350
300
250
200
150
100
50
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr


Total Tweets: #Ghonim
800000
700000
600000
500000
400000
300000
200000
100000
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr


Original Tweets: #Ghonim
45
40
35
30
25
20
15
10
5
0
25-Jan
1-Feb
8-Feb
15-Feb
22-Feb
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr

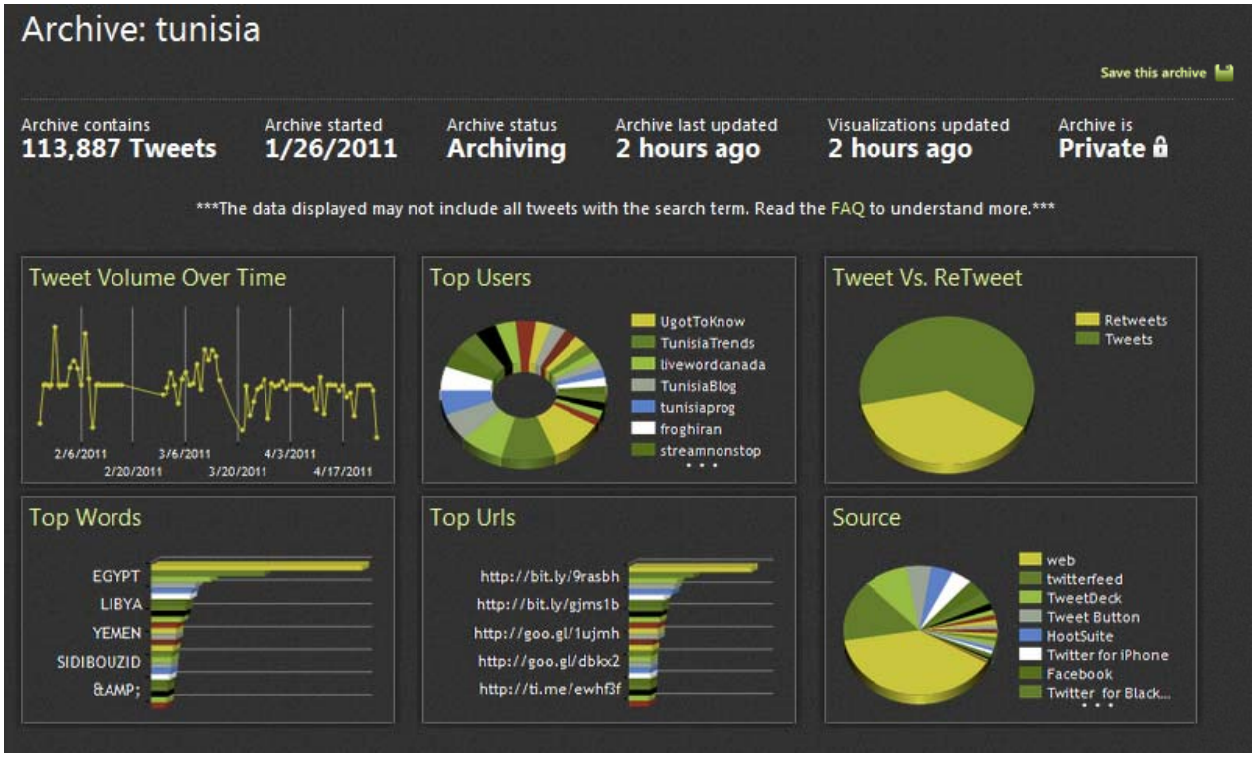

Total Tweets: #Mubarak
20000000
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

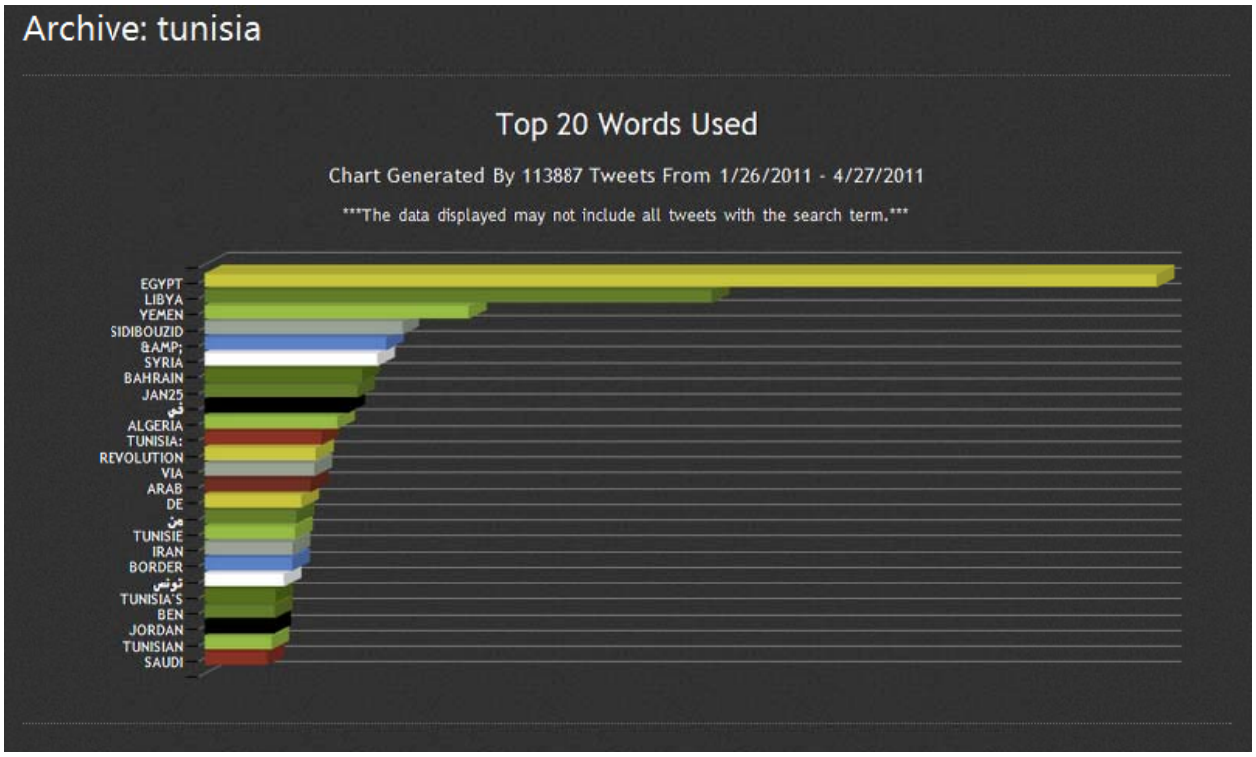

Original Tweets: #Mubarak
800
700
600
500
400
300
200
100
0
1-Jan
8-Jan
15-Jan
22-Jan
29-Jan
5-Feb
12-Feb
19-Feb
26-Feb
5-Mar
12-Mar
19-Mar
26-Mar
2-Apr
9-Apr
16-Apr
23-Apr

Appendix C: Additional Tweet Archive Data

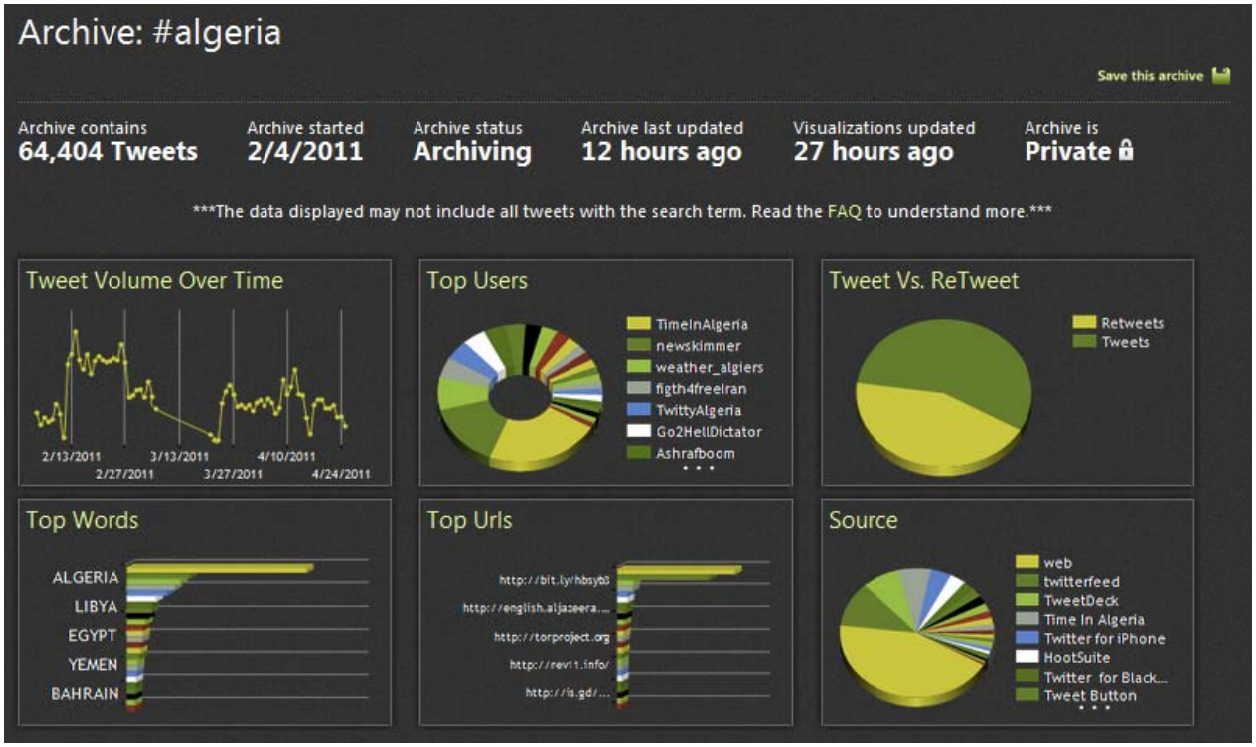
The following data was collected and analyzed using Archivist.com. The analysis is more detailed than Trendistic.com and Searchtastic.com. However, Archivist.com is limited because it only begins to monitor a particular hashtag after an individual creates an archive. Regardless, I was able to obtain the following information.

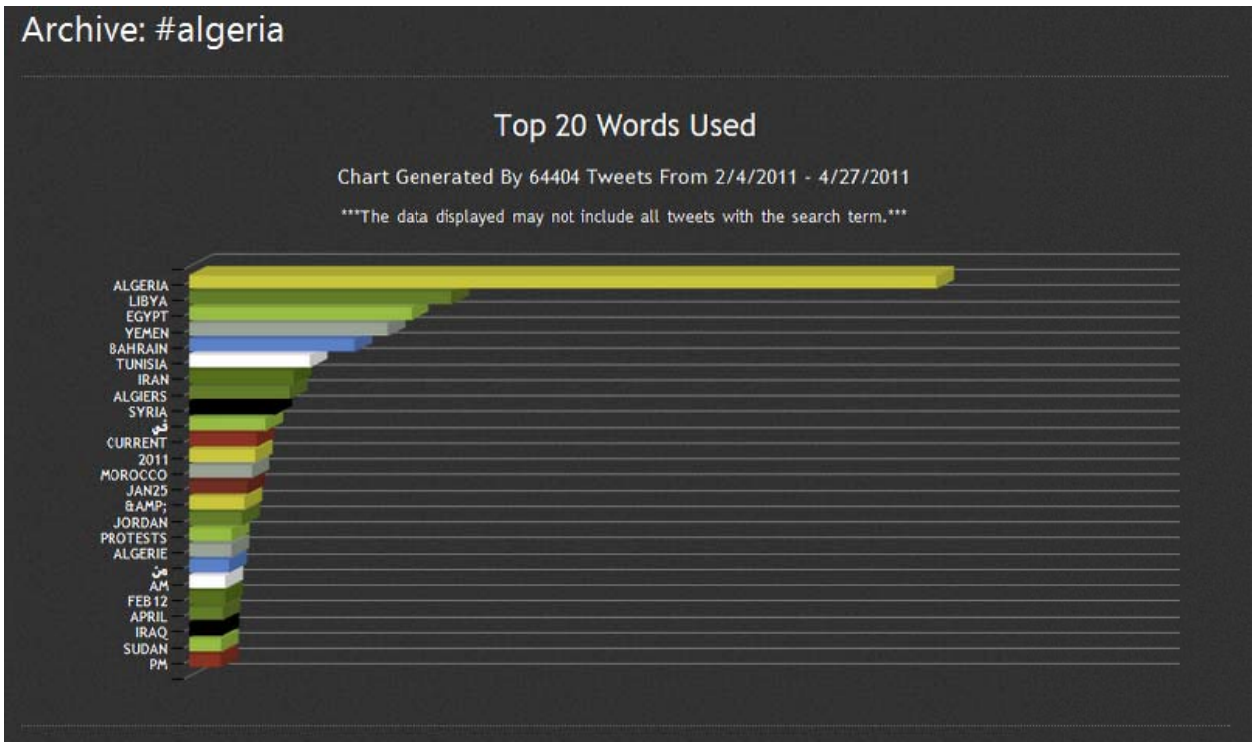
Tunisia:



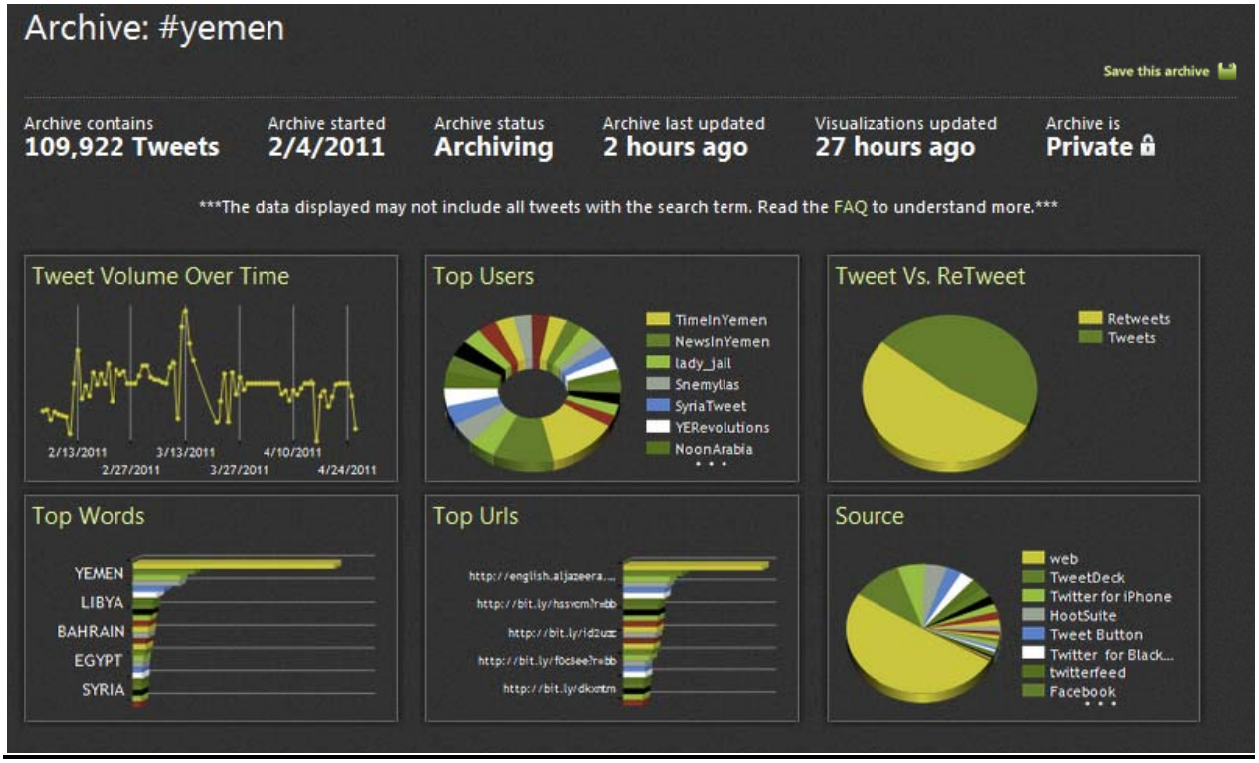

Archive: tunisia
Top 20 Words Used
Chart Generated By 113887 Tweets From 1/26/2011 - 4/27/2011
The data displayed may not include all tweets with the search term.
EGYPT
LIBYA
YEMEN
SIDIBOUZID
&
SYRIA
BAHRAIN
JAN25
في
ALGERIA
TUNISIA:
REVOLUTION
VIA
ARAB
DE
من
TUNISIE
IRAN
BORDER
تونس
TUNISIA'S
BEN
JORDAN
TUNISIAN
SAUDI

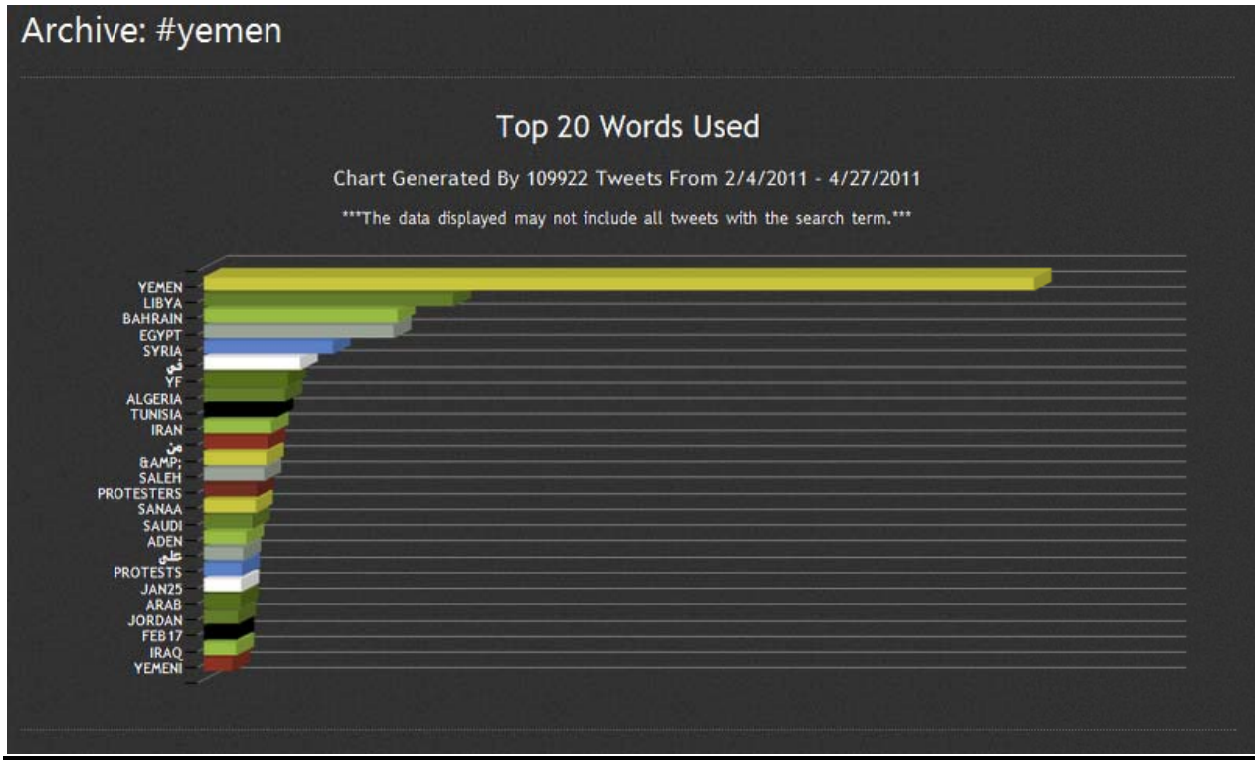
Algeria:


Archive: #algeria
Save this archive
Archive contains
64,404 Tweets
Archive started
2/4/2011
Archive status
Archiving
Archive last updated
12 hours ago
Visualizations updated
27 hours ago
Archive is
Private
The data displayed may not include all tweets with the search term. Read the FAQ to understand more.
Tweet Volume Over Time
2/13/2011
3/13/2011
4/10/2011
2/27/2011
3/27/2011
4/24/2011
Top Users
TimeInAlgeria
newskimmer
weather_algiers
figth4freeIran
TwittyAlgeria
Go2HellDictator
Ashrafboom
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
ALGERIA
LIBYA
EGYPT
YEMEN
BAHRAIN
Top Urls
http://bit.ly/hbsyb3
http://english.aljazeera....
http://torproject.org
http://revit.info/
http://is.gd/...
Source
web
twitterfeed
TweetDeck
Time In Algeria
Twitter for iPhone
HootSuite
Twitter for Black...
Tweet Button

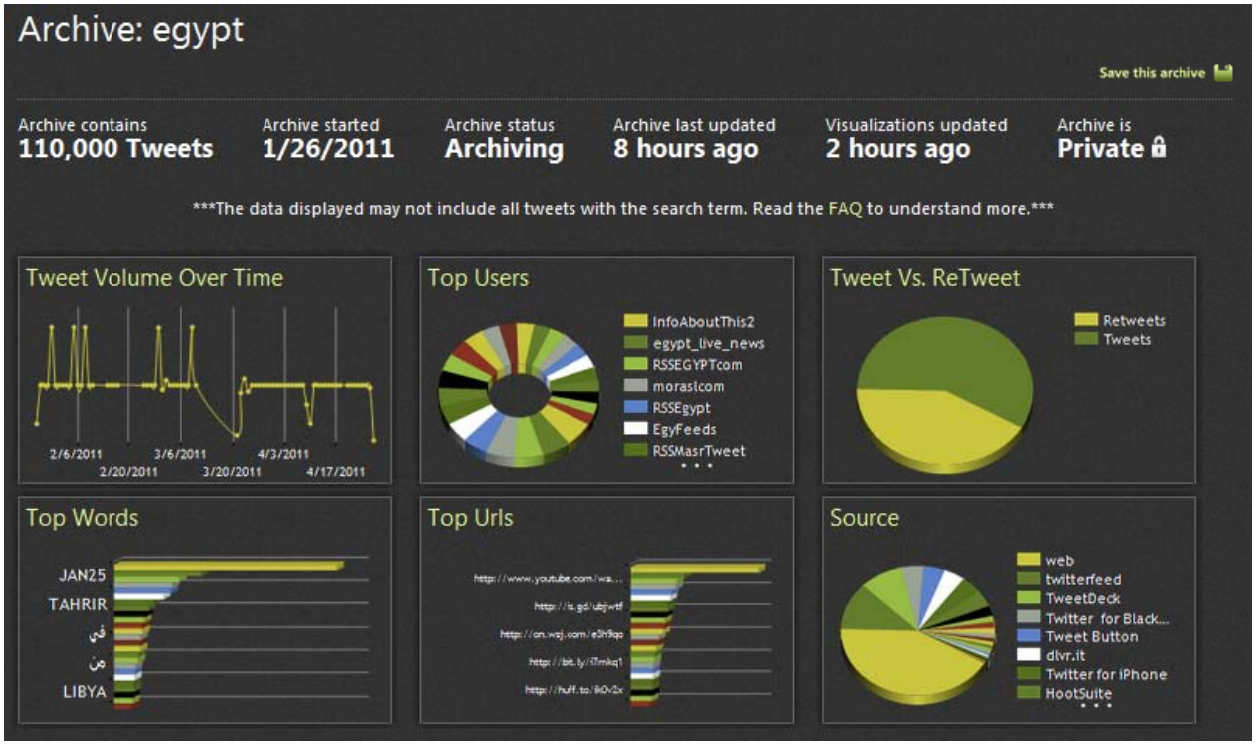

Archive: #algeria
Top 20 Words Used
Chart Generated By 64404 Tweets From 2/4/2011 - 4/27/2011
The data displayed may not include all tweets with the search term.
ALGERIA
LIBYA
EGYPT
YEMEN
BAHRAIN
TUNISIA
IRAN
ALGIERS
SYRIA
CURRENT
2011
MOROCCO
JAN25
&
JORDAN
PROTESTS
ALGERIE
AM
FEB 12
APRIL
IRAQ
SUDAN
PM

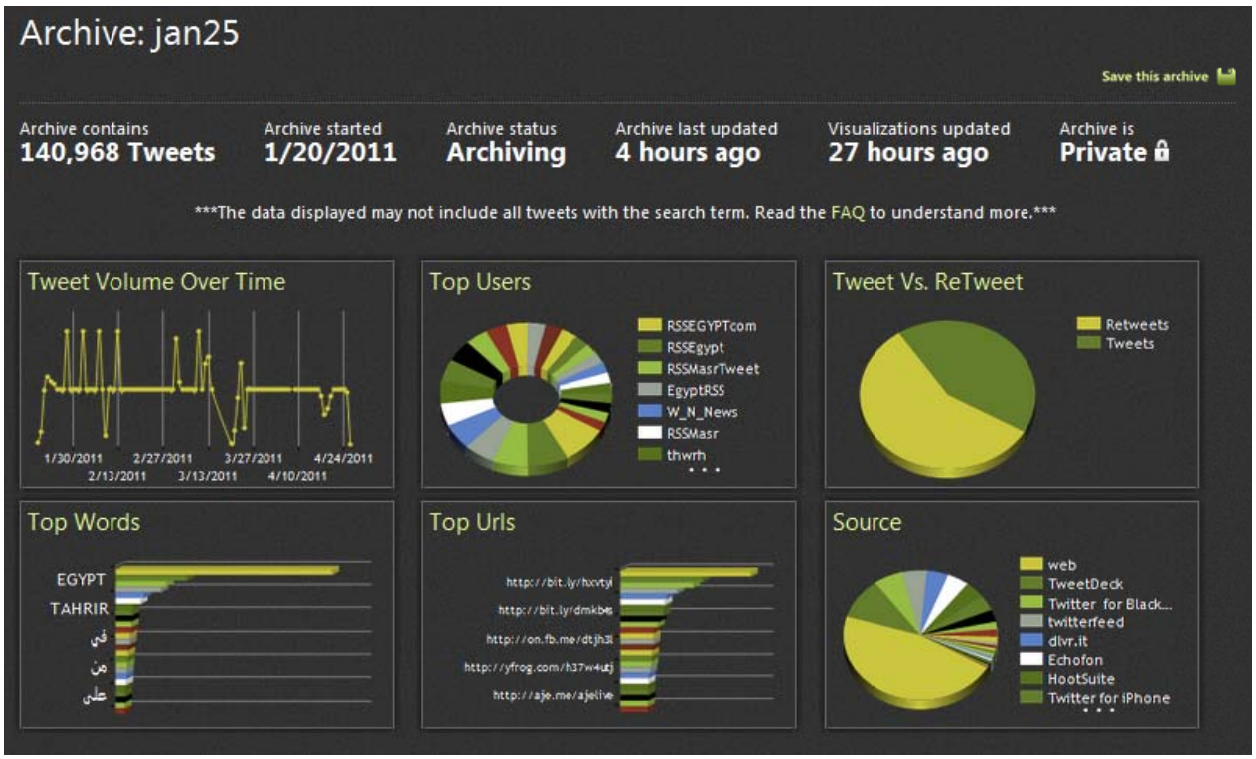
Yemen:

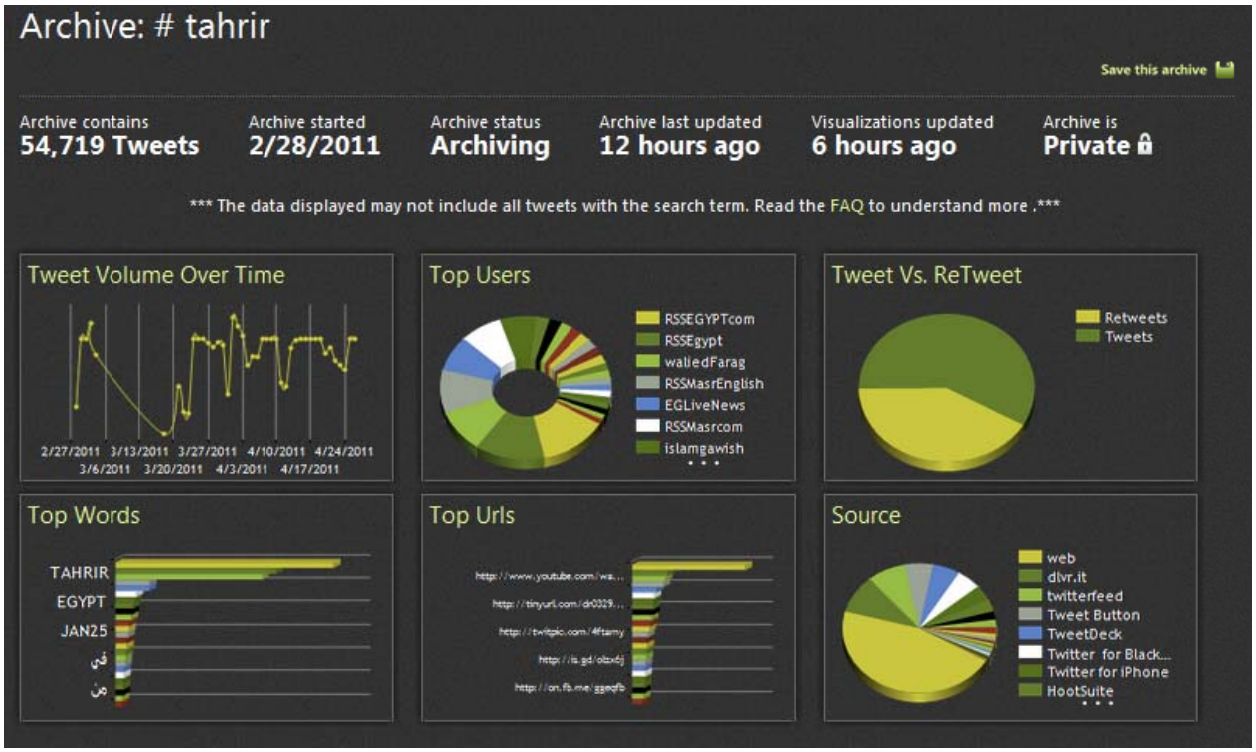

Archive: #yemen
Save this archive
Archive contains
109,922 Tweets
Archive started
2/4/2011
Archive status
Archiving
Archive last updated
2 hours ago
Visualizations updated
27 hours ago
Archive is
Private
The data displayed may not include all tweets with the search term. Read the FAQ to understand more.
Tweet Volume Over Time
2/13/2011
2/27/2011
3/13/2011
3/27/2011
4/10/2011
4/24/2011
Top Users
TimeInYemen
NewsInYemen
lady_jail
Snemyllas
SyriaTweet
YERevolutions
NoonArabia
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
YEMEN
LIBYA
BAHRAIN
EGYPT
SYRIA
Top Urls
Source
web
TweetDeck
Twitter for iPhone
HootSuite
Tweet Button
Twitter for Black...
twitterfeed
Facebook

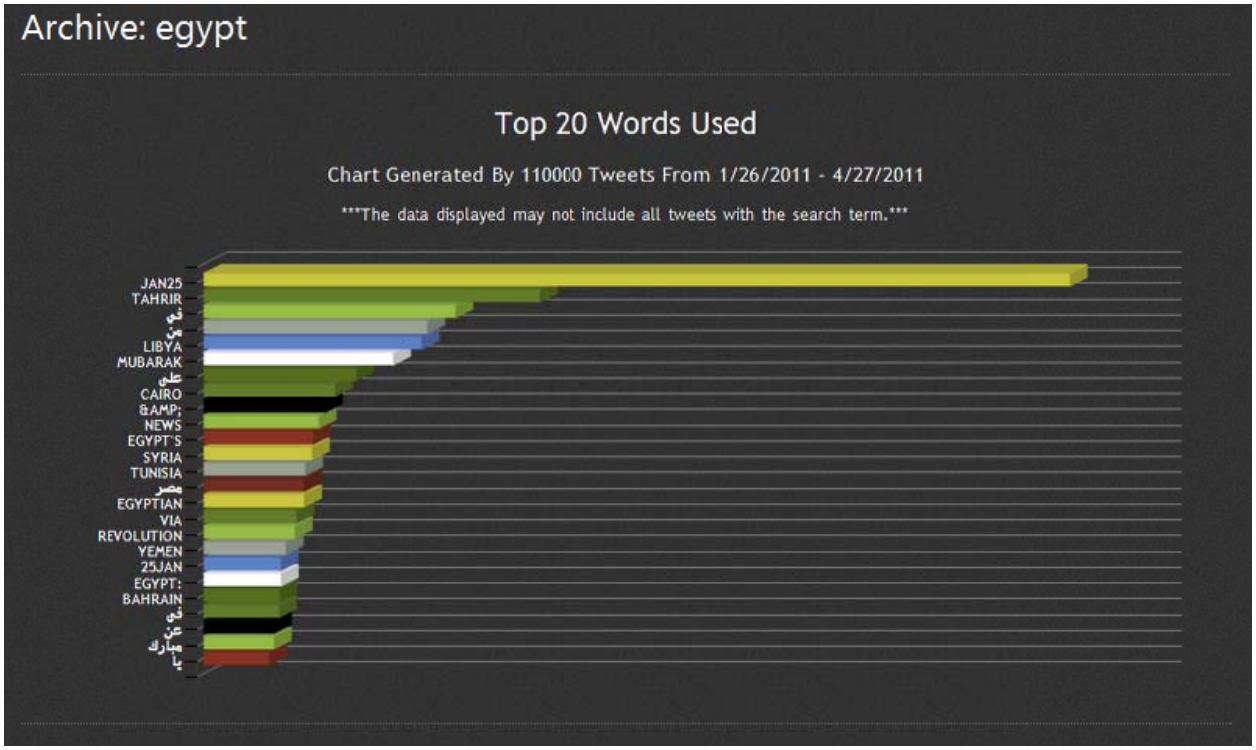

Archive: #yemen
Top 20 Words Used
Chart Generated By 109922 Tweets From 2/4/2011 - 4/27/2011
The data displayed may not include all tweets with the search term.
YEMEN
LIBYA
BAHRAIN
EGYPT
SYRIA
ALGERIA
TUNISIA
IRAN
&
SALEH
PROTESTERS
SANAA
SAUDI
ADEN
PROTESTS
JAN25
ARAB
JORDAN
FEB17
IRAQ
YEMENI

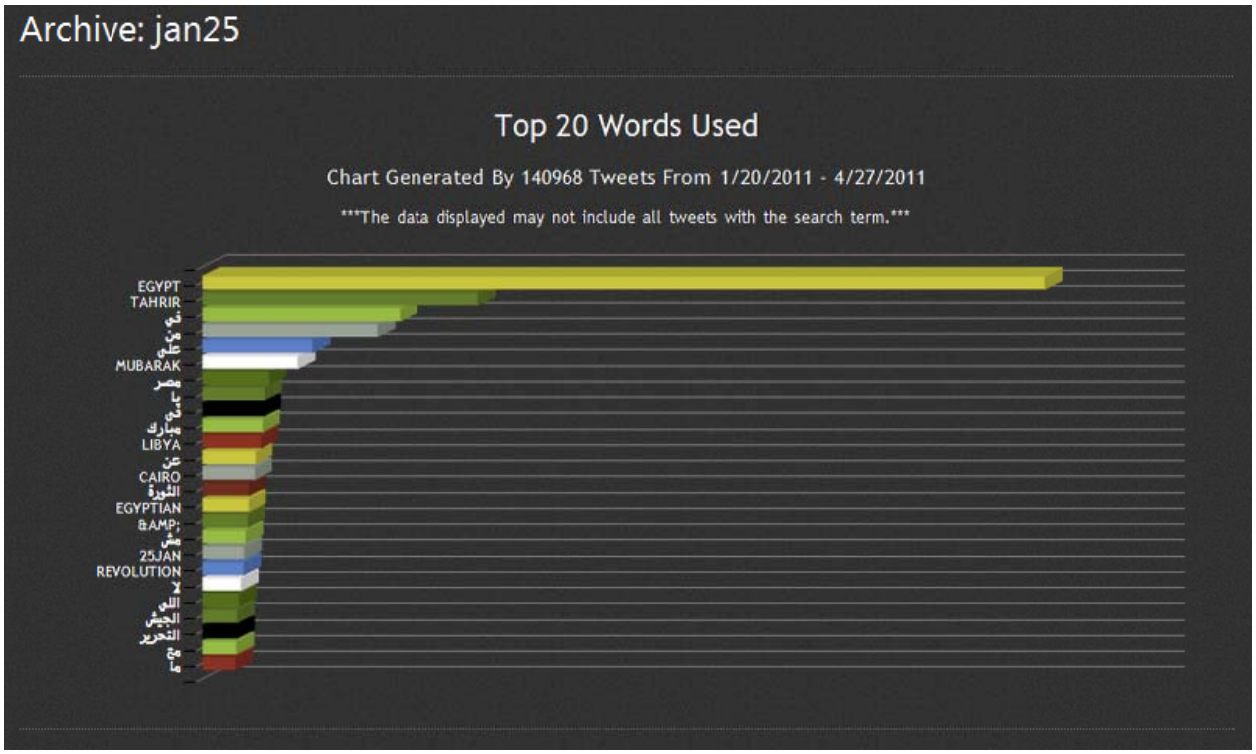
Egypt:


Archive: egypt
Save this archive
Archive contains
110,000 Tweets
Archive started
1/26/2011
Archive status
Archiving
Archive last updated
8 hours ago
Visualizations updated
2 hours ago
Archive is
Private
The data displayed may not include all tweets with the search term. Read the FAQ to understand more.
Tweet Volume Over Time
2/6/2011
3/6/2011
4/3/2011
2/20/2011
3/20/2011
4/17/2011
Top Users
InfoAboutThis2
egypt_live_news
RSSEGYPTcom
morasicom
RSSEgypt
EgyFeeds
RSSMasrTweet
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
JAN25
TAHRIR
في
من
LIBYA
Top Urls
Source
web
twitterfeed
TweetDeck
Twitter for Black...
Tweet Button
dlvr.it
Twitter for iPhone
HootSuite

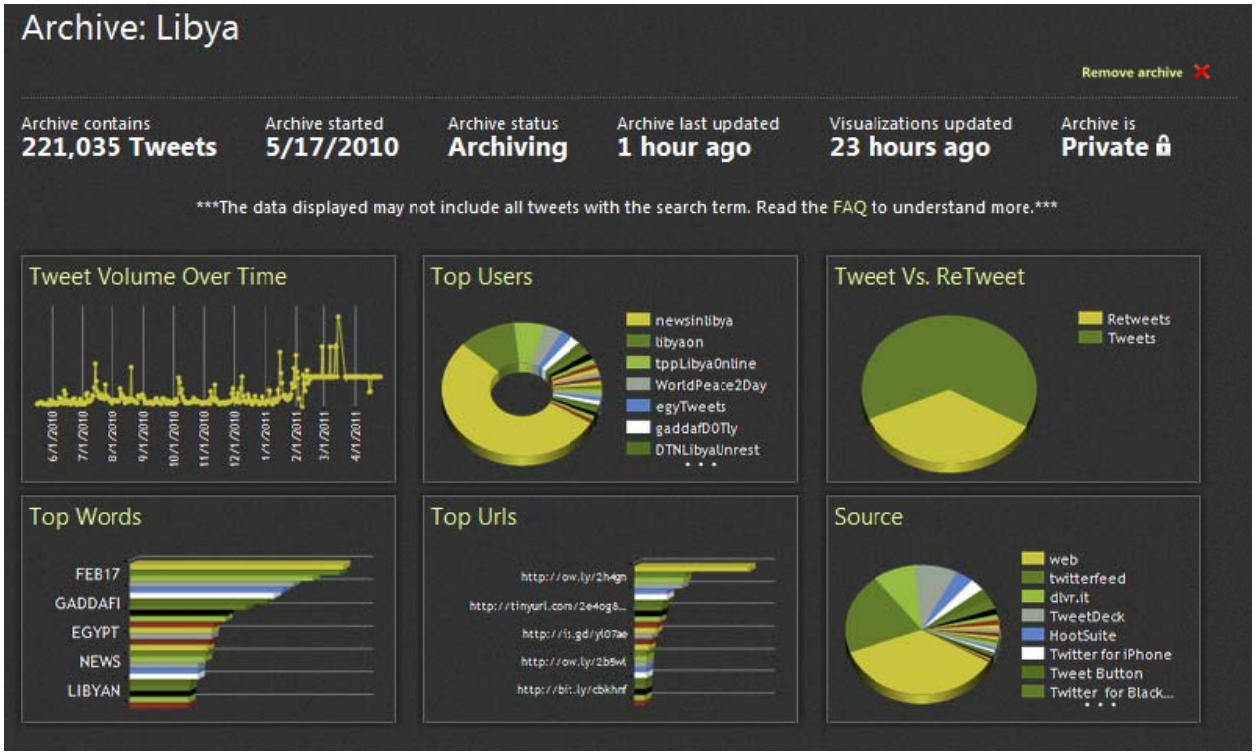

Archive: jan25
Save this archive
Archive contains
140,968 Tweets
Archive started
1/20/2011
Archive status
Archiving
Archive last updated
4 hours ago
Visualizations updated
27 hours ago
Archive is
Private
The data displayed may not include all tweets with the search term. Read the FAQ to understand more.
Tweet Volume Over Time
1/30/2011
2/27/2011
3/27/2011
4/24/2011
2/13/2011
3/13/2011
4/10/2011
Top Users
RSSEGYPTcom
RSSEgypt
RSSMasrTweet
EgyptRSS
W_N_News
RSSMasr
thwrth
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
EGYPT
TAHRIR
في
من
على
Top Urls
http://bit.ly/hxvtyl
http://bit.ly/dmkbes
http://on.fb.me/dtjh3l
http://yfrog.com/h37w4utj
http://aje.me/ajelive
Source
web
TweetDeck
Twitter for Black...
twitterfeed
dlvr.it
Echofon
HootSuite
Twitter for iPhone

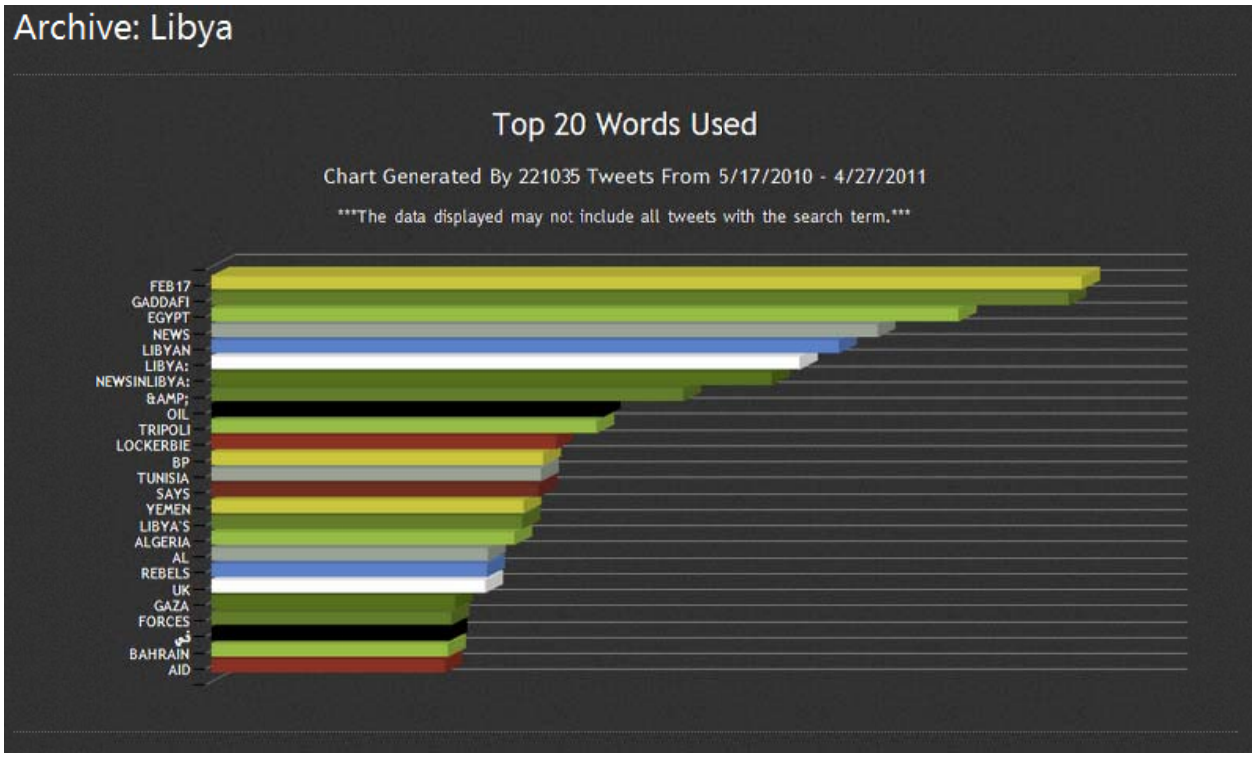

Archive: # tahrir
Save this archive
Archive contains
54,719 Tweets
Archive started
2/28/2011
Archive status
Archiving
Archive last updated
12 hours ago
Visualizations updated
6 hours ago
Archive is
Private
*** The data displayed may not include all tweets with the search term. Read the FAQ to understand more .***
Tweet Volume Over Time
2/27/2011 3/6/2011 3/13/2011 3/20/2011 3/27/2011 4/3/2011 4/10/2011 4/17/2011 4/24/2011
Top Users
RSSEGYPTcom
RSSEgypt
walliedFarag
RSSMasrEnglish
EGLiveNews
RSSMasrcom
islamgawish
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
TAHRIR
EGYPT
JAN25
Top Urls
Source
web
dlvr.it
twitterfeed
Tweet Button
TweetDeck
Twitter for Black...
Twitter for iPhone
HootSuite


Archive: egypt
Top 20 Words Used
Chart Generated By 110000 Tweets From 1/26/2011 - 4/27/2011
The data displayed may not include all tweets with the search term.
JAN25
TAHRIR
LIBYA
MUBARAK
CAIRO
&
NEWS
EGYPT'S
SYRIA
TUNISIA
EGYPTIAN
VIA
REVOLUTION
YEMEN
25JAN
EGYPT:
BAHRAIN


Archive: jan25
Top 20 Words Used
Chart Generated By 140968 Tweets From 1/20/2011 - 4/27/2011
The data displayed may not include all tweets with the search term.
EGYPT
TAHRIR
MUBARAK
LIBYA
CAIRO
EGYPTIAN
&
25JAN
REVOLUTION

Libya:


Archive: Libya
Remove archive
Archive contains
221,035 Tweets
Archive started
5/17/2010
Archive status
Archiving
Archive last updated
1 hour ago
Visualizations updated
23 hours ago
Archive is
Private
The data displayed may not include all tweets with the search term. Read the FAQ to understand more.
Tweet Volume Over Time
6/1/2010
7/1/2010
8/1/2010
9/1/2010
10/1/2010
11/1/2010
12/1/2010
1/1/2011
2/1/2011
3/1/2011
4/1/2011
Top Users
newsinlibya
libyaon
tppLibya0nline
WorldPeace2Day
egyTweets
gaddafi0Tly
DTNLibyaUnrest
Tweet Vs. ReTweet
Retweets
Tweets
Top Words
FEB17
GADDAFI
EGYPT
NEWS
LIBYAN
Top Urls
http://ow.ly/2h4gn
http://tinyurl.com/2e4oga...
http://is.gd/yl07ae
http://ow.ly/2b5wl
http://bit.ly/cbkhnf
Source
web
twitterfeed
dlvr.it
TweetDeck
HootSuite
Twitter for iPhone
Tweet Button
Twitter for Black...


Archive: Libya
Top 20 Words Used
Chart Generated By 221035 Tweets From 5/17/2010 - 4/27/2011
The data displayed may not include all tweets with the search term.
FEB17
GADDAFI
EGYPT
NEWS
LIBYAN
LIBYA:
NEWSINLIBYA:
&
OIL
TRIPOLI
LOCKERBIE
BP
TUNISIA
SAYS
YEMEN
LIBYA'S
ALGERIA
AL
REBELS
UK
GAZA
FORCES
BAHRAIN
AID