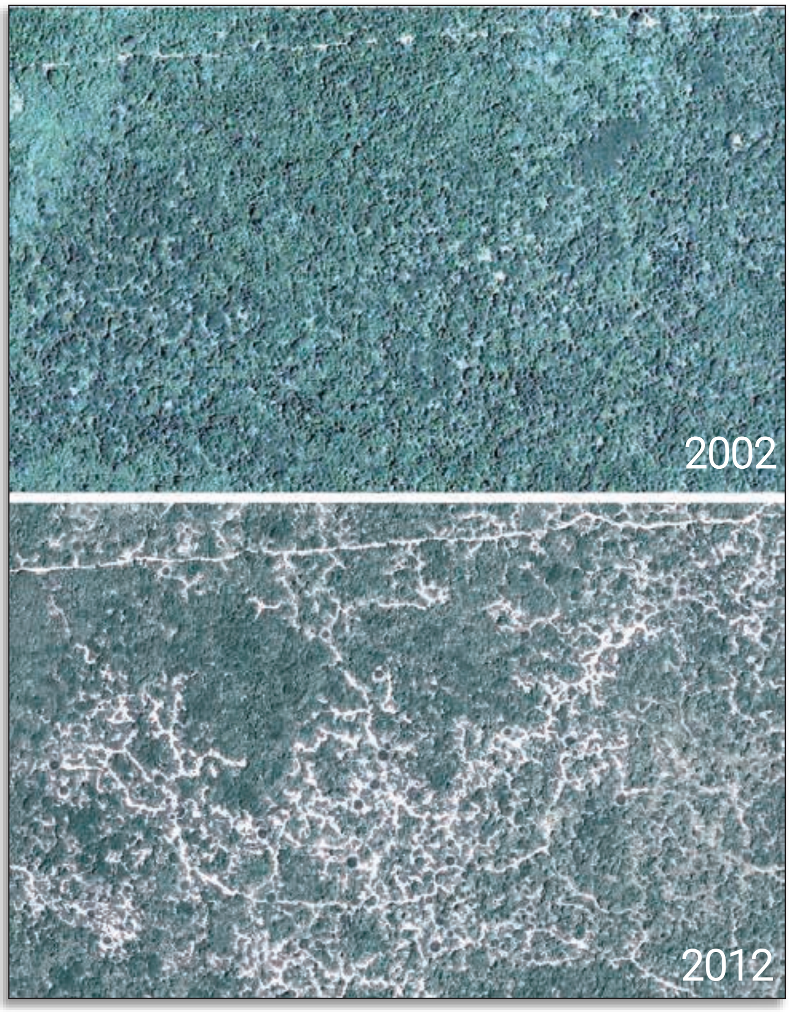
Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)

Technical Report

Analysis of very high-resolution satellite images to generate information on the charcoal production and its dynamics in South Somalia from 2011 to 2017



February 2018

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FAO SOMALIA – SWALIM

PROSCAL UN Joint Programme

Technical report

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Contents

Background

In developing countries, woodfuel accounts for 50 to 90% of the total energy used (FAO, 2010) and is the main source of household energy (Zulu and Richardson, 2013). The woodfuel related market is an important source of income for many people (Clancy, 2008). Evidence exists that at the local level it can have significant impacts on forest degradation (FAO, 2010; Kanninen et al., 2007). Charcoal is the dominant form of woodfuel used by urban households in Africa and other developing countries (Akpalu et al, 2011).

Charcoal is made by burning wood in a low-oxygen environment. According to FAO statistics, Africa accounts for 55% of the global charcoal production (FAO, 2014). However, these charcoal production estimates are often inaccurate when disaggregated at the national level. For many African countries, detailed information is lacking partly due to the informality and clandestine nature of production sector and the scattered production by rural population (Mwampamba et al, 2013). Estimates are consequently based on analytical and projection models that use woodfuel information of countries in similar socioeconomic and geographical situations, or by multiplying the country population by a per capita estimate based on a literature review carried out in 1980 (Wardle and Pontecorvo, 1981; Whiteman et al., 2002). The datedness of some of the estimates that are used as input in combination with the difficulty of data collection, makes that national charcoal production data are often at best “guesstimates” with limited accuracy (Mwampamba et al., 2013). Levels of woodfuel harvesting may be in balance with the productive capacity of the wood stocks, but overall tree loss occurs when the intensity of woodfuel production prevents regeneration and therefore sustainable production (Ribot, 1998).

In Somalia, charcoal production is not only triggered by domestic consumption, which accounts for less than a fifth of the total production and is the main source of energy in urban areas such as Mogadishu and Hargeisa (UNEP, 2005), but mostly by foreign demand, which accounts for the remaining proportion (SEMG, 2018). In fact, charcoal has developed into one of the major export products, and is sometimes referred to as “black gold” (Bakonyi and Abdullani, 2006; UN Security Council, 2011). While part of the charcoal exported from Somalia may originate from neighbouring countries like Ethiopia, the bulk of the exported charcoal is produced in Somalia itself (Belward et al., 2011). Even if national production estimates may be inaccurate (Mwampamba et al., 2013), the FAO database indicates a significant increase in production levels, i.e. from about 180,000 tonnes in 1961 to 420,000 tonnes in 1991, to almost 1.2 million tonnes in 2012 (FAO, 2014). Since the collapse of Somalia's central government in 1991, militia groups fight for political control and finance their activities partly with illegal charcoal exports (UN Security Council, 2011; UNEP, 2014). For this reason, in February 2012 under resolution

2036 the UN Security Council banned charcoal export from Somalia, regardless of the origin of the charcoal. The charcoal trade is the main driver of the fast depletion of forests and woodlands in Somalia (UNEP, 2005).

Despite high exports of charcoal from Somalia, and its contribution to tree cover loss, consequent land degradation (Omuto et al, 2009; Richardson et al., 2010), and reduction of ecosystem services provided by trees (ICRAF, 2014), little quantitative information on tree cover loss in Somalia during the past two decades is available. Moreover, Somalia is predicted to be one of the nine African countries that will face water scarcity by 2025 (Boko et al., 2007), and therefore land degradation will worsen the water scarcity effects by increasing the population's vulnerability to drought (Holleman, 2003). Given the limited security in large parts of Somalia in the last 20 years, and especially in the southern and central parts of the country since 2006, when the Islamist terrorist group Al-Shabaab took control, field surveys have been impossible to execute and consequently direct evidence of tree cover changes can exclusively be obtained through remote sensing. Tree cover clearances for charcoal production in Somalia (Rembold et al., 2013; Bolognesi et al., 2015) showed that loss of tree cover can be estimated by the identification of charcoal production sites, as they form clear circular objects that are spectrally different from their surroundings.

The technical report presented in the following pages contributes to the Output 1.2 “Monitoring Systems of Charcoal Production, Reporting and Movement in Somalia” of that component of the UN Joint Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL) funded by Italy and Sweden.

The available information on charcoal production and export is limited and lacks continuity to establish trends over a period of time. FAO SWALIM has undertaken the monitoring of the impact of charcoal production on the natural vegetation and its dynamics. Through very high-resolution satellite images, it is possible to identify and count charcoal burning sites and to derive from them the number of trees cut per unit area and the amount of charcoal produced. SWALIM Remote Sensing Unit has regularly analysed satellite imagery of the representative areas and reported on charcoal production sites dynamics.

Sites are identified by comparing satellite images acquired in different years. Satellite images also allowed for monitoring activities occurring in the locations where charcoal is stored in stockpiles ready for export.

HOW IS CHARCOAL PRODUCED?

The charcoal production method carried out in the study area is known as the Bay Method, and it was described by Robinson (1988). To produce charcoal, a type of oven known as 'kiln' is used. Kilns are built by piling the timber straight on the soil floor. The timber is collected from the surroundings and arranged into a circular mound design, with stronger poles erected at the centre, and other shorter pieces of wood positioned around it. The mound is packed as close as possible, and the gaps are filled with smaller pieces of wood, shrubs, and grass to facilitate kiln lighting. The whole structure is then buried with sand and iron sheets. Once the burning process is completed, the charcoal is formed and it is loaded into bags, leaving a layer of black ashes on the ground that is visible on satellite VHR images.

NOTE: The above photographs, showing the setup of a kiln for charcoal production, have been taken in Puntland (Northern Somalia) where the dry environment is very different as compared to the more humid found in South Somalia. This difference is reflected in the amount of trees used to setup a single site and in the size of the kilns, which in South Somalia can reach up to 20 meter diameter, as observed in this study.

The VHR imagery was provided by the U.S. Department of State (USDS) Humanitarian Information Unit, under the NextView License. The images used to produce this study are listed in ANNEX II.

1. Estimation of charcoal stored in the stockpiles sites identified along southern Somalia coast, through the analysis of VHR satellite images and photographs.

Charcoal has developed into one of the major export products (UNEP, 2005) and it is estimated that 4.4 million trees are logged annually to produce 250,000 tonnes of charcoal exported every year from Somalia to Saudi Arabia, Yemen, Bahrain, Kuwait, Oman and the United Arab Emirates. The UN Security Council banned charcoal export from Somalia, regardless of the origin of charcoal. However, illegal charcoal trading is continuing and VHR satellite images and photographs (from ground and helicopter) have been used to estimate the amount of charcoal stored in various stockpiles sites spotted along southern Somalia coast. Six charcoal stockpiles sites have been identified and they are located in: Baraawe, Kismayo, Kodai, Buur Gaabo, Buscbusc, and Qoddo, with Kismayo and Buur Gaabo being the most important ones in terms of site extent and amount of charcoal stocked.

Fig.1 - Charcoal stockpile locations - © Google Earth

A standard charcoal bag weight 27kg and stocked bags have been estimated as per the following formula:

area covered by charcoal stockpiles (m^2)

/

dimension of the base of a charcoal bag (0.4 m^2)

x

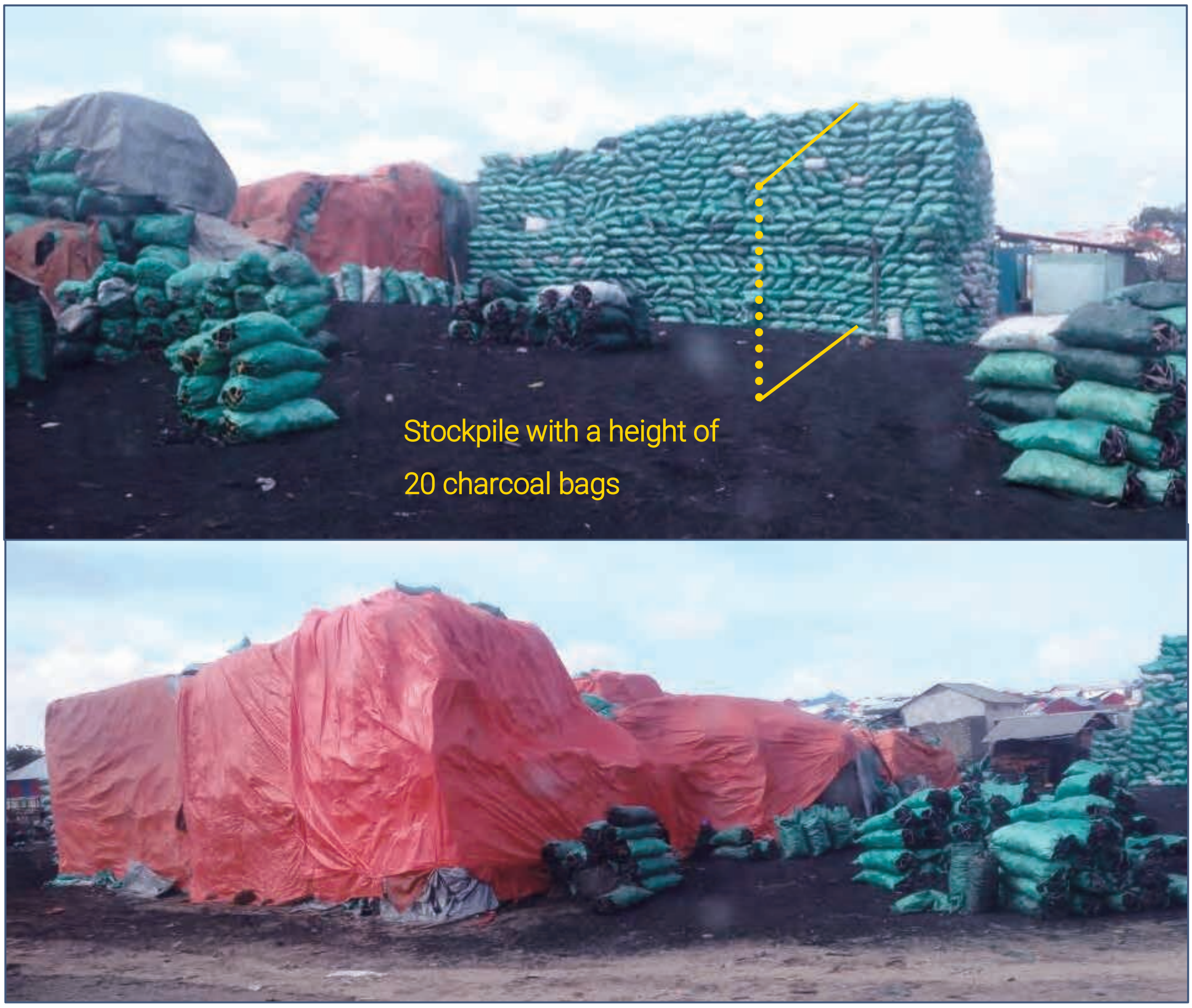
average number of bags piled up (15 bags)

The *area covered by charcoal stockpiles* has been estimated through visual interpretation of available satellite imagery. The *dimension of the base of a charcoal bag* has been set to 0.4 m^2 based on local experts' knowledge, reporting the charcoal bag dimension to be of 80 cm in length and 50 cm in width. The *average number of bags piled up* has been set to 15 following the analysis of photos taken at Buur Gaabo and Kismayo storing sites, and it is considered a conservative measure as stockpiles can be higher.

Fig.2 - Example of visual interpretation of Buur Gaabo charcoal storing site. The area covered by charcoal stockpiles has been outlined in yellow (Image: Worldview-2, 9 October 2016) - © [2016] DigitalGlobe

Fig. 3 Photos of Buur Gaabo site
(taken from helicopter on 14th June 2017)

Fig.4 - Photos of Kismayo site
(taken on 28th June 2017)



The estimation of charcoal stockpiles from VHR imagery and photographs is described in the following pages. Image quality and extent of charcoal stock areas for Baarawe, Buscbusc, Kodai and Qoddo did not allow for analysis at the same level of details as done for Buur Gaabo and Kismayo.

1.1 – KISMAYO

Fig.5 – Locations of charcoal stockpiles in Kismayo - © [2018] DigitalGlobe

Kismayo has three stockpile locations on the outskirt of the city. Site K1, on the road to Afmadu (North), site K2 on the road to the airport (West) and site K3 just South-West of site K2, towards the shore. Very high resolution imagery was available only for December 2012 and from January 2015 onward. Between these two dates, stockpile storing on site K2 stopped, whereas storing on site K3 emerged as a new stockpiling site. Recent images still show black ground covering the area of site K2 as if still covered in charcoal ashes, but no charcoal bags are detectable.

Panchromatic scenes have the limitation of offering only one spectral band and, consequently, they provide less information compared to multispectral imagery. For this reason, on panchromatic images covering site K1 (placed inside a urban context), it is difficult to distinguish charcoal stockpiles from surrounding objects such as huts or stockpiles of other material, and interpretation may be less accurate than the one performed on multispectral images (Fig.6). Vice versa, site K3 is placed in the outskirts of Kismayo where no urban objects are present and panchromatic images can be interpreted with good accuracy, as the only object present in the area are stockpiles (Fig.7).

Fig.6 - Detail of Kismayo K1 site on a panchromatic image. Charcoal stockpiles do not appear as distinct from other structures as seen on multispectral images, where stockpiles are identifiable thanks to the bluish colour typical of charcoal bags - © [2016] DigitalGlobe

Fig.7 - Detail of Kismayo K3 site on both panchromatic and multispectral image. On multispectral images, stockpiles are identifiable thanks to the bluish colour typical of charcoal bag or the orange tarps cover. However, the area surrounding the site is a rangeland and the only manmade objects present are the charcoal stockpiles, which make them detectable - © [2018, 2017] DigitalGlobe

The table in ANNEX I includes a detailed summary of available images, area covered by charcoal stockpiles per image and estimated amount of charcoal bags per site.

Figure 8 shows estimated amount of charcoal bags for K1 and K3 sites and respective image date. Amounts are given in ranges to account for visual interpretation inaccuracy.

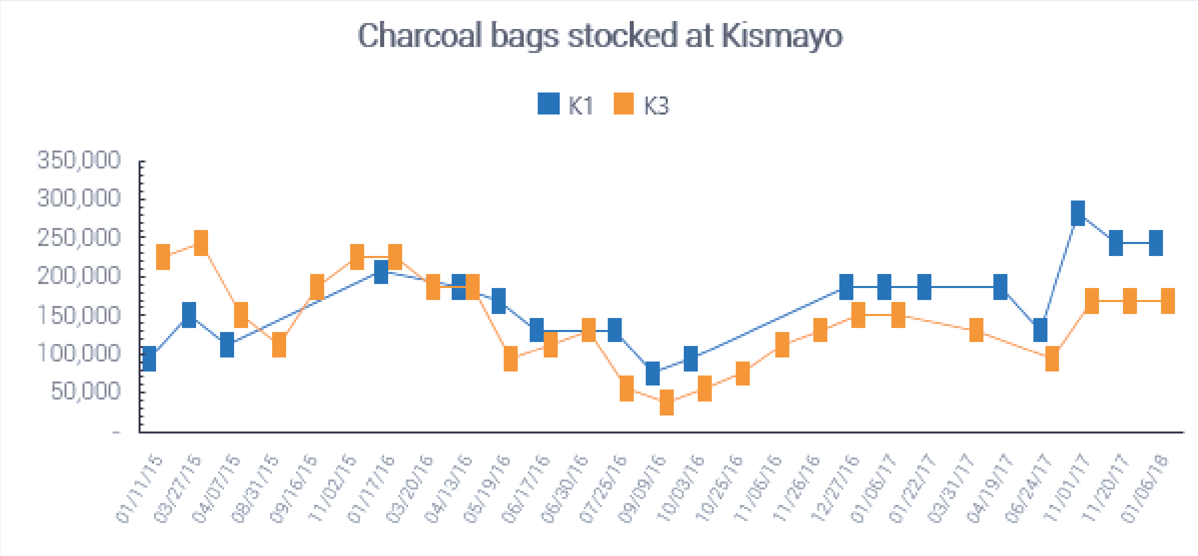


Fig.8 – Estimated amount of charcoal bags for Kismayo K1 and K3 sites

An analysis in fluctuation of stockpile sizes can be attempted, but not completed due to cloud cover and temporal gaps in available images. Factors that need to be taken into consideration when analysing the results for both Kismayo and Buur Gaabo (in the following pages) are:

1) Seasonality: there are four distinct seasons: two rainy seasons (Gu – April to June, and Deyr – October to December), and two dry seasons (Jilaal, the main one – January to March, and Hagaa – July to September). It is likely that during rainy seasons the production of charcoal decreases.

2) The Somalia and Eritrea Monitoring Group reported that the flows toward the stockpiles were likely more consistent and regular in 2017 as compared to 2015 and 2016, as "Al Shabaab has resumed systematic checkpoint taxation instead of attacking and jailing burners and traders in areas under its control". This could have caused an increase in recent stockpiles.

3) The production rate can also be affected by sanctions enforcement. The Somalia and Eritrea Monitoring Group in 2016 noticed a temporary drop in exports from May to July, which is believed to be a response to confiscations of cargoes by the UAE.

1.2 – BUUR GAABO

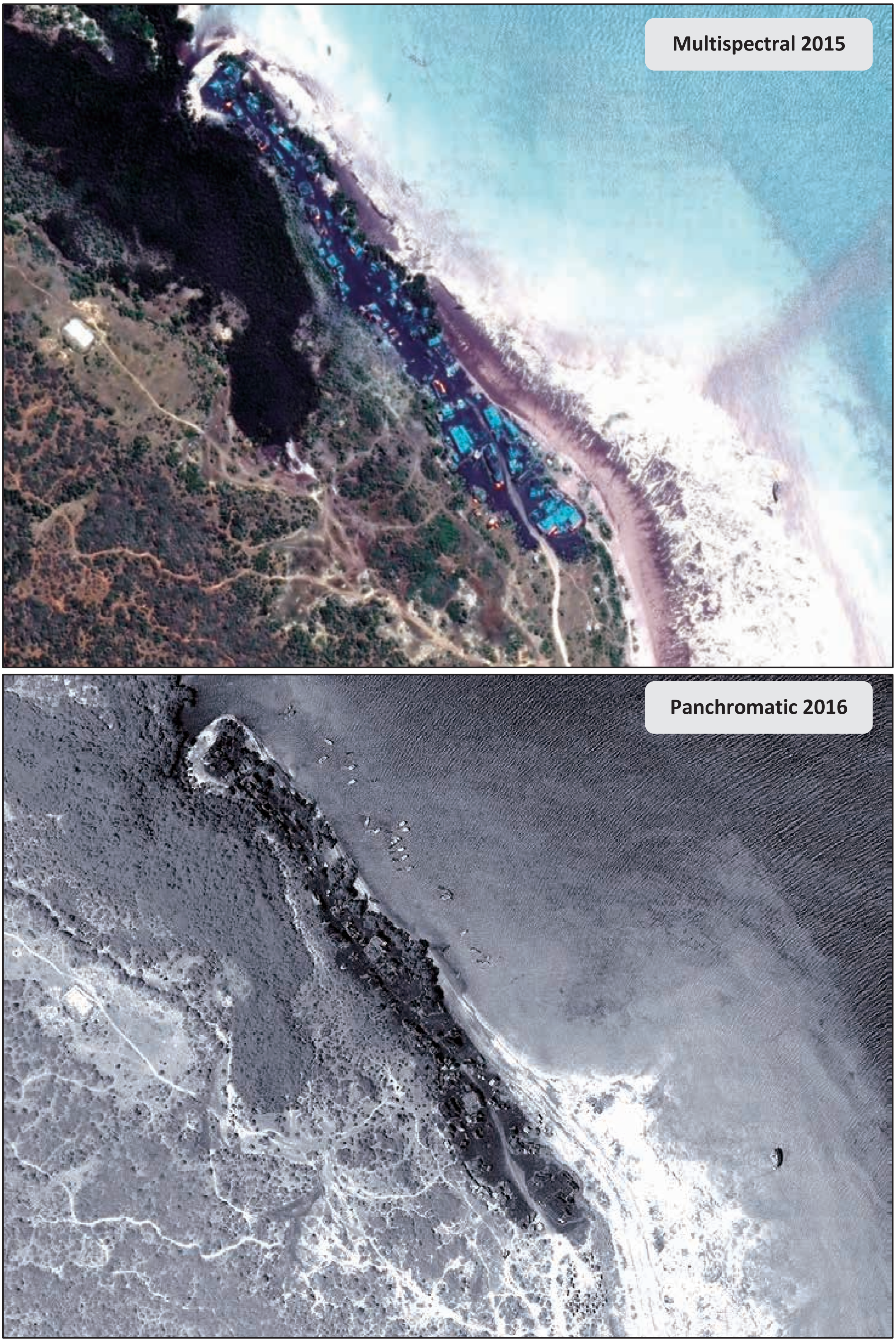


Fig. 9-10 – VHR images of Buur Gaabo site - © [2015, 2016] DigitalGlobe

Unlike Kismayo, panchromatic scenes of Buur Gaabo are easier to interpret, because no objects that can appear similar to charcoal piles are found in the vicinity. It is clear from multispectral images that the site is used only for storing charcoal bags. The results below include areas covered by charcoal stockpiles per image and estimated amount of charcoal bags per site (given in ranges to account for visual interpretation inaccuracy).

Figure 11 shows estimated amount of charcoal bags per image date. Amounts are given in ranges to account for visual interpretation inaccuracy.

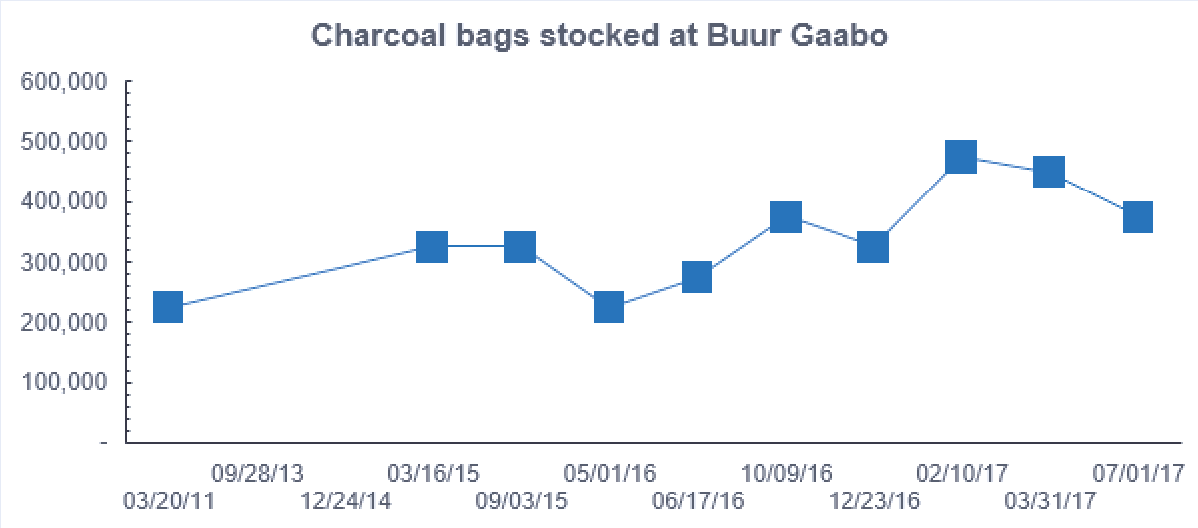


Fig. 11 - Estimated amount of charcoal bags for Buur Gaabo.

1.3 – BUSCBUSC

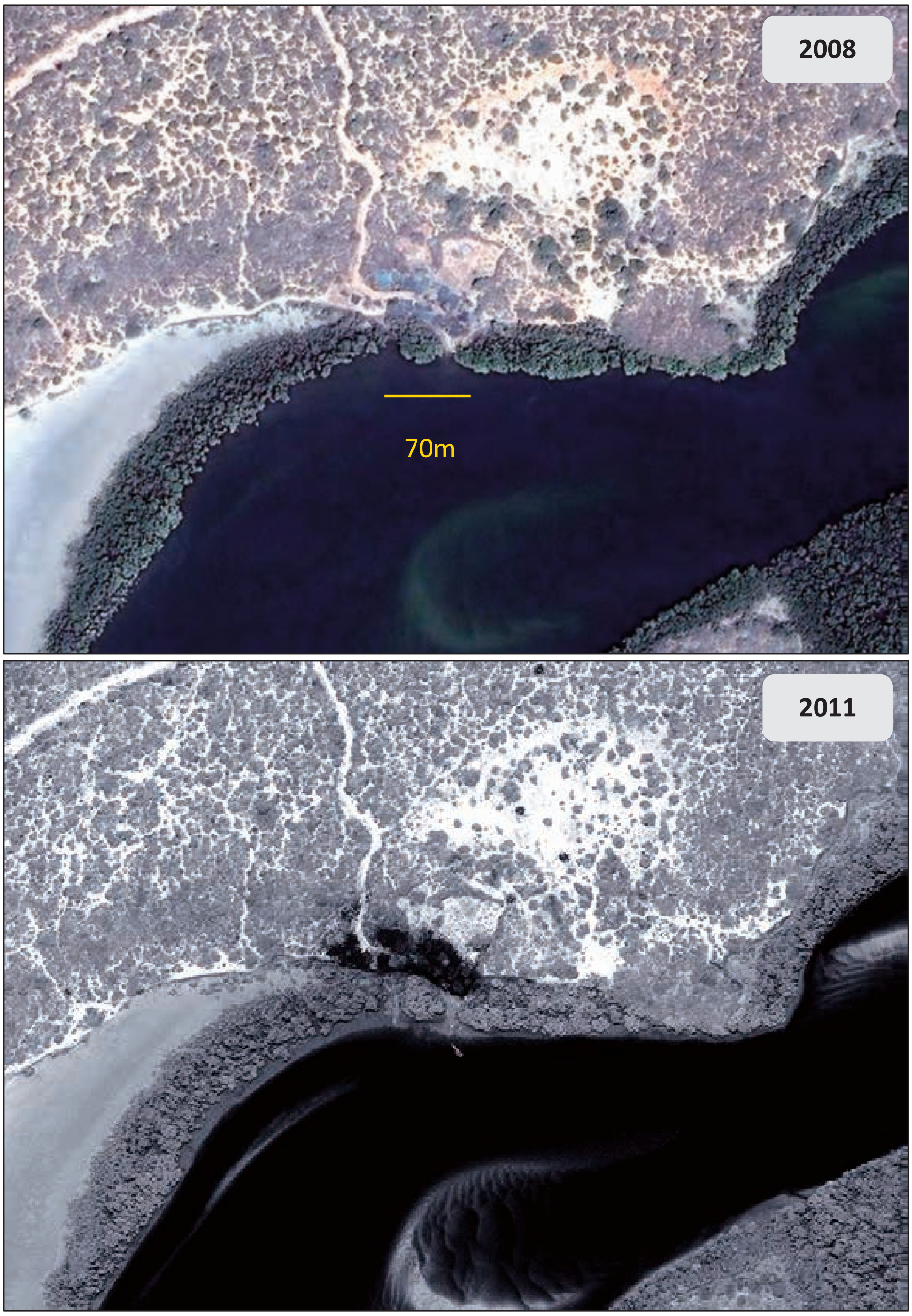
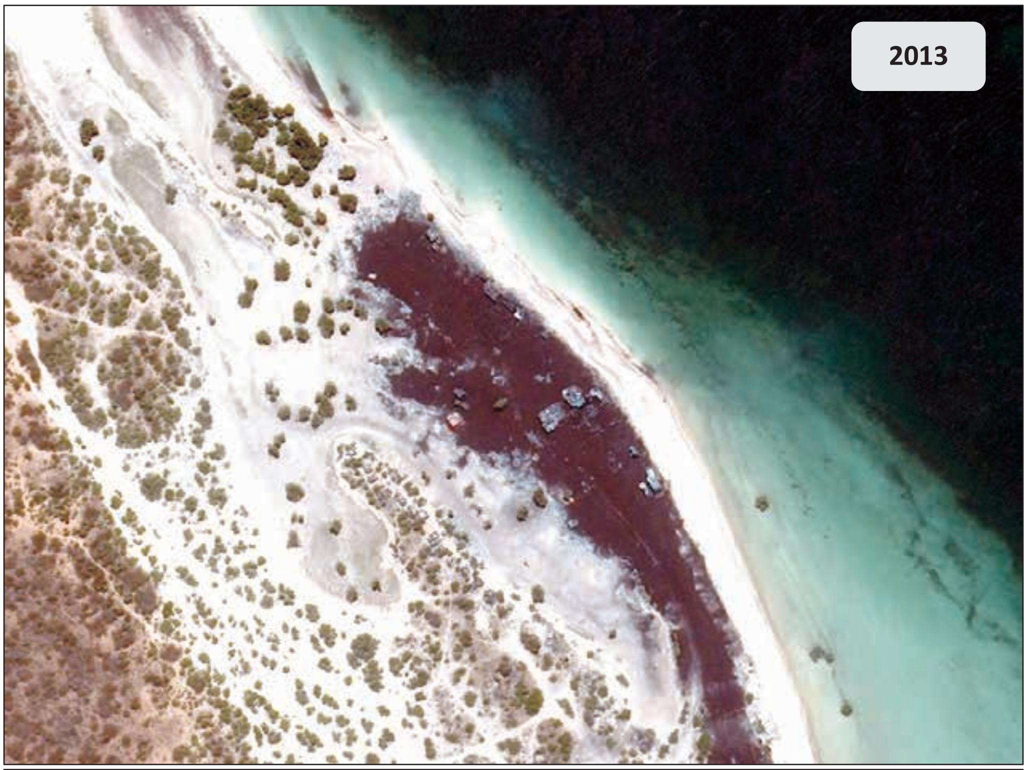


Fig.12-13 – VHR images of Buscbusc site - © [2008, 2011] DigitalGlobe

Buscbusc site has been used in the past for storing charcoal, as stockpiles are visible on images dated 2008-2011. However, it was of very small size as at its maximum extension was covering an area of about 2,000 m^2. It seems to be no longer used for storing as no stockpiles are visible in recent dates. Nonetheless, the ground appears black as if covered by charcoal ashes and we can presume it is used as a transit location to transport charcoal to Buur Gaabo, which is about 25 km down the homonymous stream.

1.4 – KODAY



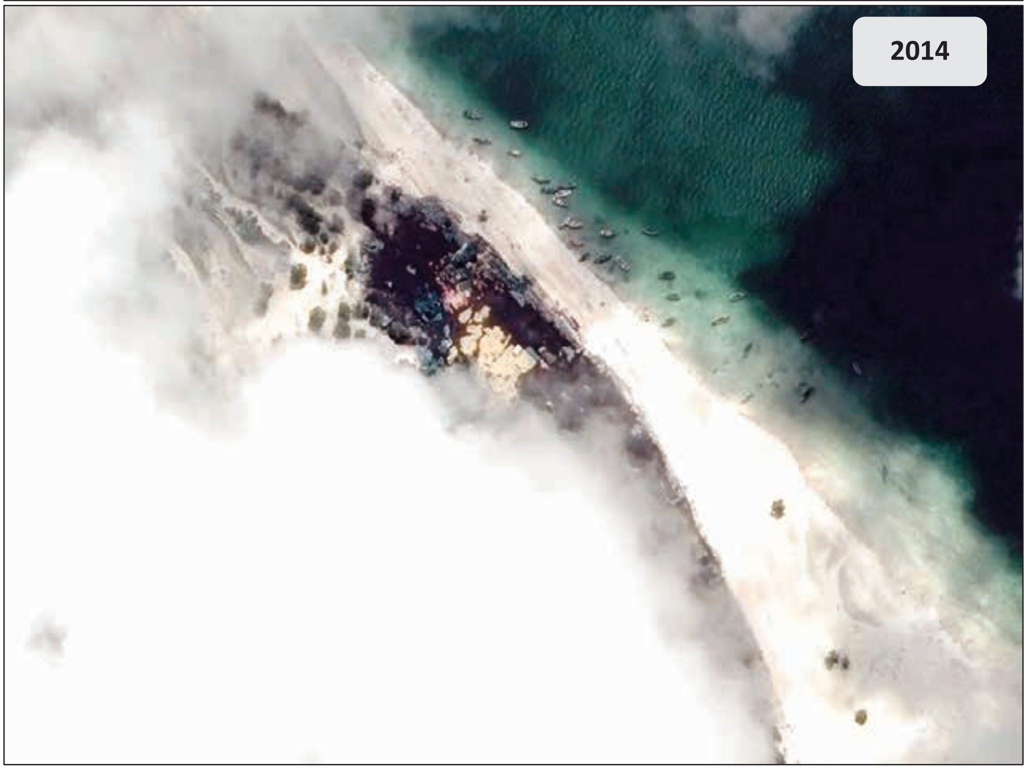


Fig.14-15 – VHR images of Koday site - © [2013, 2014] DigitalGlobe

Stockpiles are visible on all 2011 images of Koday site. Only few stockpiles are present on 2013 images, while June 2014 scene (even if partially covered by clouds) captured a peak of storing activity, with many stockpiles and boats ashore observable. In the March 2015 image, stockpiles appear to be back to the level observed in images of 2013 and to fade into just traces of black ashes on following dates (period 2015-2017).

1.5 – QODDO

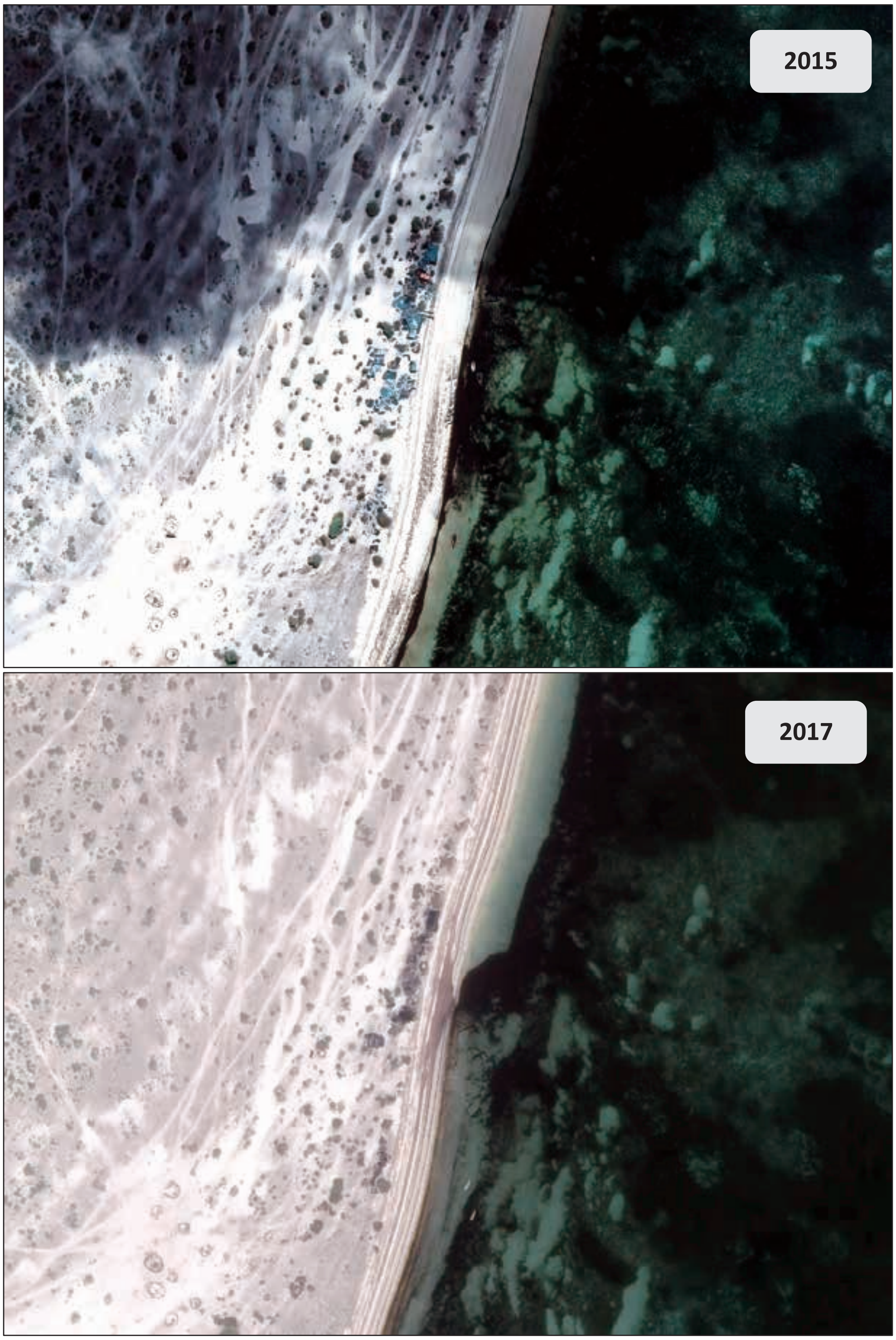


Fig.16-17 – VHR images of Qoddo site - © [2015, 2017] DigitalGlobe

Up to December 2012 no stockpiles are visible at the Qoddo site. They appear for the first time on December 2014 image, with maximum site extension visible on April 2015 scene. The site looks active as of October 2017 (latest image available), but with significant less charcoal stored when compared to April 2015.

1.6 – BAARAWE

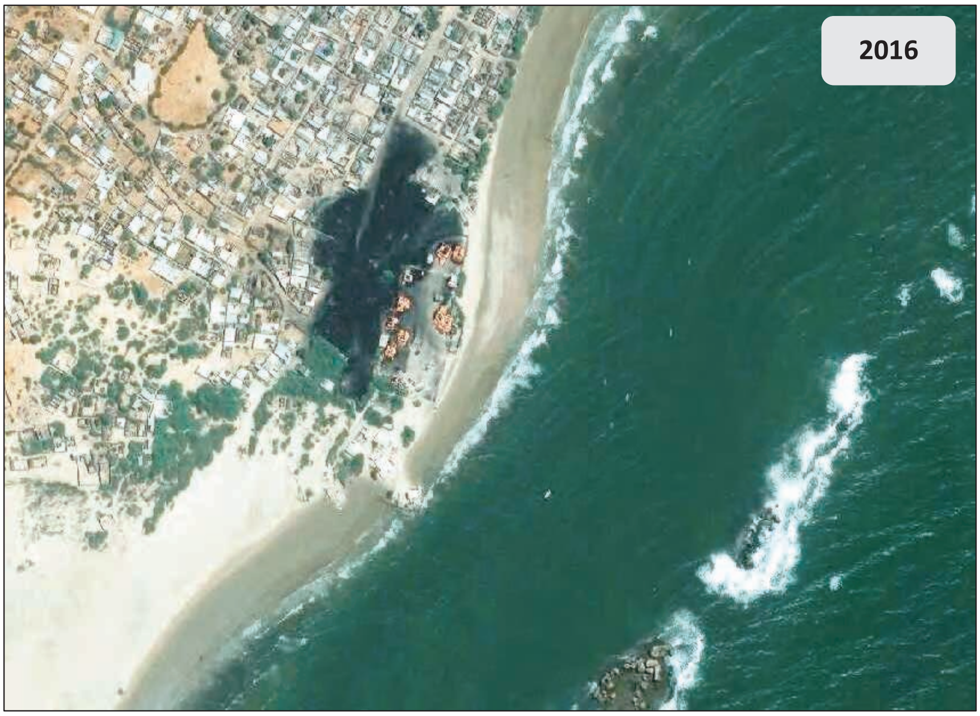


Fig.18-19 – VHR images of Baarawe site - © [2014, 2016] DigitalGlobe

Baarawe site images show the following estimated areas covered by charcoal stockpiles:

February 2010: 10,000 m^2; March 2011: 7,000 m^2; October 2014: 2,000 m^2.

As per the image of 29 January 2015, site appears cleared from charcoal bags except for some stockpiles covered with orange plastic tarps that do not change up to 22 October 2016 (last image available). These structures cover an area of about 1,500 m^2.

Following the arrest of various officials exporting charcoal, after the capture of Baarawe from Al Shabaab by Somali National Army and AMISOM (African Union Mission in Somalia) forces in October 2014, the Somalia and Eritrea Monitoring Group believe that the trade in Baarawe has ceased. Baarawe was Al Shabaab's principal port for export after they lost Kismayo to AMISOM. Since late November 2015, evidence collected by the SEMG, including regularly updated satellite imagery and aerial surveillance of the city's port and stockpiles, suggests that charcoal trade in Baarawe and the surrounding area has stopped (SEMG, 2015).

2. Analysis of charcoal production occurred in the area of interest of South Somalia over the period 2011-2017 covered by multi-temporal VHR images.

The FAO SWALIM remote sensing unit performed visual interpretation of multi-temporal very-high resolution satellite images listed in ANNEX II over an area of about 37,000 km^2.

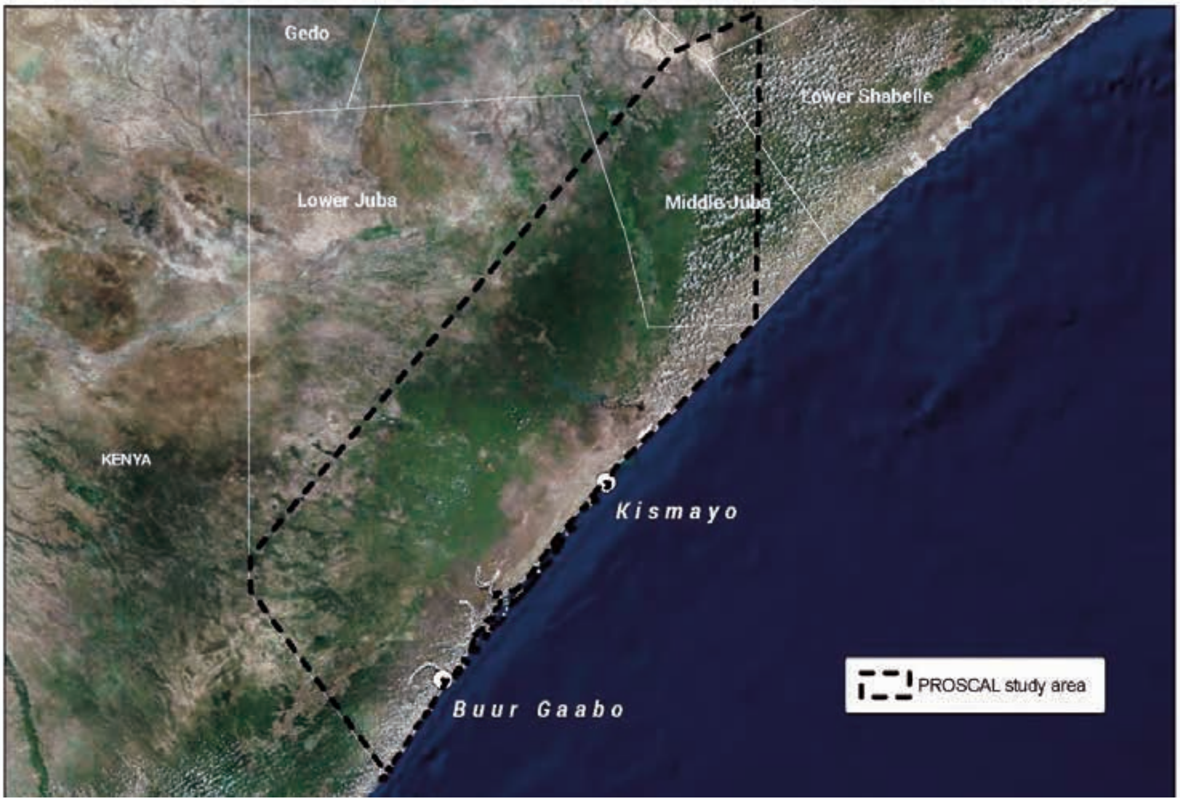


Fig.20 – PROSCAL study area - © Google Earth

The analysis of the interpretation results was performed following the reference methodology described in the article "Rapid mapping and impact estimation of illegal charcoal production in southern Somalia based on WorldView-1 imagery" (Bolognesi et al., 2015). The amount of charcoal produced can be estimated by linking the identified number and size of charcoal production sites with the production capacity of each site. To estimate the volume of timber used, the kiln mound is assumed to be comparable to the geometric shape of a spherical cap. The list below identifies the relevant parameters for calculations and their ranges. These ranges were derived from existing studies and local expertise.

1) A lower size threshold of 2 m radius was adopted to filter out all smaller sites that would be highly susceptible to interpretation error. Likewise, a higher threshold of 11 m radius was set as no kiln of such dimension, or greater, has ever been documented.

2) To calculate the volume of the spherical cap, two values are needed: the height of the spherical cap, and the radius of the base circle. Based on local expertise and previous studies (MPDES-CHE, 2004), two possible kiln height values were adopted, i.e. 1.5 m and 2.0 m.
3) One meter was subtracted from all recorded kilns radius to account for spreading out of charcoal ashes after the kiln is uncovered and the charcoal is being transferred into bags.
4) The timber stacking inevitably leaves gaps between timber pieces and other materials that are used for the kiln construction (grasses and shrubs for kiln lightning). Therefore, a range between 20% and 40% of volume subtraction was adopted to account for space occupied by air and other materials.
5) A wood-to-charcoal conversion efficiency of 20% was assumed based on values provided by the majority of sources for this type of charcoal production in Somalia and other tropical regions (Bird and Shepherd, 1989; ICRAF, 2014; MPDES-CHE, 2004; Robinson, 1988). Nonetheless, the current intense charcoal production practices may have reduced efficiency levels as compared to cited studies, but hard data on this is lacking.
6) Water is present in wood, both in bound form in cell walls, and as free water inside cells and between cell cavities. The average timber moisture was set to 47% following studies by Bird and Shepherd (1989) and Robinson (1988).
7) The dry-wood density is the wood mass per unit of volume and it differs for different tree species. Density was assumed to range between 500 kg/m^3 and 700 kg/m^3 based on the key species of Acacia bussei, Acacia senegal, Acacia tortilis, and Terminalia species (Bird and Shepherd, 1989; Robinson, 1988).

The following conversion table is the result of the methodology described above, and shows charcoal amounts produced per site, based on kiln radius size, and equivalent number of charcoal bags. The mean values are based on all possible combinations of the assumed low/high values.

Site radius (m)	Charcoal mean (kg)	Bag mean (no.)
1	252	9
2	675	25
3	1,329	49
4	2,244	83
5	3,420	127
6	4,858	180
7	6,557	243
8	8,518	315
9	10,740	398
10	12,636	468

FAO SWALIM remote sensing unit identified and recorded all kilns (observed as black dots) over the period 2011 – 2017 on the satellite images acquired. Not all the satellite images available covering the study area have been acquired and analysed; a screening was done considering the most suitable images (cloud cover, seasonality) able to fully cover the study area.

Since kiln sites can still be detected after two or more years from their first use, sites were counted only for the first image on which they appear to avoid double counting. However, during the analysis it has been observed that in a couple of cases the same kiln site have been utilized in different years to produce charcoal. This observation was noticed thanks to a more intense black colour, a rounder shape and a bigger size of the kiln sites detected as compared to their first use; the time interval between the first use and its re-use ranges from 5 to 6 years. This latter finding implies that considering the charcoal production sites active only once may lead to an underestimation of the actual charcoal production, although the figures involved should not significantly alter the totals reported.

Also, some sites identified and counted on 2011-2013 images might be the remnants of sites built in the previous years.

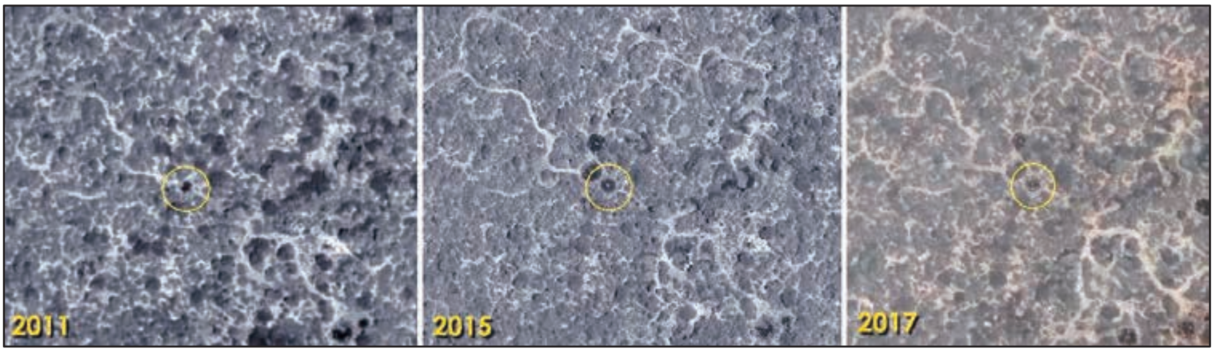
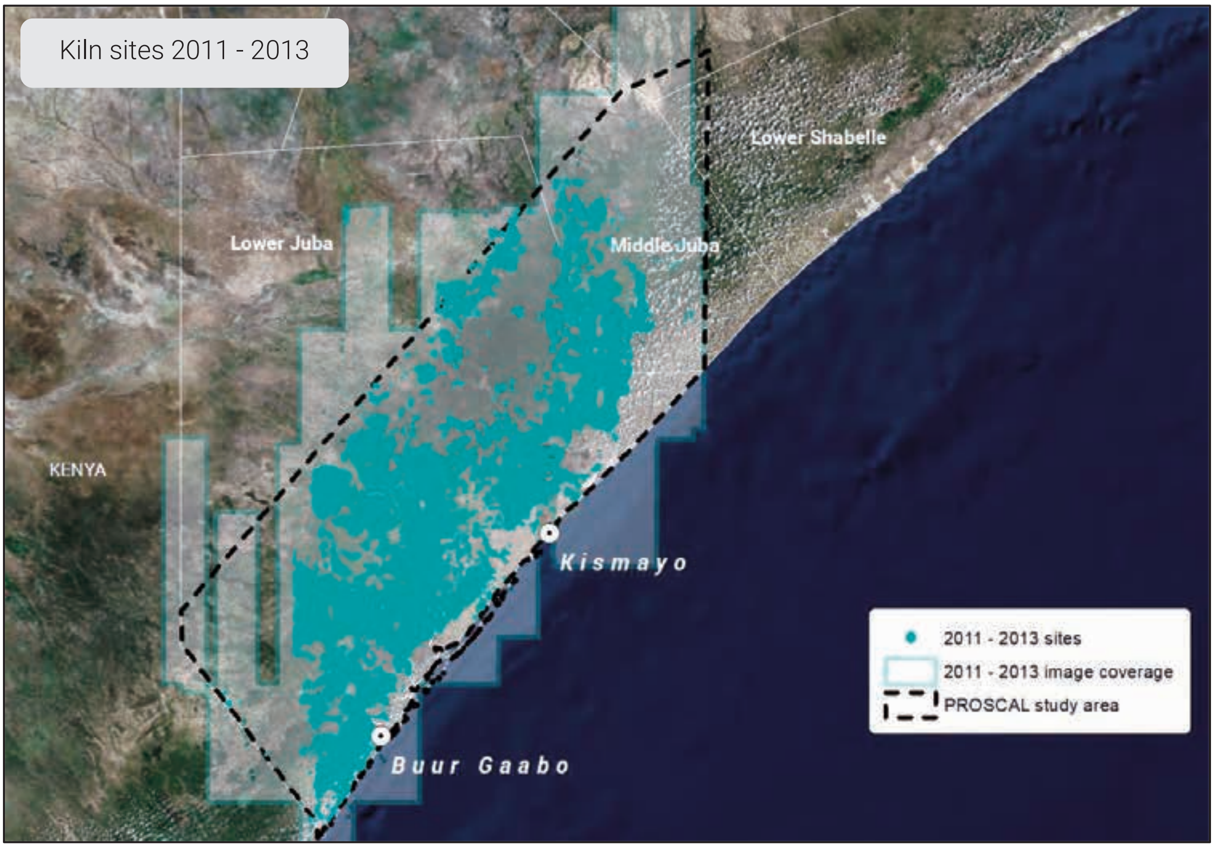


Fig.21 – Example of a kiln used twice. In 2011 an old kiln is indicated with a yellow circle. The same kiln was used in 2015, as demonstrated by the bigger and more defined circular shape. In the same area two more kilns were setup. In 2017 the ashes of the kiln are less defined due to the surface water runoff and the regrowth of grasses. This figure also shows the selective cut of the big trees present in the area and visible with a darker tone and a coarser texture on the 2011 image. In fact, only few of them are left in 2017, due to charcoal production - © [2011, 2015, 2017] DigitalGlobe

As there is no homogeneous imagery coverage for each year, data has been aggregated into three periods: 2011-2013, 2014-2016 and 2017. The 2017 images were included in the analysis though with incomplete coverage of the area of interest, to highlight that charcoal production is still ongoing and therefore very relevant.

Figures 22, 23, 24 show the distribution of identified charcoal sites and image coverage per period.



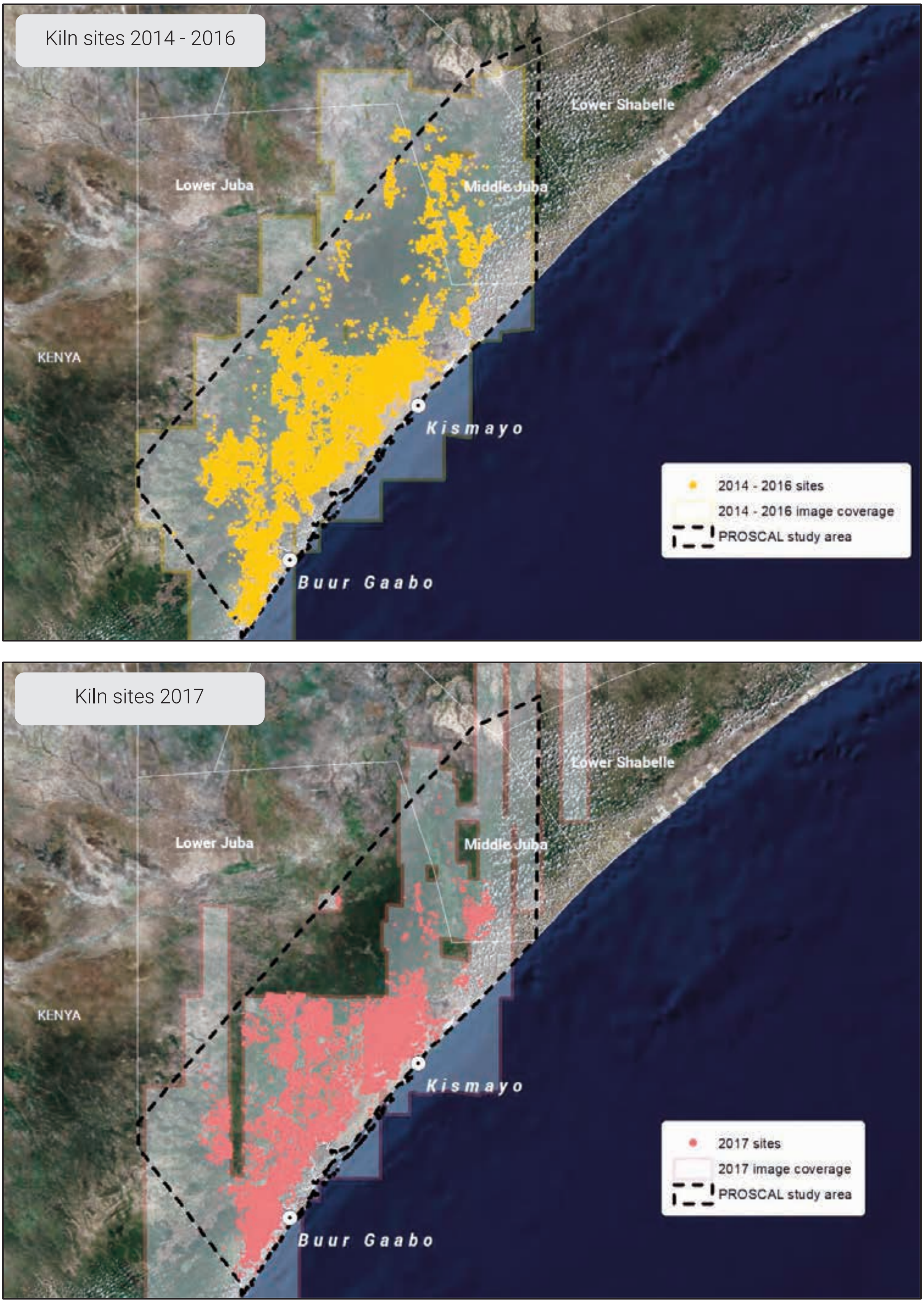


Fig.22-23-24 – Distribution of identified charcoal sites and image coverage per period - © Google Earth

The following table shows the analysis results based on the image coverage analysed for the three periods (amounts are rounded to the nearest thousand) :

Period	Identified charcoal sites (#)	Charcoal production (tons)	Charcoal bags (#)
2011 - 2013	122,000	242,000	8,972,000
2014 - 2016	60,000	123,000	4,543,000
2017	49,000	79,000	2,930,000
Total	**231,000**	**444,000**	**16,445,000**

Unavailability of images and excessive cloud cover were limiting factors that prevented full VHR image coverage of the study area.

If performing the analysis considering only the overlapping image coverage available for all three periods, the results are as follows:

Period	Identified charcoal sites (#)	Charcoal production (tons)	Charcoal bags (#)
2011 - 2013	107,000	211,000	7,816,000
2014 - 2016	56,000	115,000	4,249,000
2017	46,000	77,000	2,840,000
Total	**209,000**	**403,000**	**14,905,000**

In view of the results from the overlapping coverage, the charcoal production for the period 2011 – 2013 was 2,605,000 bags per year, while it reduced to 1,416,000 bags per year during the period 2014 – 2016. It then increased in 2017, to 2,840,000 bags of charcoal produced. However, when considering for example the images available for 2017, they cover 79% of the study area. This means that projecting the estimated charcoal production to the total area covered by trees, the number of bags would be 3,595,000 in line with Somalia and Eritrea Monitoring Group reports on trends in charcoal production.

It should be emphasized that figures derived from this study are calculated based on a series of conservative assumptions and that there is a negative effect of clouds on the images interpreted. The percentages of cloud cover per image are reported in ANNEX II, while the table below shows the average cloud cover per each period investigated.

Average Cloud Cover (%)

2017	18.1
2014-2016	7.9
2011-203	3.1
Stockpiles	12.8

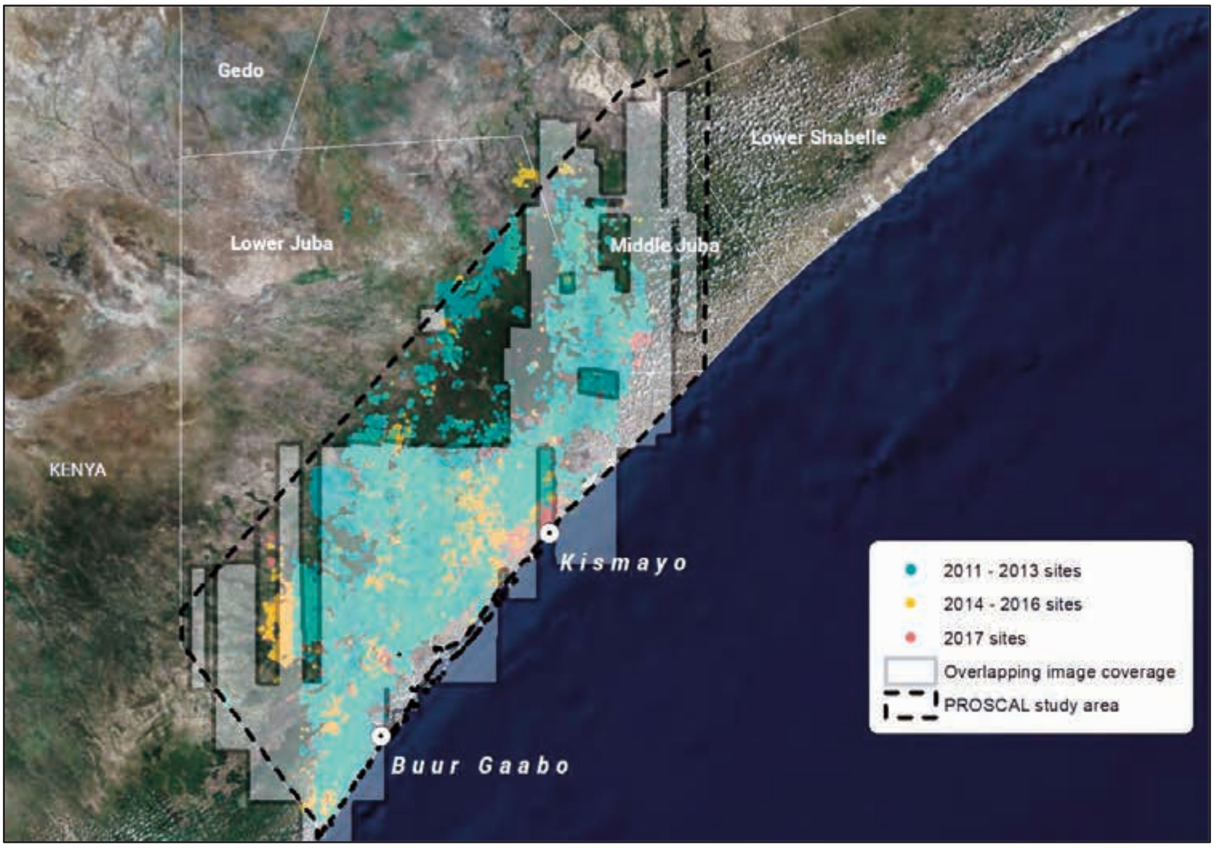


Fig. 25 - Overlapping area covered by VHR images for the three periods - © Google Earth

The area circled in red on Fig.26 presents almost no sites detected during the period 2011-2016 (almost no images available for 2017). Experts' knowledge suggests that the area is not used for charcoal production due to: lack of water resources that prevent workers from spending long time in the field; the area is tsetse fly-infested; trees are smaller in size as compared to other areas.

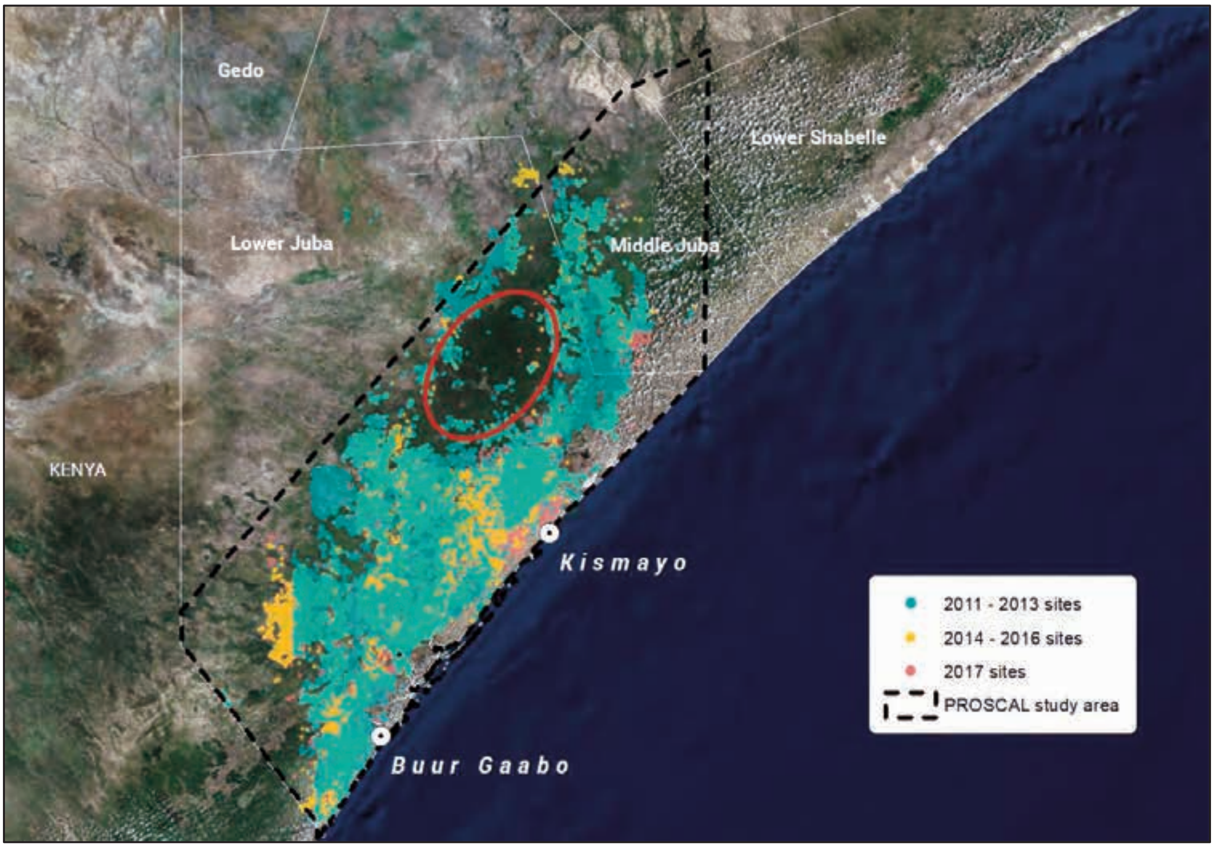


Fig. 26 - Area highlighted in red appears to be less affected by charcoal production - © Google Earth

Based on interviews and data from UNEP's report on the state of the Environment in Somalia (UNEP, 2005) it is assumed that **2 bags of charcoal are produced from a single average Acacia tree**. If the tree-bag conversion rate from the first study is applied, then about **8 million trees were felled during the period 2011 – 2017**, just for the area covered by the analysed images.

According to previous studies, the tree density for the area can vary between 3,400 trees and 6,000 trees per km^2. Out of 37,000 km^2, total extent of the study area, about 27,000 km^2 have been classified as covered by trees through the visual interpretation of both Landsat-8 images (2016/2017) and Google Earth very high resolution satellite images, which translates to about 93 to 165 million total potential trees present in the area depending on the tree density estimate adopted. These estimates, combined with the analysis of charcoal production, put the deforestation rate in the range **10% - 17.6% over the period 2011 – 2017 that is 1.4% to 2.5% per year**.

Figures are likely higher if considering the lack of images or/and excessive cloud cover on some images that limit the study area coverage.

Fig.27 - Tree covered area within the PROSCAL study area.

2.1 - Analysis of kiln size distribution

In total, more sites were identified for the period 2011-2013 due to the following reasons: 1) part of the sites detected in 2011-2013 are most likely the remains of production sites utilized in the previous years; 2) more images were available for this period; 3) images are less affected by cloud cover. However, regardless these facts, the trend of kiln sites distribution per radius size is similar over the 3 periods (see chart on Fig. 28): 3-meter radius kiln sites appear to be the most common, followed by 4 and 2 meters sites.

Interesting to note that unlike in 2011-2013 and in 2014-2016, in 2017 the number of 2 m radius kiln sites is higher than those of 4 m radius. This could be an indication that larger trees are decreasing and hence the production of charcoal is shifting to smaller trees and smaller kilns.

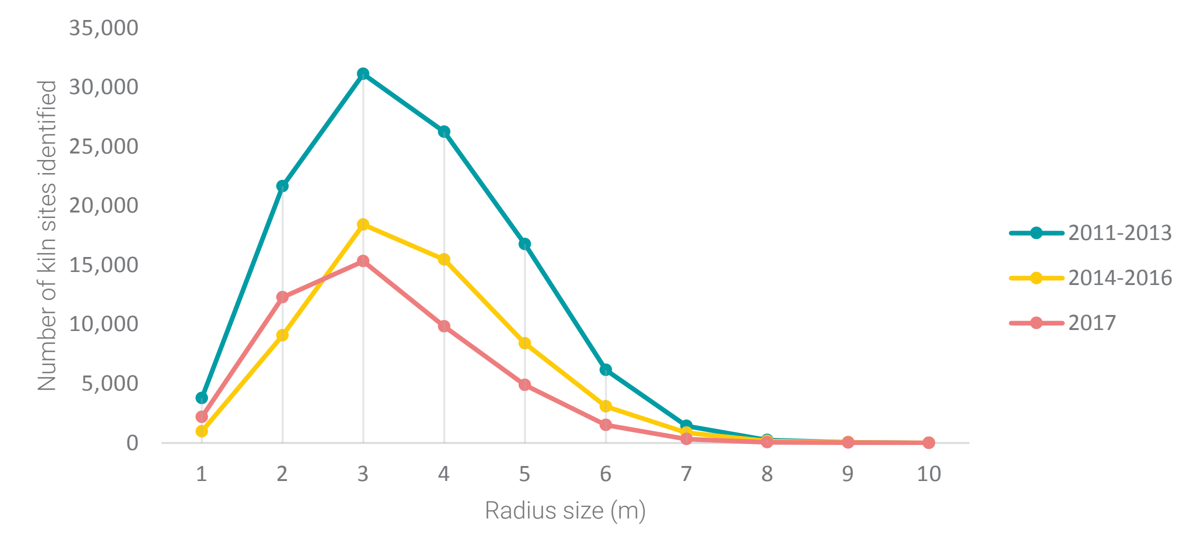


Fig. 28 - Kiln sites distribution per radius size over the three periods.

Chart on figure 29 shows the distribution in % of identified kiln sites, grouped by radius size. The percentage of 3 m radius sites is higher in 2014-2016 and 2017 than 2011-2013. Also, compared to previous periods, in 2017 there is a general drop in percentage of larger size sites (4 to 10 m) opposed to an increase in smaller sites (1 and 2 m). This supports the presumption that due to intensity of charcoal production, larger trees are disappearing and producers are moving to smaller ones.

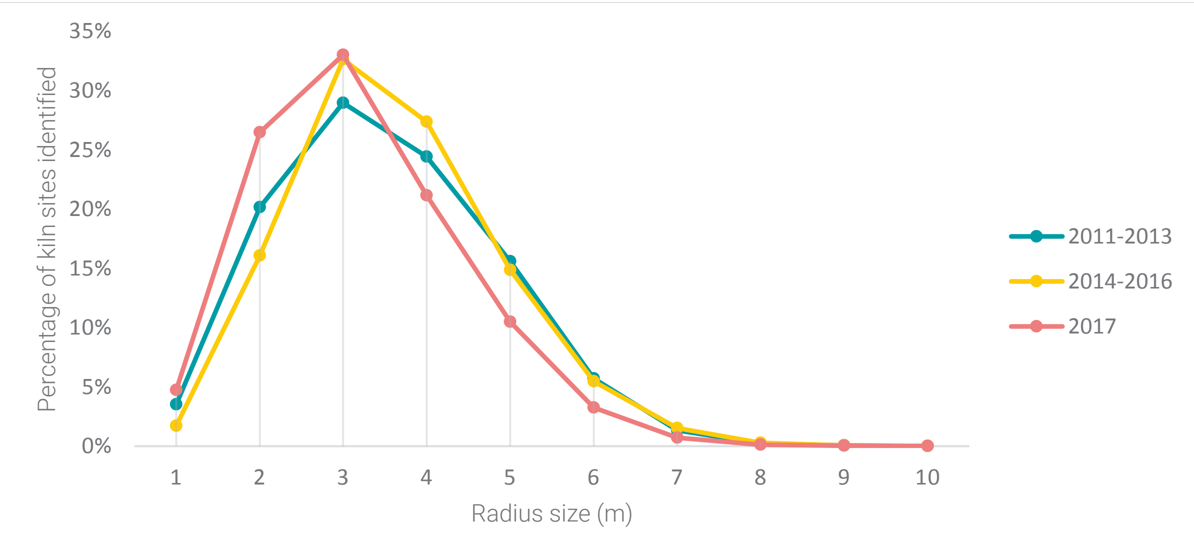
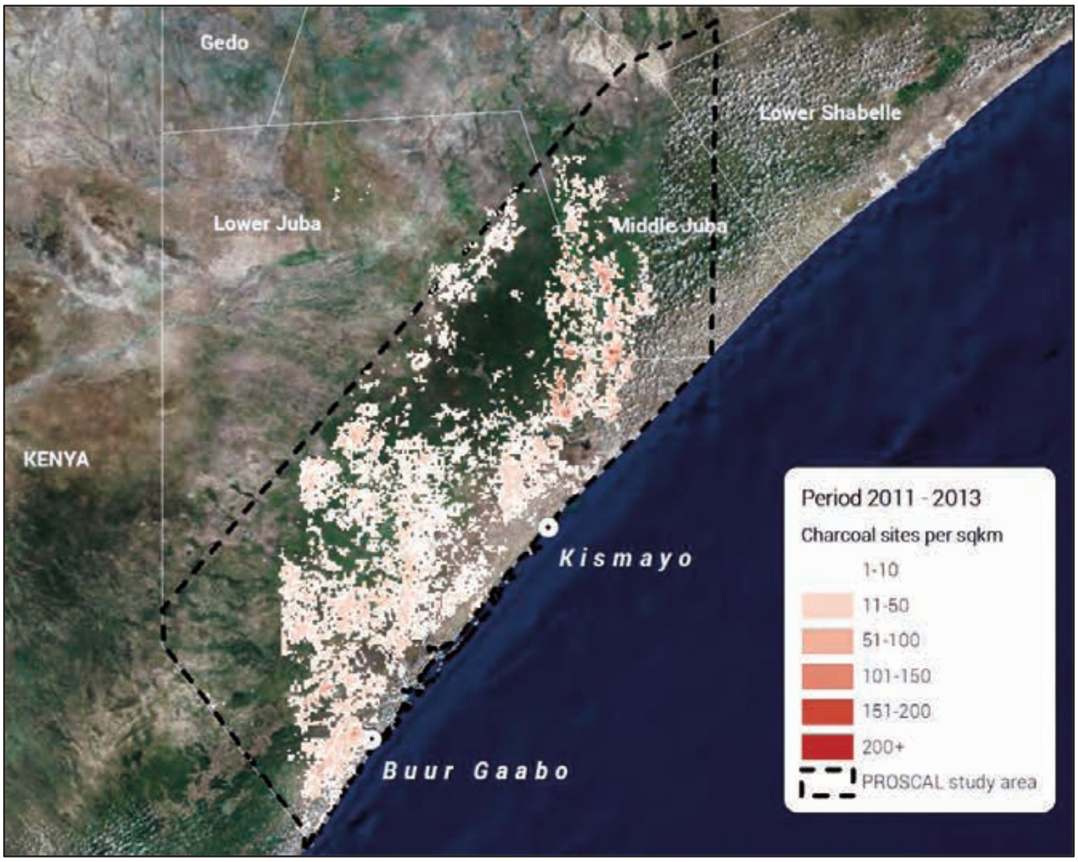
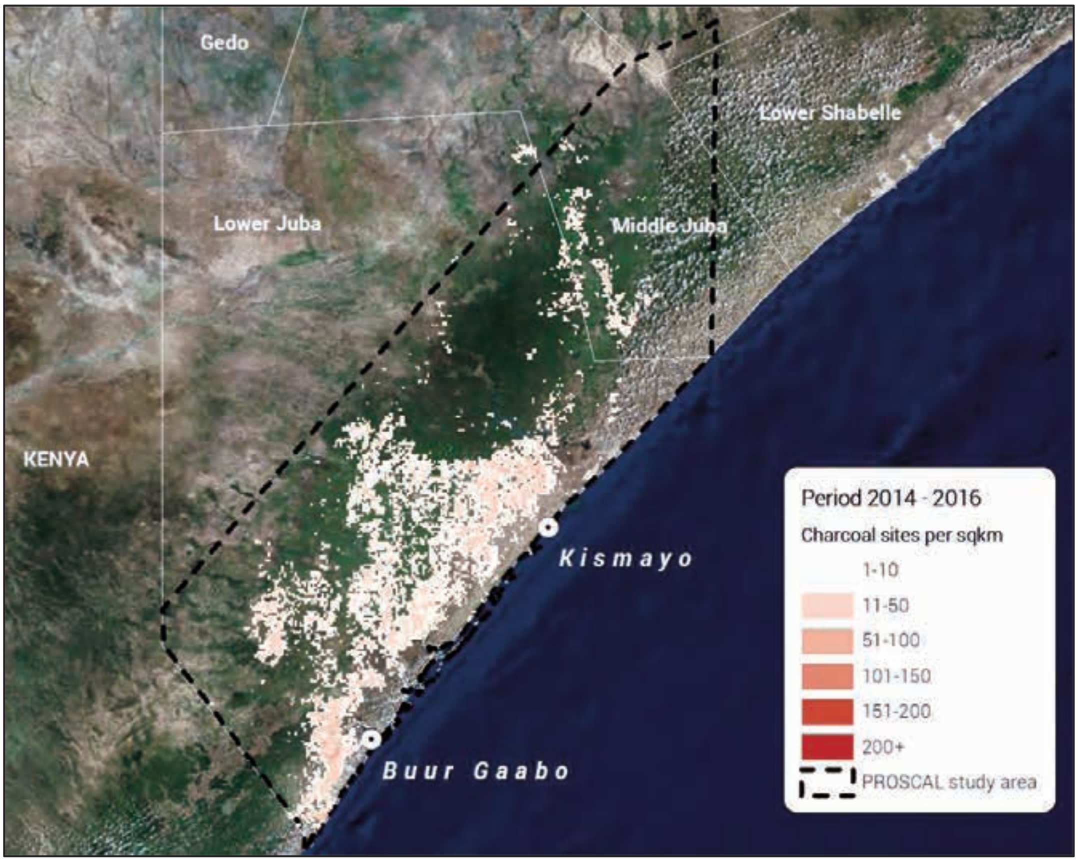


Fig. 29 - Distribution in percentage of identified kiln sites, grouped by redius size.

2.2 - Analysis of production dynamics

The study area was divided in a grid of 1km x 1km squares and the number of kiln sites within each square was counted. On figures 30-31-32, darker red means higher density of sites per km^2 that translates in higher exploitation intensity. For example, in the period 2011 – 2013 the most affected areas are located north-north-east of Kismayo, around Jilib, and west of Buur Gaabo. During both period 2014 – 2016 and 2017, the most affected areas are those in the proximity of Kismayo and Buur Gaabo.





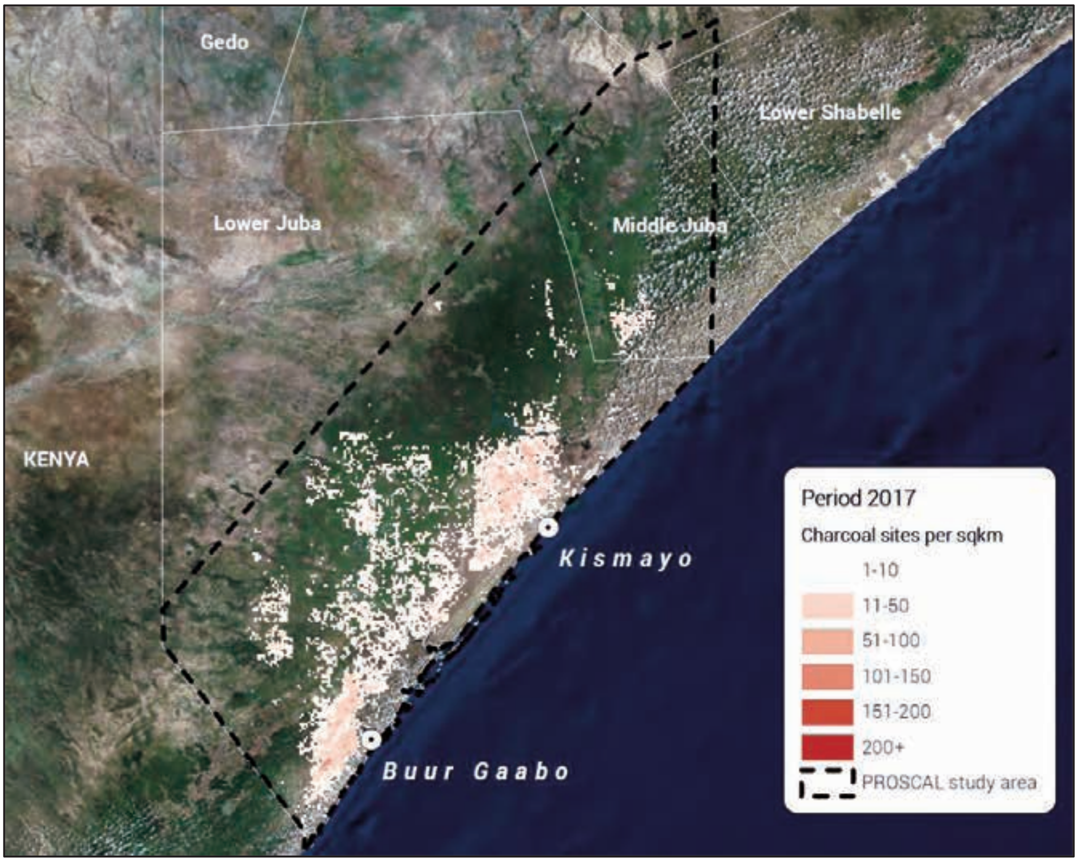


Fig.30-31-32 – Spatial distribution of charcoal production. Charcoal sites are grouped by 1 km × 1 km grid cells - © Google Earth

Analysing the results of overlapping image coverage, allows for deeper understanding of charcoal production dynamics.

The analysis can be affected by the presence of clouds on available images and/or by the interpretation of contiguous images with different acquisition date within the same time frame, but in general it gives a good understanding of the shifting in locations of charcoal production. For example, during the investigated period, it is evident that charcoal production decreased in the area north-north-east of Kismayo (around Jilib), while intensified in areas near Kismayo and Buur Gaabo. This could be explained by the depletion of tree resources in the area and consequently producers were forced to move to more productive areas (with higher number of trees). Another reason could be of logistic sort. In fact, the new locations are closer to the main active ports used for shipping charcoal overseas, resulting in a decrease of costs linked to the transportation (and possibly taxation at checkpoints along the route) from the production site to the stocking and shipping location.

Figures 33, 34 and 35 highlight changes in number of site based on a 1 km^2 grid.

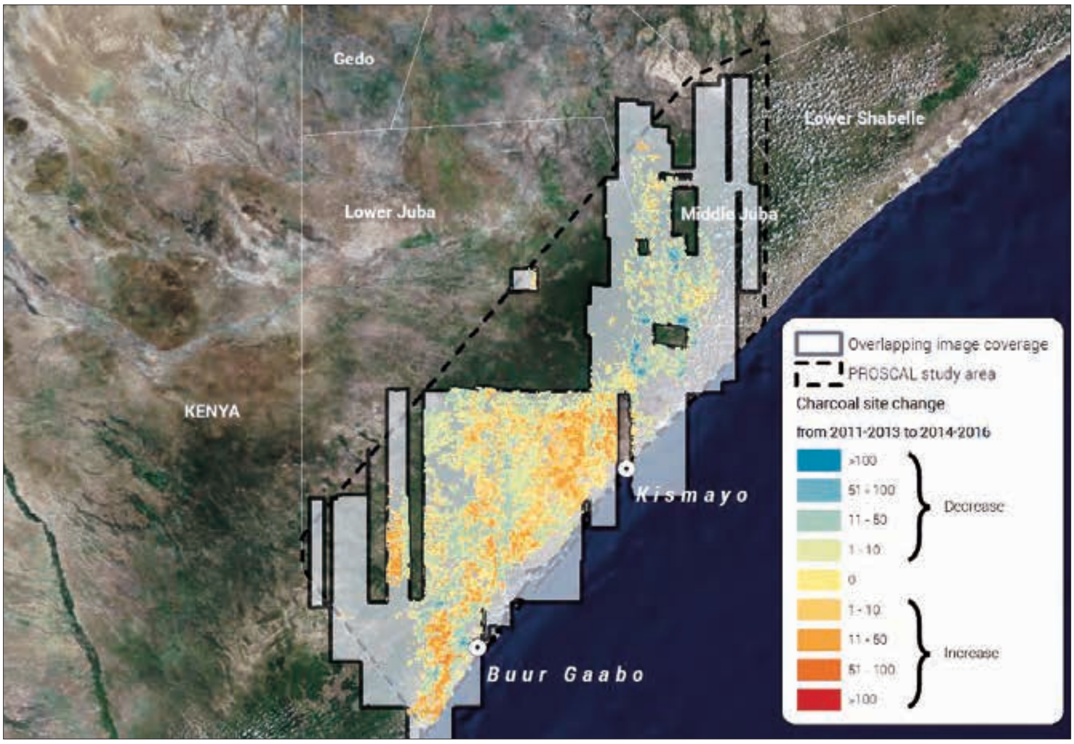


Fig.33 - Change between 2011-2013 and 2014-2016 - © Google Earth

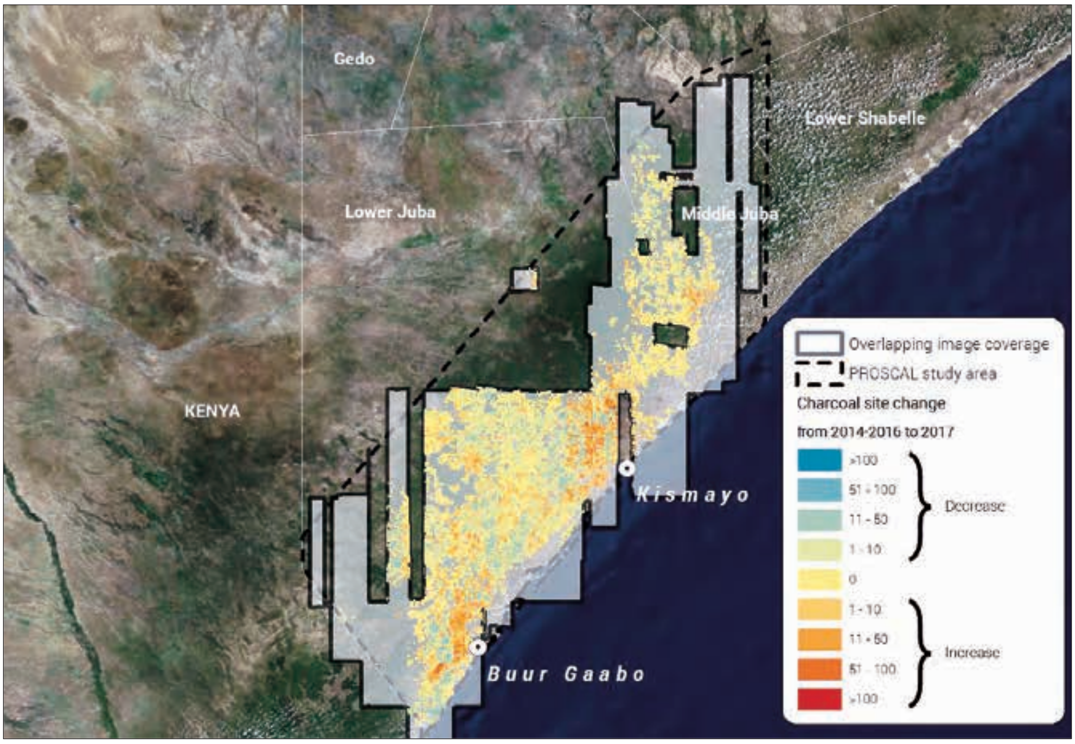


Fig.34 - Change between 2014-2016 and 2017 - © Google Earth

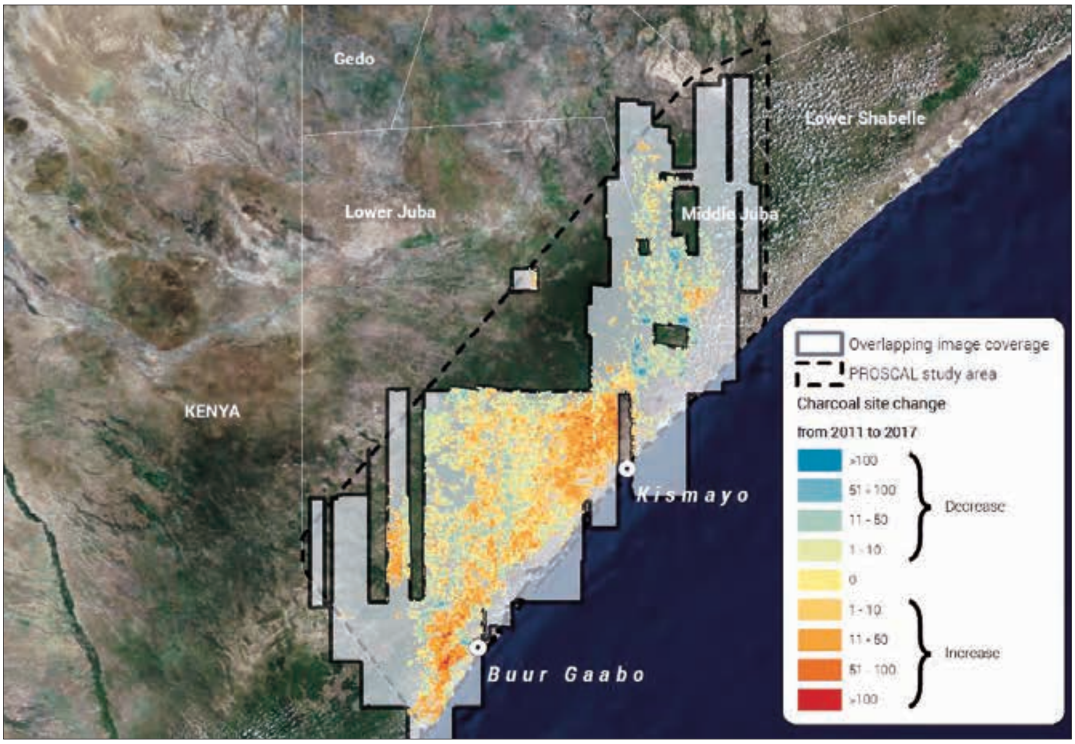


Fig.35 - Overall change between the three periods - © Google Earth

The analysis of production dynamics through the distribution of kilns, from 2011 to 2016 shows an overall shift of charcoal production from the northern portion of the study area towards south, and from 2016 to 2017, a shift from the inland to the coastal area.

During the analysis of VHR images covering the southern portion of the study area, a breach was noted along the Kenya-Somalia border (see Fig.36). Given the shift of the production area southwards, it is possible that the opening was used to smuggle charcoal into Kenya. However, being the economic incentive much lower than exporting it to the Gulf Coastal Countries, it is very likely that only small amounts of charcoal were smuggled this way.

Fig.36 - The figure shows the mosaic of two images taken in the same period (end of 2017) along the Kenya-Somalia border. The red outlined box indicates the point used by trucks to cross the border. Several fresh tracks originating from this point are detected - © [2017] DigitalGlobe

3. Discussion and Recommendations

The loss of tree cover has a negative impact on the environment and consequently on people's lives. For example, the loss of the protective tree layer has a direct consequence of increasing the underlying soil's vulnerability to erosion by exposing it to agents such as desiccating winds and heavy rains (FAO, 2007).

Figure 37, 38 and 39 show, with a clear visual example, the devastating effects of charcoal production in one area of about 500 ha next to Jilib.

Vegetation cover appears almost intact on 2007 images (Fig. 37). It has to be noted that the dark green patches with a smooth texture, visible on the central and right portion of the image, indicates the presence of shrubby dense vegetation, while the lighter green colour with a coarser texture indicates the presence of trees.

In **2012**, the situation has completely changed and the typical pattern of tracks encroaching in the tree covered area is found in most part of the image (Fig. 38). Tracks are made with the purpose of accessing trees and produce charcoal. Note how new roads lead to new charcoal sites following an opportunistic plan to get closer to larger trees.

The light green colour indicates bare soil covered by seasonal grasses, i.e. the areas where trees have been cut. The absence of trees makes these areas very vulnerable as they are subject to further degradation due to surface runoff. During the rainy season the surface layer of fertile soil is constantly washed away. Moreover, increased runoff reduces groundwater recharge, thus lowering the water table, making droughts worse and determining a downward spiral towards an irreversible land degradation.

In **2014** the situation has worsened and the portion of bare soil is wider. It should be noticed that only areas with trees have been selectively affected by charcoal production, while the darker shrubby areas, clearly visible in 2007, have not been touched for obvious reasons, i.e. lower charcoal production. In seven years, about 40% of the area depicted in this example has been deforested.

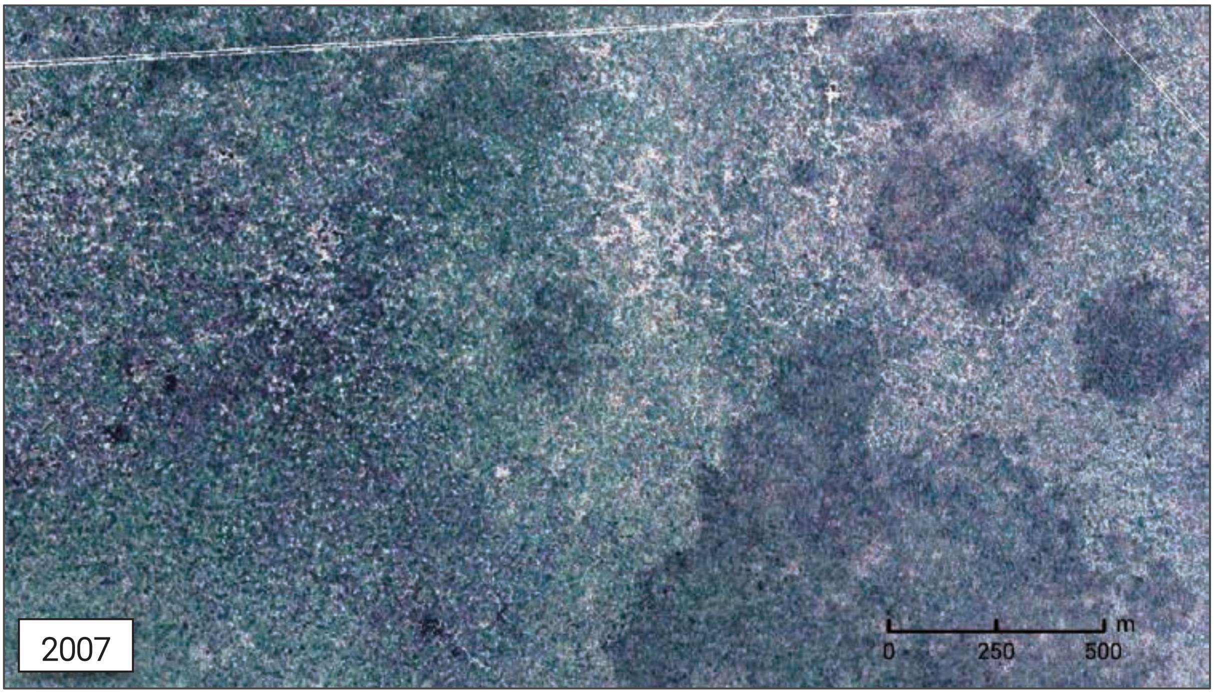


Fig. 37 - Vegetation cover appears almost intact on a 2007 image - © Google Earth

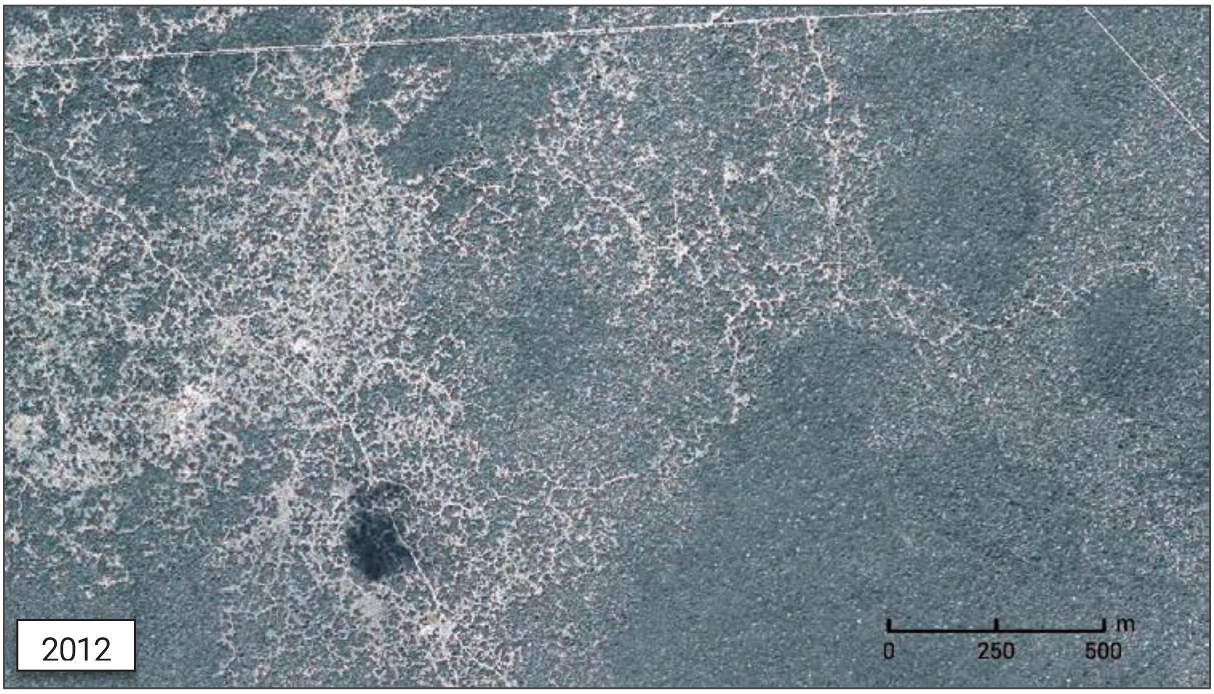


Fig. 38 - Vegetation cover appears degraded and the typical pattern of tracks encroaching in the tree covered area is found in most part of the image - © Google Earth

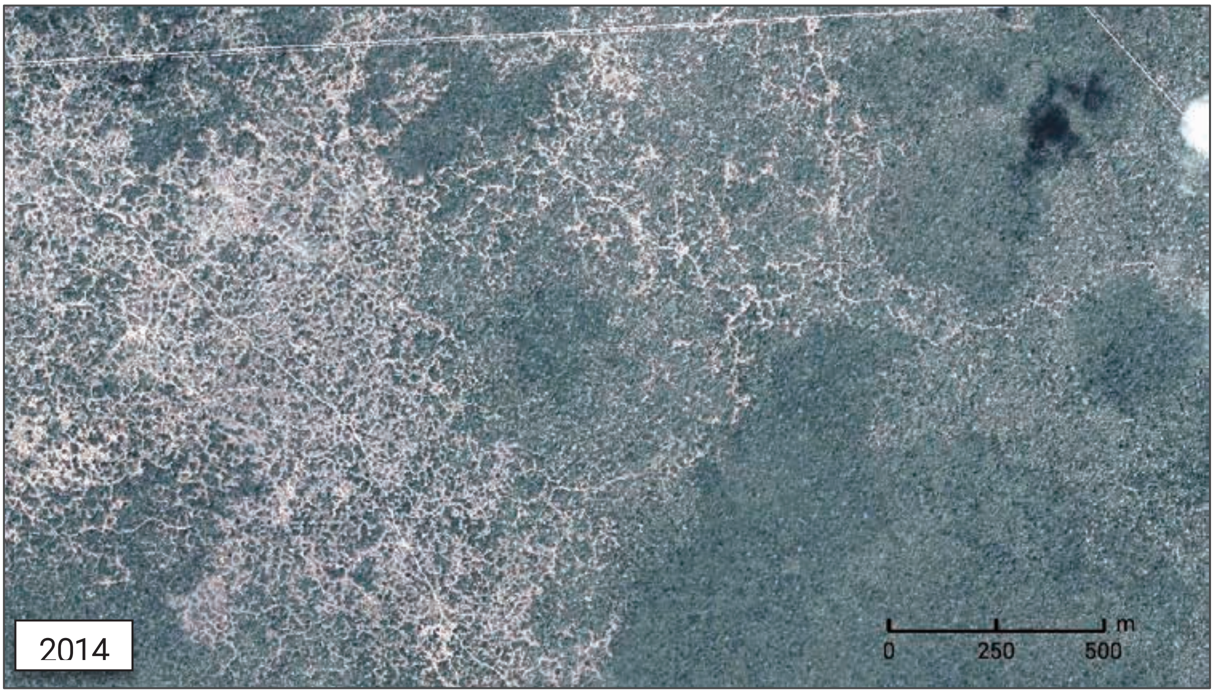


Fig. 39 - Vegetation cover appears even more degraded with a wider portion of bare soil compared to Fig.38 - © Google Earth

A complete list of the resilience effects provided by trees in the dry lands of Eastern Africa was presented in a publication by the World Agroforestry Center (ICRAF, 2014):

- Trees are less unstable than livestock and crops during drought, as their deep rooting system allows access to water resources (not available to other life forms);
- Trees experience little mortality during drought (unlike livestock) and normally recommence full production once drought is over;
- Trees provide goods and services (fodder and forage) during the period at the end of the dry season and the start of the rainy season, when foods from crops and livestock are insufficient to satisfy demand;
- Trees enhance soil fertility by recycling of nutrients from the deep soil horizons to the topsoil layers and by fixating atmospheric nitrogen;
- Trees provide erosion control by reducing water runoff and speed, and thus improving soil moisture and protecting land, making it available for settlement and agriculture;
- Trees sequester carbon and thus can generate income through carbon emission trading system;
- Trees provide wood fuels.

Al-Shabaab is reported to be one of the main actors actively involved in the charcoal production business, together with Kenya Defence Force (KDF) and Interim Jubba Administration, through taxation at checkpoints and ports (UN Security Council, 2011 and 2016), and therefore in the loss of tree cover. Extending the analysis to other parts of the country (depending on image availability) will result in a better overview of charcoal production zones, which could give an indication of Al-Shabaab influence in the region. Nonetheless, also other armed groups may potentially profit from the incomes of large-scale charcoal production and consequently it may not be wise to focus the analysis of charcoal production solely on supposed Al-Shabaab territory.

The information derived from this study cover an unprecedented area of southern Somalia and take into account conservative figures. They provide accurate and crucial information on the magnitude of charcoal production/trade, its spatial origins and the impact in terms of tree loss over a wide timeframe.

The production of an estimate **16 million charcoal bags was calculated for the period 2011-2017**, equivalent to 8 million trees felled just in the area covered by the analysed images within the PROSCAL study area, translating in **one tree cut down every 30 seconds for the past 7 years**. It is exposed that the charcoal production affect most of the study area, with an estimated deforestation rate in the range of 10% - 17.6% over the period 2011 – 2017 that is 1.4% to 2.5% per year.

Locations of charcoal stockpiles are pinpointed and fluctuations in stocks calculated aiming at a better understanding of production and export dynamics. Six major charcoal stockpiles sites were identified, with Kismayo and Buur Gaabo being the most important ones in terms of site extent and amount of charcoal stocked. Stockpiles stored in these two ports showed changes revealing an active trading, regardless the UN Security Council ban on charcoal export from Somalia.

The analysis of the charcoal production dynamics shows that it decreased around Jilib while intensified in areas near Kismayo and Buur Gaabo, which could be explained by the depletion of tree resources in Jilib area and forcing producers to move to more productive areas. Another reason could be of logistic sort, as the new locations are closer to the main active ports used for shipping charcoal overseas.

The analysis of kiln sites distribution per radius size is similar over the 3 periods and 3-meter radius kiln sites appear to be the most common, followed by 4 and 2 meters sites. However, in 2017 was noted that the numbers of 2 m radius kiln sites is higher than those of 4 m radius, as compared to the previous periods. This could be an indication that larger trees are decreasing and hence the production of charcoal is shifting to smaller trees and smaller kilns.

Even though with some limitations, the study helps in exposing the scale of charcoal production and extent of environmental destruction. Hence, these information will facilitate:

- Formulation of environmental policies, mobilization of key stakeholders in the region and building institutional capacity among government entities across Somalia for the effective monitoring and enforcement of the charcoal trade ban. Enforcement of export ban requires effective implementation by recipient UN member states (Gulf countries) and unless the export problem is solved, then the environmental impact cannot be properly addressed;
- Transition towards livelihood options that are sustainable, reliable and more profitable than charcoal production;
- Start of reforestation and afforestation throughout the country for the rehabilitation of degraded lands.

However, the already alarming figures on charcoal produced, could be even more distressing considering the following limitations experienced during the study:

- Partial study area coverage due to lack of images or/and excessive cloud cover on some images.

- Uncertainty of assumptions made: for example, a recent study by UNEP (2015) put the tree-charcoal bag rate to 1 bag per 2 trees in South Sudan, a country with an environment comparable to south Somalia. If this could be the case for south Somalia then, the tree loss would be 4 times higher than currently calculated. In addition, an accurate analysis of the full range of multispectral VHR images available would allow for an improved calculation of tree density (currently in the range 3,400 to 6,000 per km^2) and derived deforestation rate.

Considering the above limitations, in case an improved study is foreseen, it is recommended to:

1) Perform a real case assessment to get precise values linked to charcoal production of a typical Somali kiln. This could help improving previous and current assumptions and overcome the uncertainties encountered in this and other studies. A real case scientific assessment would be a benchmark for future studies on charcoal production.
2) Widen the area of interest using available data on tree-covered areas, in order to monitor all the possible portions of southern Somalia affected by charcoal production.
3) Produce a land cover mapping/change assessment of the new study area to distinguish pure forested areas from shrub lands and/or other land cover features. The change assessment would define the trajectories of changes (for example: forest to bare soil or forest to agriculture, etc.).
4) Acquire all the archived VHR satellite images available covering the area of interest, also considering archives not tapped by this study (for example: Pleiades or Planet VHR satellite images)
5) Define sample areas within the area of interest where to assess the exact amount of trees density, hence to derive precise percentages of tree loss.

Data derived from an improved assessment would provide more accurate and robust information over a larger area.

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- United Nations S/2016/919 - "Letter dated 7 October 2016 from the Chair of the Security Council Committee pursuant to resolutions 751 (1992) and 1907 (2009) concerning Somalia and Eritrea addressed to the President of the Security Council". http://www.un.org/ga/search/view_doc.asp?symbol=S/2016/919
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ANNEX I – Detailed summary of VHR satellite images used to assess area covered by charcoal stockpile in Kismayo by site

Scene name	Year	K1 ~ area # bags	K2 ~ area # bags	K3 ~ area # bags
Multispectral_12JAN30073346-S3DMR1C1	2012	outside image	~5,000 m^2 187,500	n/a
Multispectral_12DEC22	2012	cloud	~7,000 m^2 262,500	n/a
Panchromatic_15JAN11082914-P3DSR1C1	2015	~2,500 m^2 93,750	n/a	~6,000 m^2 225,000
Panchromatic_15FEB19082538-P3DSR1C1	2015	cloud	n/a	Cloud
Multispectral_15MAR27074806-S3DMR1C1	2015	~4,000 m^2 150,000	n/a	~6,500 m^2 243,750
Multispectral_15APR07074154-S3DMR1C1	2015	~3,000 m^2 112,500	n/a	~4,000 m^2 150,000
Multispectral_15AUG31075247-S3DMR1C1	2015	Cloud	n/a	~3,000 m^2 112,500
Multispectral_15SEP16073443-S3DMR1C1	2015	Cloud	n/a	~5,000 m^2 187,500
Panchromatic_15NOV02094014-P3DSR1C1	2015	Cloud	n/a	~6,000 m^2 225,000
Panchromatic_15DEC23094144-P3DSR1C1	2015	cloud	n/a	Cloud
Panchromatic_16JAN17095515-P3DSR1C1	2016	~5,500 m^2 206,250	n/a	~6,000 m^2 225,000
Panchromatic_16MAR20101156-P3DSR1C1	2016	Cloud	n/a	~5,000 m^2 187,500
Multispectral_16APR13072224-S3DMR1C1	2016	~5,000 m^2 187,500	n/a	~5,000 m^2 187,500
Multispectral_16MAY19074434-S3DMR1C1	2016	~4,500 m^2 168,750	n/a	~2,500 m^2 93,750
Multispectral_16JUN17072427-S3DMR1C1	2016	~3,500 m^2 131,250	n/a	~3,000 m^2 112,500

Panchromatic_16JUN30102846-P3DSR1C1	2016	outside image	n/a	~3,500 m^2 131,250
Multispectral_16JUL25072224-S3DMR1C1	2016	~3,500 m^2 131,250	n/a	~1,500 m^2 56,250
Multispectral_16SEP09072512-S3DMR1C1	2016	~2,000 m^2 75,000	n/a	~1,000 m^2 37,500
Panchromatic_16OCT03103010-P3DSR1C1	2016	~2,500 m^2 93,750	n/a	~1,500 m^2 56,250
Multispectral_16OCT25072719-S3DMR1C1	2016	cloud	n/a	~2,000 m^2 75,000
Panchromatic_16NOV06103408-P3DSR1C1	2016	outside image	n/a	~3,000 m^2 112,500
Multispectral_16NOV26074432-S3DMR1C1	2016	cloud	n/a	~3,500 m^2 131,250
Panchromatic_16DEC27103751-P3DSR1C2	2016	~5,000 m^2 187,500	n/a	~4,000 m^2 150,000
Multispectral_17JAN06073300-S3DMR1C2	2017	~5,000 m^2 187,500	n/a	~4,000 m^2 150,000
Panchromatic_17JAN22103140-P3DSR1C2	2017	~5,000 m^2 187,500	n/a	cloud
Multispectral_17FEB13072929-S3DMR1C2	2017	cloud	n/a	cloud
Panchromatic_17MAR31103342-P3DSR1C2	2017	cloud	n/a	~3,500 m^2 131,250
Multispectral_17APR19072937-S3DMR1C2	2017	~5,000 m^2 187,500	n/a	outside image
Panchromatic_17JUN24103552-P3DSR1C2	2017	~3,500 m^2 131,250	n/a	~2,500 m^2 93,750
Multispectral_17NOV01_R1C1-R1C2	2017	~7,500 m^2 281,250	n/a	~4,500 m^2 168,750
Panchromatic_17NOV20_R2C1-R1C2-R2C2	2017	~6,500 m^2 243,750	n/a	~4,500 m^2 168,750
Multispectral_18JAN06_R8C1-R8C2	2018	~6,500 m^2 243,750	n/a	~4,500 m^2 168,750

ANNEX II – List of VHR satellite images used to detect charcoal sites and stockpiles

LEGEND
2017
2014-2016
2011-203
Stockpiles

FID	Satellite Source	Acquisition Date	Product Type	Cloud Cover (%)	Off Nadir Angle	Sun Elevation	Sun Azimuth	GSD (m)	Feature Id	Parent Id
1	**WV02**	2017-12-30T07:37:09.142Z	Pan Sharpened Natural Color	**13.1**	28.0	57.1	137.0	0.5	f6131fb5b2473bdc99b06f9fa7c0b4ef	
2	**GE01**	2017-12-20T07:27:00.685Z	Pan Sharpened Natural Color	**6.1**	24.0	56.3	136.3	0.49	aeb24e653831c34f723c967af129b378	
3	**WV02**	2017-12-11T07:35:23.614Z	Pan Sharpened Natural Color	**31.0**	28.2	58.7	139.0	0.5	c275cb83f7249bf527e9d272bd4d240e	
4	**WV03_VNIR**	2017-12-06T07:56:30.869Z	Pan Sharpened Natural Color	**32.3**	25.6	62.4	146.5	0.36	020ccc7544c92b002e8ab03fb89a1867	
5	**WV01**	2017-10-17T10:35:11.803Z	Panchromatic	**15.1**	22.6	62.9	247.0	0.5	29fa960b04081054bc488a7963e0e851	
6	**WV01**	2017-10-17T10:34:50.203Z	Panchromatic	**15.8**	17.4	63.1	246.8	0.5	f1df7a3393bd575a114e72b9ef8339b9	
7	**WV02**	2017-10-04T07:35:20.093Z	Pan Sharpened Natural Color	**34.0**	24.1	68.6	105.0	0.5	578ec9aba2603b7d77d14d1437dcce76	
8	**WV01**	2017-09-17T10:35:50.552Z	Panchromatic	**0.1**	26.4	66.9	273.8	0.5	dbe3cd19693dc3b352a9fccda4004bc7	
9	**WV01**	2017-09-17T10:35:36.902Z	Panchromatic	**0.0**	15.9	67.1	275.3	0.5	134173ce3527e9c1654cb45ff438baf3	
10	**GE01**	2017-08-22T07:27:06.485Z	Pan Sharpened Natural Color	**23.1**	27.7	62.0	66.6	0.5	6d233cf4d08a1c46fb6fd33667a52d23	
11	**WV01**	2017-08-18T10:37:04.374Z	Panchromatic	**22.4**	27.3	65.8	301.4	0.5	e97b54f8f9f598c7b7b18e2e1c0a24b6	
12	**WV01**	2017-08-18T10:36:51.374Z	Panchromatic	**36.8**	26.5	66.3	300.4	0.5	558234bae0db24d6fc35f82337e80c31	
13	**GE01**	2017-08-17T07:44:00.285Z	Pan Sharpened Natural Color	**19.7**	12.0	62.3	57.6	0.42	32f99ae9664f11c3101689ec0d3bc369	
14	**GE01**	2017-08-14T07:33:50.685Z	Pan Sharpened Natural Color	**47.7**	24.6	59.5	58.5	0.48	50f56cedde62e123f61e3f0d49d56d0c	
15	**GE01**	2017-07-26T07:36:19.484Z	Pan Sharpened Natural Color	**6.6**	19.6	57.0	50.0	0.5	18981b8f080588bc7555b3d3added366	
16	**GE01**	2017-07-15T07:32:36.485Z	Pan Sharpened Natural Color	**15.0**	25.8	55.4	47.7	0.5	1a35e7143b1af3c914bcbc140f5c8828	
17	**WV03_VNIR**	2017-06-14T07:49:46.738Z	Pan Sharpened Natural Color	**49.1**	27.3	60.2	38.8	0.38	5f43aef178b6f35c79d98449b0d9182b	
18	**WV03_VNIR**	2017-06-08T07:53:18.571Z	Pan Sharpened Natural Color	**36.0**	23.5	61.1	38.0	0.36	c3fc344e53e94bf87f36a76cb4ef2b8d	

19	**WV03_VNIR**	2017-06-08T07:53:01.494Z	Pan Sharpened Natural Color	**29.9**	19.0	61.1	37.9	0.34	8c69d24b7dac4edd053b8ce0c23439eb	
20	**WV03_VNIR**	2017-06-08T07:52:48.683Z	Pan Sharpened Natural Color	**30.6**	18.2	61.1	37.9	0.34	14a2dc2d39d942cdefc4de4daf4f3c2c	
21	**WV03_VNIR**	2017-06-08T07:52:31.844Z	Pan Sharpened Natural Color	**43.3**	21.8	61.1	37.9	0.35	c2e0025079eed9361c6a4d6e91ed1d52	
22	**GE01**	2017-06-07T07:37:07.885Z	Pan Sharpened Natural Color	**26.0**	20.0	57.2	43.7	0.5	65921dfb4f6360c0ccc2caffe62a6cd2	
23	**WV02**	2017-06-04T07:30:25.321Z	Pan Sharpened Natural Color	**25.5**	26.7	57.8	44.8	0.5	964e067674d4094acce1e3c0893c28fd	
24	**GE01**	2017-05-14T07:55:21.885Z	Pan Sharpened Natural Color	**9.2**	29.6	64.7	42.6	0.5	b630da6db00f3387c6f153812d7cca00	
25	**WV03_VNIR**	2017-05-14T07:51:19.147Z	Pan Sharpened Natural Color	**30.3**	24.8	64.4	43.7	0.36	40373369e066304b811a3610fc864e59	
26	**WV02**	2017-04-27T07:35:27.565Z	Pan Sharpened Natural Color	**12.7**	25.1	61.8	55.7	0.5	daf7047922138c6f3a6aac9916e076d6	
27	**WV02**	2017-04-19T07:30:35.254Z	Pan Sharpened Natural Color	**1.5**	26.9	63.2	63.7	0.5	707455c566fa3dedcc7b82119c615c59	
28	**WV02**	2017-04-19T07:29:37.404Z	Pan Sharpened Natural Color	**13.5**	28.8	62.9	64.1	0.5	c334456e8387253f5be7f15baa535cb3	
29	**WV03_VNIR**	2017-04-01T07:57:45.166Z	Pan Sharpened Natural Color	**20.5**	19.8	70.2	75.4	0.33	449467b0aeb7045f76e85f72dd54b696	
30	**WV02**	2017-03-31T07:30:39.526Z	Pan Sharpened Natural Color	**0.2**	26.5	64.1	82.7	0.5	f06707889d0fbce0a6b79d96efebe728	
31	**WV02**	2017-03-25T07:52:25.617Z	Pan Sharpened Natural Color	**11.2**	15.9	67.8	80.8	0.5	af3e4734d36504aa7422039729cc11b6	
32	**WV02**	2017-03-25T07:52:06.018Z	Pan Sharpened Natural Color	**6.0**	23.2	67.8	80.8	0.5	869ecce0dcd7708cf053b0b8e3bd546c	
33	**WV03_VNIR**	2017-03-19T07:49:17.779Z	Pan Sharpened Natural Color	**26.7**	28.2	67.5	89.2	0.38	3b1d19b587935d4199f2162ebe567488	
34	**WV03_VNIR**	2017-03-19T07:49:06.029Z	Pan Sharpened Natural Color	**49.7**	28.2	67.5	89.9	0.39	de54ce04c1d1e09d5a7340a45ca43173	
35	**WV03_VNIR**	2017-03-13T07:52:39.636Z	Pan Sharpened Natural Color	**3.7**	21.0	68.2	95.6	0.35	496c454e1736693adace7fc173d748fc	
36	**WV03_VNIR**	2017-03-13T07:52:22.936Z	Pan Sharpened Natural Color	**25.5**	20.1	68.0	96.9	0.34	9227524b83c23b84884c9a2f6921971b	
37	**WV02**	2017-03-09T07:43:34.423Z	Pan Sharpened Natural Color	**13.7**	11.1	64.5	97.4	0.5	67455541e8b857a018065358d130460a	
38	**GE01**	2017-03-01T07:36:28.485Z	Pan Sharpened Natural Color	**0.6**	16.3	63.0	108.2	0.5	ae4d651e4cc210961f4468bd573912eb	
39	**WV02**	2017-02-21T07:34:21.749Z	Pan Sharpened Natural Color	**7.3**	22.7	60.7	108.7	0.5	4ca535b5041b6999dc861c1a9c54199f	
40	**GE01**	2017-02-18T07:32:29.485Z	Pan Sharpened Natural Color	**16.3**	27.3	59.3	111.0	0.5	739e145dcfdf6c230b172e22d2d2b2df	
41	**WV02**	2017-02-13T07:29:29.788Z	Pan Sharpened Natural Color	**36.2**	26.4	58.8	115.8	0.5	677bbdd6691a1fe56bafaab25aa34ae4	

42	**WV03_VNIR**	2017-02-10T07:53:07.868Z	Pan Sharpened Natural Color	**36.3**	28.1	63.4	120.5	0.39	c0ff87bf43530488d7bb26db033bda0d	
43	**WV03_VNIR**	2017-02-04T07:55:36.974Z	Pan Sharpened Natural Color	**20.3**	19.7	62.5	125.1	0.34	bb19f2e83feec06789b2e00bb3beb203	
44	**WV03_VNIR**	2017-02-04T07:55:13.024Z	Pan Sharpened Natural Color	**10.3**	21.7	62.2	125.4	0.35	c14603f5193fbc87d5203fc38bb6dc5d	
45	**WV02**	2017-02-02T07:34:38.572Z	Pan Sharpened Natural Color	**3.7**	11.3	58.3	126.1	0.5	03342287b16cef48ec7b83ab9408ae2b	
46	**WV02**	2017-02-02T07:34:03.371Z	Pan Sharpened Natural Color	**0.5**	24.3	57.9	125.7	0.5	28eba1eace902034cf45cb100062761e	
47	**GE01**	2017-01-30T07:34:09.685Z	Pan Sharpened Natural Color	**13.2**	21.5	57.9	121.7	0.5	330d43ac8b976ad1b2735add3303feb8	
48	**WV02**	2017-01-25T07:30:38.261Z	Pan Sharpened Natural Color	**16.6**	28.0	56.4	124.8	0.5	5f6e2ba14e831992140f452679f070b4	
49	**WV02**	2017-01-22T07:40:04.705Z	Pan Sharpened Natural Color	**0.1**	23.2	57.7	132.0	0.5	7af0f542fda072076e8125992ace0aff	
50	**WV03_VNIR**	2017-01-17T08:04:13.193Z	Pan Sharpened Natural Color	**16.6**	3.6	61.4	138.1	0.31	21ed1dc5ca98b918ecd11f5832b89a0d	
51	**WV03_VNIR**	2017-01-16T07:49:00.394Z	Pan Sharpened Natural Color	**29.9**	26.3	59.5	134.6	0.37	3295cfbc09027ea19f9bfe5c3acfc10e	
52	**WV03_VNIR**	2017-01-11T08:07:37.550Z	Pan Sharpened Natural Color	**4.3**	19.5	61.6	142.8	0.34	2cacbdc5918c9c2166fe6c1380436b2b	
53	**GE01**	2017-01-11T07:35:47.485Z	Pan Sharpened Natural Color	**2.3**	11.4	57.1	133.1	0.5	534798288cf30e14e5076271e5bb9645	
54	**WV03_VNIR**	2017-01-10T07:52:13.901Z	Pan Sharpened Natural Color	**18.7**	25.2	59.7	136.4	0.37	5843189fb12063ce7bc7200be46f6dc1	
55	**WV01**	2017-01-09T10:35:20.745Z	Panchromatic	**6.9**	24.2	61.6	219.4	0.5	2bf8a611f48351cc75e559c2b7ea9d89	
56	**WV01**	2017-01-09T10:35:05.594Z	Panchromatic	**3.7**	19.5	61.6	219.6	0.5	eb5944176624f78f3900b02ae272cc51	
57	**WV01**	2017-01-09T10:34:50.745Z	Panchromatic	**2.8**	20.2	61.5	219.7	0.5	937f24a1124be63ed384dffcedf1f333	
58	**WV02**	2016-12-18T07:34:08.204Z	Pan Sharpened Natural Color	**21.2**	24.6	57.0	137.9	0.5	b4f78d900096bb7fed60e26d81c628e5	
59	**WV02**	2016-12-18T07:33:50.404Z	Pan Sharpened Natural Color	**12.4**	19.8	57.0	138.0	0.5	7c47bfc5a575c867824058302b892be0	
60	**WV02**	2016-12-07T07:40:18.617Z	Pan Sharpened Natural Color	**17.7**	22.5	59.0	139.7	0.5	151c0e76ecab3d374c61d436453af65c	
61	**WV02**	2016-10-30T07:42:54.612Z	Pan Sharpened Natural Color	**26.9**	19.1	66.8	129.3	0.5	e0a0c0c9ada4fd2b4ed0fb92f557d145	
62	**WV02**	2016-10-30T07:42:35.961Z	Pan Sharpened Natural Color	**15.2**	10.6	66.7	129.0	0.5	f6a743f1f63baa4d88cac8a78e48897f	
63	**WV02**	2016-10-30T07:42:35.961Z	Pan Sharpened Natural Color	**15.2**	10.6	66.7	129.0	0.5	f6a743f1f63baa4d88cac8a78e48897f	
64	**WV02**	2016-10-22T07:38:53.350Z	Pan Sharpened Natural Color	**21.7**	24.3	67.8	118.0	0.5	b069becbe937390c9bd6f4a5dd75c3ad	

65	**WV03_VNIR**	2016-10-16T08:01:32.591Z	Pan Sharpened Natural Color	**35.4**	14.6	73.3	125.3	0.33	00ad0bae7d8695c4b7a999ef767d0b41	
66	**WV03_VNIR**	2016-10-09T07:48:22.598Z	Pan Sharpened Natural Color	**33.1**	22.7	71.5	112.3	0.36	9729a15172f4fc00e506959b3ff95d38	
67	**WV01**	2016-10-03T10:30:10.415Z	Panchromatic	**4.3**	27.9	66.8	260.4	0.5	76cf87bd1653469edbac79342b77a34d	
68	**WV03_VNIR**	2016-09-21T07:56:07.167Z	Pan Sharpened Natural Color	**5.8**	5.2	73.3	93.1	0.31	bf5d99402ef6368e9e13bdc7a25cce6f	
69	**WV01**	2016-09-07T10:34:11.805Z	Panchromatic	**1.8**	23.9	67.9	288.4	0.5	36b9401bd71335a67529823374555219	
70	**WV02**	2016-08-21T07:26:31.160Z	Pan Sharpened Natural Color	**14.7**	27.5	60.7	63.9	0.5	f8d5dd0e0bf335dc200e1dc92b444716	
71	**GE01**	2016-08-20T07:41:32.485Z	Pan Sharpened Natural Color	**8.8**	20.2	63.7	60.1	0.5	1bf1015dcf590d735b080130c350da50	
72	**WV01**	2016-06-08T10:37:47.309Z	Panchromatic	**31.2**	13.8	58.5	321.0	0.5	183a994a3ac1314e4957a78b3b83c50f	
73	**WV01**	2016-06-04T10:31:10.770Z	Panchromatic	**12.4**	14.0	59.7	321.6	0.5	5b45acd9ac678554fa7201c41448439d	
74	**WV01**	2016-05-31T10:24:07.479Z	Panchromatic	**3.3**	29.0	60.5	323.9	0.5	3551f2139acf59f6fc1aa09965d91936	
75	**WV02**	2016-05-31T07:51:30.968Z	Pan Sharpened Natural Color	**3.5**	25.7	60.2	39.7	0.5	a49e267ecce3572996b471b5cb71294f	
76	**WV02**	2016-05-26T07:35:36.361Z	Pan Sharpened Natural Color	**26.0**	7.6	58.2	45.6	0.5	8d7270581a7d152e02aa52b116a95b36	
77	**WV01**	2016-05-14T10:19:27.948Z	Panchromatic	**10.0**	27.7	63.4	320.4	0.5	5bd20866ea9ad24a7d5c0511d9855b8d	
78	**GE01**	2016-05-03T07:36:46.485Z	Pan Sharpened Natural Color	**31.7**	21.0	64.1	55.2	0.5	6a78a0474b60d8a8354972153a338436	
79	**WV02**	2016-04-13T07:22:30.599Z	Pan Sharpened Natural Color	**15.8**	26.6	61.7	69.7	0.5	55ee56fdc4fdcf20e65fe04fb71abad8	
80	**WV02**	2016-04-13T07:22:18.399Z	Pan Sharpened Natural Color	**20.7**	25.2	61.5	69.8	0.5	188571082c2b49b46613316719f64eb1	
81	**WV01**	2016-03-20T10:12:26.510Z	Panchromatic	**6.2**	18.2	77.2	277.1	0.5	3e166e64825b105c1617b22cd61b40fd	
82	**WV01**	2016-03-16T10:06:01.770Z	Panchromatic	**19.1**	26.7	79.2	269.9	0.5	c3483867425b05c1e8aeba8b583e5c3c	
83	**WV01**	2016-03-16T10:05:31.169Z	Panchromatic	**41.6**	27.0	79.0	264.8	0.5	e72beee503fd4de34b9fd4dfe0b6ebd2	
84	**GE01**	2016-03-15T07:39:59.085Z	Pan Sharpened Natural Color	**0.6**	21.5	65.0	95.1	0.5	bd17f236b24427f42a26f9b560704728	
85	**GE01**	2016-03-15T07:39:36.885Z	Pan Sharpened Natural Color	**0.5**	10.4	65.0	95.1	0.5	b16b8e91f0cad7a16d1e7186808b501c	
86	**WV02**	2016-03-06T07:23:41.794Z	Pan Sharpened Natural Color	**2.6**	25.1	59.6	100.0	0.5	0576a6f97c95dfe56d4be70069fccc53	
87	**GE01**	2016-02-28T07:52:40.685Z	Pan Sharpened Natural Color	**6.5**	27.2	66.0	110.5	0.5	eb9b3539793246fb169def1c8431187c	
88	**GE01**	2016-02-28T07:51:40.284Z	Pan Sharpened Natural Color	**8.5**	26.7	65.6	111.0	0.5	0cc64380b6033b05f8aa4a8655f51f71	

89	**WV01**	2016-02-24T09:54:48.472Z	Panchromatic	**4.8**	27.6	76.8	219.6	0.5	ebe8861057ed3a3901d691cc95f5f39a	
90	**WV02**	2016-02-24T07:29:42.129Z	Pan Sharpened Natural Color	**0.7**	22.5	59.3	108.3	0.5	f0c9a91c300423e5c9a82f7ce777431b	
91	**GE01**	2016-02-22T07:32:38.085Z	Pan Sharpened Natural Color	**11.1**	16.5	60.4	113.4	0.5	1776d3ad6b118985ee2d0fa85630e0df	
92	**WV03_VNIR**	2016-02-21T07:52:29.688Z	Pan Sharpened Natural Color	**0.0**	19.6	64.6	117.3	0.34	6517b6e17bda914f7705048d3ff1c120	
93	**WV03_VNIR**	2016-02-21T07:52:04.089Z	Pan Sharpened Natural Color	**0.1**	4.9	64.6	117.3	0.31	0255841b98fc9b4fe4d3bd46d1d58b68	
94	**WV03_VNIR**	2016-02-21T07:51:39.189Z	Pan Sharpened Natural Color	**0.3**	11.1	64.6	117.3	0.32	4b2134f3a0ccd68c0eca671e4b90099c	
95	**WV02**	2016-02-21T07:39:36.625Z	Pan Sharpened Natural Color	**1.1**	7.6	61.8	112.0	0.5	d6f12a8afc16ff5fe8dbed2869c5f7f0	
96	**WV02**	2016-02-21T07:39:17.475Z	Pan Sharpened Natural Color	**2.3**	14.1	61.8	112.1	0.5	12fb7fbe107cc2d596801eb730a1040e	
97	**WV01**	2016-02-19T10:13:25.534Z	Panchromatic	**3.9**	17.5	74.5	225.1	0.5	21d1e0162bc7f2d7d000240834d1e284	
98	**WV02**	2016-02-18T07:50:49.220Z	Pan Sharpened Natural Color	**0.3**	25.4	63.0	115.7	0.5	1c51819d66199be3df24f4e36e4853b9	
99	**GE01**	2016-02-17T07:49:29.485Z	Pan Sharpened Natural Color	**0.0**	22.3	63.3	120.5	0.5	dc884063f27130dbd2aa9e0ae49019f7	
100	**GE01**	2016-02-17T07:49:11.285Z	Pan Sharpened Natural Color	**0.0**	19.8	63.2	120.7	0.5	31c1156b74eb7ee636095cd229f621df	
101	**WV02**	2016-02-16T07:24:27.616Z	Pan Sharpened Natural Color	**6.9**	21.6	57.8	113.0	0.5	0a356c474438ef44ad58d98d7eda4eab	
102	**GE01**	2016-02-14T07:40:33.885Z	Pan Sharpened Natural Color	**1.3**	21.4	60.7	118.2	0.5	13195f16e015f2f807d87a8517a1cfcf	
103	**WV03_VNIR**	2016-02-09T08:02:21.701Z	Pan Sharpened Natural Color	**2.2**	27.6	64.7	129.3	0.38	6469d734a2a647fcd15e91d0ea4c2c53	
104	**WV02**	2016-01-22T07:45:57.208Z	Pan Sharpened Natural Color	**0.0**	25.4	58.7	133.4	0.5	b870625d1bb4bd17f035c18c1854816c	
105	**WV02**	2016-01-22T07:45:57.208Z	Pan Sharpened Natural Color	**0.0**	25.4	58.7	133.4	0.5	b870625d1bb4bd17f035c18c1854816c	
106	**WV02**	2016-01-22T07:45:39.009Z		**0.0**	20.7	58.5	133.1	0	d2b2e0fcd3e948a88d949da14a37cc79	4cf98585a4a2828835258a65baf47341
107	**WV02**	2016-01-22T07:45:20.608Z		**0.2**	18.3	58.4	132.8	0	34b8ca3d7a2c45f43608c3e25b3cbbb2	4cf98585a4a2828835258a65baf47341
108	**WV02**	2016-01-17T07:31:02.052Z	Pan Sharpened Natural Color	**0.1**	23.5	56.3	130.4	0.5	bb3a34f4d0515fec5c2a50ceee3c1a98	
109	**Multiple**	2016-01-17T07:30:48.802Z	Pan Sharpened Natural Color	**1.6**	0.0	0.0	0.0	0.5	cd58e822f9360b3c3f71664a1292a375	
110	**WV01**	2015-10-20T09:44:07.374Z	Panchromatic	**1.0**	26.1	75.6	231.9	0.5	816f8dcb2c4933fbc1947449e193f9da	
111	**WV02**	2015-03-16T07:53:10.594Z	Pan Sharpened Natural Color	**0.4**	17.5	67.7	92.9	0.5	1205fb0324f1850f4a2d4d7721c0b616	
112	**WV02**	2015-03-05T08:00:22.028Z	Pan Sharpened Natural Color	**0.0**	27.1	68.3	108.0	0.5	53618f859311b4edbe54c7a0bee012ae	

113	**WV01**	2015-02-23T08:31:23.733Z	Panchromatic	**0.0**	17.6	73.1	128.2	0.5	a006199fdef12d8ce8ac6d3a260d8509	
114	**WV02**	2015-02-12T07:35:51.597Z		**0.0**	25.0	59.9	119.8	0	8eb330deadeb4979bf48b3b204fd8766	505850cc57e9be9cd16594b17802309e
115	**WV02**	2015-02-12T07:35:39.197Z		**0.4**	23.7	59.7	119.6	0	3ec90e7d35f69f986a916bac5e5d46c1	505850cc57e9be9cd16594b17802309e
116	**WV02**	2015-02-12T07:35:39.197Z	Pan Sharpened Natural Color	**0.7**	23.7	59.7	119.6	0.5	794bed2d6cf8dd9bc78e10cdc260cb3c	
117	**WV02**	2015-02-12T07:35:26.848Z	Pan Sharpened Natural Color	**1.2**	23.8	59.6	119.5	0.5	341d6024a7124aea9fa37d401bffbbdc	
118	**WV02**	2015-02-12T07:35:26.848Z		**0.7**	23.8	59.5	119.5	0	911b09f4541e0bd7824ac27018f8e211	505850cc57e9be9cd16594b17802309e
119	**WV02**	2015-02-12T07:35:14.348Z		**8.5**	25.2	59.4	119.3	0	ae40cff364e10ef97a394ba12e7eb589	505850cc57e9be9cd16594b17802309e
120	**GE01**	2015-01-20T07:33:33.085Z	Pan Sharpened Natural Color	**0.3**	24.9	56.3	128.9	0.5	9d8fc402a4082bbcc8761041ac5a1ad3	
121	**WV03**	2015-01-12T07:31:49.543Z		**0.3**	13.0	55.0	132.6	0	fcb57c5502b3b60a7f79144ac6dc4c84	4cf98585a4a2828835258a65baf47341
122	**WV03**	2015-01-12T07:31:25.293Z		**0.0**	21.2	55.0	132.5	0	ac2a8bb2f2fab208e5351f0a9109062c	4cf98585a4a2828835258a65baf47341
123	**WV03**	2015-01-12T07:31:02.993Z		**0.0**	27.9	55.1	132.5	0	8e5f05f29794b7cca046251895b427be	4cf98585a4a2828835258a65baf47341
124	**WV02**	2013-09-28T07:46:24.217Z		**0.8**	27.9	70.7	91.4	0	0dff4790dd2e92dbf1fba7df0b1c4182	3a0e4939a48af0ec79f1df223b68bb81
125	**WV01**	2013-03-25T07:35:25.492Z	Panchromatic	**30.3**	21.2	64.8	86.6	0.5	47d9713ac9343499b4067789d62b5e05	
126	**WV01**	2013-02-23T07:43:23.058Z		**0.0**	24.2	62.9	112.5	0	adb4d0e5425c8ab09f1e30f373da3202	7eda794323eb6a1b2957038091d8695d
127	**WV01**	2013-02-23T07:43:10.004Z		**0.0**	16.9	63.0	112.5	0	64fa24daeb731c357fb4adb0479b65f5	7eda794323eb6a1b2957038091d8695d
128	**WV01**	2013-02-23T07:42:55.082Z		**0.0**	4.3	63.1	112.6	0	c03e320ed00b44aec514e684179c6101	7eda794323eb6a1b2957038091d8695d
129	**WV01**	2013-02-23T07:42:41.372Z		**0.0**	3.7	63.0	113.3	0	97ae0e931384a620187535138baad098	e6503e54c0dba7bbdd911567b4d9f16c
130	**WV01**	2013-02-19T07:37:31.975Z	Panchromatic	**0.0**	22.2	61.2	115.0	0.5	4ba843a0df3f5c8f1c15c7502da3af15	
131	**WV01**	2013-02-19T07:37:31.975Z		**0.0**	22.7	61.2	115.1	0	e43af89e981a3cc5534e7d5c908d1d68	e6503e54c0dba7bbdd911567b4d9f16c
132	**WV01**	2013-02-19T07:37:17.435Z	Panchromatic	**0.0**	14.9	61.3	115.0	0.5	7db9421380f2a8a7c90de3f471b20f85	
133	**WV01**	2013-02-19T07:37:17.435Z		**0.0**	15.9	61.3	115.2	0	7dc34956d650925298fd4b519fc6e7ea	e6503e54c0dba7bbdd911567b4d9f16c
134	**WV01**	2013-02-19T07:37:02.933Z		**0.0**	13.0	61.3	115.3	0	e2d5d9ebfc96535816813e7b2b00cb8d	e6503e54c0dba7bbdd911567b4d9f16c
135	**WV01**	2013-02-19T07:36:49.022Z	Panchromatic	**7.7**	18.9	61.5	115.2	0.5	acab121b21bbda8d7b627a967fa3229d	
136	**WV02**	2013-02-17T08:02:23.782Z	Pan Sharpened Natural Color	**18.2**	24.1	66.0	119.1	0.5	dd6439a967804bc8e9d54e8003c1f274	
137	**WV02**	2013-02-17T08:00:57.783Z		**0.0**	7.8	65.7	121.9	0	e0069d24f499d97652509061c88d6dec	0de31f7e0c9a39e3bfbe6c4ad36ccc8a
138	**WV02**	2013-02-17T08:00:39.983Z		**0.0**	14.5	65.6	121.7	0	62b24b638d14a9f511ec39f616b1d804	0de31f7e0c9a39e3bfbe6c4ad36ccc8a
139	**WV02**	2013-02-17T08:00:23.044Z		**0.0**	24.3	65.4	121.4	0	c05ce990d3aff2749b822ec38cf381c6	0de31f7e0c9a39e3bfbe6c4ad36ccc8a

140	**WV02**	2013-01-24T07:46:46.156Z		**3.8**	28.8	59.6	131.2	0	078650e3972dbd645da1fb1367f2fa9f	b98c0974be693177c06a21b84c9f4373
141	**WV02**	2013-01-24T07:46:46.156Z		**3.8**	28.8	59.6	131.2	0	078650e3972dbd645da1fb1367f2fa9f	b98c0974be693177c06a21b84c9f4373
142	**WV01**	2013-01-20T07:44:48.305Z	Panchromatic	**9.3**	19.0	58.7	130.2	0.5	c4f48698cffdf62c4698ab140235fc44	
143	**WV01**	2013-01-20T07:44:34.062Z	Panchromatic	**14.0**	9.1	58.8	130.3	0.5	4d802fe51ebee8e7be76eec65bd38698	
144	**WV02**	2013-01-18T08:08:47.238Z		**4.0**	28.5	63.5	138.6	0	2e79d45cc5f790b8f3b552059bbe0693	763bd2badbd5d178c0fc6c976eb993c2
145	**WV02**	2013-01-18T08:07:40.838Z	Pan Sharpened Natural Color	**0.0**	23.7	62.1	142.8	0.5	cc0e77ec0778287515ab44160bf196fc	
146	**WV02**	2013-01-10T08:03:18.627Z		**4.4**	14.4	61.7	138.4	0	18d972dc13367bb9bff16e051c48f60a	dce0cdd9a92d45ff631b11371f6c4b3c
147	**WV01**	2012-12-30T07:38:18.060Z		**0.9**	23.4	56.9	136.7	0	eb91f9c26769e84a6c5c201bae2dae5c	7eda794323eb6a1b2957038091d8695d
148	**WV02**	2012-12-25T07:53:27.804Z		**0.0**	27.2	60.9	139.8	0	2d07a756d5a8a9dd2100642d2e09e3f1	6d4c61a84fcd07a7dc20a1a17148cd44
149	**WV01**	2012-12-17T07:42:04.769Z		**4.7**	20.4	59.6	137.1	0	04edc588f87d1b546f1271687556ddb7	3a0e4939a48af0ec79f1df223b68bb81
150	**WV01**	2012-12-17T07:41:48.168Z		**2.1**	25.9	59.6	137.3	0	480210d624d67257a76fc423115f1e56	3a0e4939a48af0ec79f1df223b68bb81
151	**WV02**	2012-12-14T07:58:35.189Z		**5.8**	16.5	62.6	143.4	0	c199c7448b6b4bdf0edbf74b320aba10	6d4c61a84fcd07a7dc20a1a17148cd44
152	**WV02**	2012-12-03T08:04:00.974Z		**8.2**	14.6	64.9	145.8	0	b8be0dd982ebcc1fb7e20f20f7a202fe	6d4c61a84fcd07a7dc20a1a17148cd44
153	**WV02**	2012-07-29T07:46:17.057Z		**8.9**	27.1	61.1	47.9	0	2edffc3bf518eeeab468546af32b626e	841cac592854497246c0e048f0ae3d84
154	**WV02**	2012-07-29T07:46:00.097Z		**4.1**	25.2	61.2	47.8	0	e89654593aafe1a0d2b5972c2f85767f	841cac592854497246c0e048f0ae3d84
155	**WV01**	2012-06-08T07:58:48.062Z		**3.5**	18.6	59.8	35.7	0	3ceb3fd2646537f0f5c652a9f29677f6	44355bd775e1783abd8ae6dc998919fe
156	**WV01**	2012-04-23T07:43:02.079Z		**3.7**	28.3	64.0	56.7	0	dbb8b016644184b0f15afcd1f7738dd3	44355bd775e1783abd8ae6dc998919fe
157	**WV02**	2012-04-22T07:56:43.557Z		**0.2**	15.9	66.7	53.6	0	b7d68abf9aebe3a4a2fab2075370e161	dce0cdd9a92d45ff631b11371f6c4b3c
158	**WV01**	2012-03-20T07:41:56.060Z		**1.1**	25.0	66.6	92.9	0	9402e443e67e3ea03335e47aa4e0f447	bc8837dfe6d0f7681cf02225ba99a323
159	**WV02**	2012-03-07T07:49:41.418Z	Pan Sharpened Natural Color	**0.6**	28.4	65.9	103.6	0.5	b50995338f8031e77220e1612999e710	
160	**WV01**	2012-03-07T07:47:32.014Z		**0.0**	25.7	65.4	103.0	0	9c3d3f4fa0c636cf93b055db714d24b1	b90962cdfc9215d8bf0b8fcd439d4447
161	**WV01**	2012-03-03T07:42:19.376Z		**0.0**	27.3	64.5	104.2	0	91f4ee3d04b38279b9444b249ca137ab	763bd2badbd5d178c0fc6c976eb993c2
162	**WV01**	2012-02-15T07:42:25.022Z	Panchromatic	**37.4**	26.2	61.4	120.8	0.5	6a1be53dc855d0d46baf89f0d57146d0	
163	**WV01**	2012-02-06T07:53:59.372Z		**1.0**	23.1	62.9	125.0	0	e6b8a0bc514ba91ec04b7fcec9480301	763bd2badbd5d178c0fc6c976eb993c2
164	**WV02**	2012-02-06T07:53:49.097Z		**0.0**	25.2	62.6	125.6	0	ba1e326aa5f295687f47a3253cfa02e4	85dfa14abd1be6a6fc6fbcc0bc7e5d45
165	**WV01**	2012-02-06T07:53:27.772Z		**3.0**	0.9	62.8	124.7	0	ffb5659e4ab55435799ac883c106d0e1	763bd2badbd5d178c0fc6c976eb993c2
166	**WV01**	2012-02-06T07:53:00.572Z		**1.3**	21.6	62.8	125.0	0	5c56e2eed34b0a31f699b25ba5011843	763bd2badbd5d178c0fc6c976eb993c2

167	**WV02**	2012-02-03T08:05:31.373Z		**0.0**	26.2	64.0	132.9	0	306d8de08d696ea290c5433c2f061eef	0de31f7e0c9a39e3bfbe6c4ad36ccc8a
168	**WV02**	2012-02-03T08:05:11.017Z		**0.0**	24.3	63.8	134.0	0	f5284716fb49c666ad8bb44eacd0c6f2	bc8837dfe6d0f7681cf02225ba99a323
169	**WV01**	2012-02-02T07:48:00.982Z		**0.1**	27.3	60.6	123.8	0	1223d4e2e6b4a40e185d598b540726ec	dce0cdd9a92d45ff631b11371f6c4b3c
170	**WV01**	2012-02-02T07:47:40.058Z		**2.9**	19.8	61.2	124.4	0	8de935026fc3d19fab133d004ff6965a	44355bd775e1783abd8ae6dc998919fe
171	**WV02**	2012-01-29T07:49:37.967Z	Pan Sharpened Natural Color	**2.6**	26.9	60.8	128.3	0.5	0968f738afee4c37018d48784af09b76	
172	**WV02**	2012-01-29T07:49:37.967Z		**5.2**	26.3	60.9	128.0	0	2ea7e2f9e7cf113d7418ef10bb1df460	763bd2badbd5d178c0fc6c976eb993c2
173	**WV02**	2012-01-29T07:49:37.096Z		**0.0**	27.3	60.6	128.5	0	b64649350602251702bf214e3a3413bc	85dfa14abd1be6a6fc6fbcc0bc7e5d45
174	**WV01**	2012-01-29T07:42:24.039Z		**1.2**	27.5	59.7	127.4	0	70306baa30b078f3ffc822ca947fb21e	841cac592854497246c0e048f0ae3d84
175	**WV02**	2012-01-18T07:53:46.014Z		**3.3**	13.9	60.5	135.1	0	defaa8a5217e122a5731f5ff0311cbf1	85dfa14abd1be6a6fc6fbcc0bc7e5d45
176	**WV02**	2012-01-04T08:08:35.830Z		**0.0**	18.7	62.1	146.2	0	97cfddc89fe267bcc72445c92f129bb0	b98c0974be693177c06a21b84c9f4373
177	**WV02**	2012-01-04T08:08:35.830Z		**0.0**	18.7	62.1	146.2	0	97cfddc89fe267bcc72445c92f129bb0	b98c0974be693177c06a21b84c9f4373
178	**WV01**	2012-01-03T07:53:55.783Z		**0.0**	18.5	59.4	141.6	0	24b20452cdd98b2e88e0f1c4a6e03a15	e6503e54c0dba7bbdd911567b4d9f16c
179	**WV02**	2011-12-30T07:52:46.223Z		**2.9**	16.7	59.8	142.2	0	06459e9cb1370ebf6e1f85907c69cc5a	b98c0974be693177c06a21b84c9f4373
180	**WV02**	2011-12-30T07:52:46.223Z		**2.9**	16.7	59.8	142.2	0	06459e9cb1370ebf6e1f85907c69cc5a	b98c0974be693177c06a21b84c9f4373
181	**WV02**	2011-12-30T07:52:25.424Z		**1.4**	12.1	59.8	142.2	0	459b3c8bef852fd976b1cc0c878c87cf	b98c0974be693177c06a21b84c9f4373
182	**WV02**	2011-12-30T07:52:25.424Z		**1.4**	12.1	59.8	142.2	0	459b3c8bef852fd976b1cc0c878c87cf	b98c0974be693177c06a21b84c9f4373
183	**WV02**	2011-12-30T07:52:10.624Z		**2.2**	13.1	59.9	142.3	0	680eaea442fa49f5140c55c6a39328b2	b98c0974be693177c06a21b84c9f4373
184	**WV02**	2011-12-30T07:52:10.624Z		**2.2**	13.1	59.9	142.3	0	680eaea442fa49f5140c55c6a39328b2	b98c0974be693177c06a21b84c9f4373
185	**WV02**	2011-11-16T08:09:54.018Z		**1.1**	19.5	69.1	147.9	0	99d88dc6bd91e79b2d560b38ef91e87a	44355bd775e1783abd8ae6dc998919fe
186	**WV01**	2011-03-28T08:00:52.019Z		**0.0**	21.7	71.4	84.5	0	f90ae1a189c718eddae70bfa7d213181	bc8837dfe6d0f7681cf02225ba99a323
187	**WV01**	2011-03-24T07:56:07.040Z		**2.8**	19.9	69.0	87.0	0	c21eb2e22cb2a877d5d7206b03330a16	b90962cdfc9215d8bf0b8fcd439d4447
188	**WV01**	2011-03-20T07:50:34.061Z		**2.8**	26.7	67.3	87.7	0	a19f1042f4db3a9f121738066bf138af	44355bd775e1783abd8ae6dc998919fe
189	**WV01**	2011-03-15T08:06:41.931Z	Panchromatic	**1.1**	24.3	71.2	95.4	0.5	fe46f7c4c9105b59e98e7f929557c1e0	
190	**WV01**	2011-03-11T08:01:24.056Z		**4.9**	14.3	69.1	101.5	0	87e85ca3bd3b374d461884b4b118fe1e	b90962cdfc9215d8bf0b8fcd439d4447
191	**WV01**	2011-03-07T07:56:42.178Z		**0.0**	26.1	67.5	101.2	0	a347048e0aac8e2a0861cbece4302ec2	dce0cdd9a92d45ff631b11371f6c4b3c
192	**WV02**	2011-02-11T07:45:52.021Z		**7.9**	19.3	62.0	120.7	0	f3d769548856cf04b322d9cd1cfc0d30	85dfa14abd1be6a6fc6fbcc0bc7e5d45
193	**WV01**	2011-02-09T08:06:34.539Z	Panchromatic	**0.2**	21.5	65.0	125.7	0.5	31085a58397eb548f9b26c1662d1a655	
194	**WV01**	2011-02-05T08:00:35.718Z	Panchromatic	**0.9**	27.6	64.1	130.5	0.5	27b69a5e35c35603ad1a1c8d3fc51e91	

195	**WV01**	2011-01-15T07:55:48.942Z	Panchromatic	**5.1**	13.1	60.6	136.1	0.5	0d4e76c12e984e3591208f4fc3806079	
196	**WV01**	2011-01-06T08:07:27.737Z	Panchromatic	**1.2**	17.6	61.7	142.2	0.5	4084d3443af951b5e63a9bcd2c08f841	
197	**WV01**	2011-01-06T08:07:27.737Z	Panchromatic	**1.2**	17.6	61.7	142.2	0.5	4084d3443af951b5e63a9bcd2c08f841	
198	**WV01**	2011-01-06T08:06:55.038Z		**0.0**	23.7	61.4	144.1	0	3fad772eb5551f1f77fab0e4bf17e78b	b90962cdfc9215d8bf0b8fcd439d4447
199	**WV01**	2011-01-02T08:01:19.079Z		**0.1**	14.8	60.1	145.3	0	a56aa135bfe906bdca1c873b9d01919d	bc8837dfe6d0f7681cf02225ba99a323
200	**WV02**	2010-11-12T07:53:53.040Z		**1.3**	7.3	67.3	141.1	0	66326d28c8b9f2a6f86f5f8767a62149	841cac592854497246c0e048f0ae3d84
201	**WV01**	2009-11-11T07:57:37.372Z	Panchromatic	**0.0**	22.0	67.4	139.6	0.5	b1d555faa846c03317e70b74b129d67e	
202	**WV01**	2017-11-20T10:38:40.545Z	Panchromatic	**0.0**	5.1	58.2	230.9	0.5	6827075569524b07fac7845dfa43f895	
203	**GE01**	2017-11-01T07:31:48.685Z	Pan Sharpened Natural Color	**16.0**	18.7	65.3	126.0	0.45	bda419b9bb411e53e6567c21f885a46f	
204	**WV01**	2017-10-30T10:31:36.971Z	Panchromatic	**1.1**	25.3	62.2	239.8	0.5	7211994264988bb6e19f27a058d1453d	
205	**WV01**	2017-10-30T10:31:24.722Z	Panchromatic	**2.4**	25.4	62.3	239.7	0.5	57beacfad16fd99ddb78a3576675afcd	
206	**WV02**	2017-07-01T07:34:26.382Z	Pan Sharpened Natural Color	**16.7**	25.8	54.9	43.7	0.5	14a5f9657d464bc815574649ec8cb676	
207	**WV01**	2017-06-24T10:35:52.883Z	Panchromatic	**10.6**	13.0	58.8	320.8	0.5	dcbb5e9c9b828f937107e76bc8fe5604	
208	**WV01**	2017-05-04T10:36:02.959Z	Panchromatic	**9.3**	26.9	62.1	310.3	0.5	6179f8fee7babf3606b879d756428bc0	
209	**WV02**	2017-04-27T07:35:27.565Z	Pan Sharpened Natural Color	**12.7**	25.1	61.8	55.7	0.5	daf7047922138c6f3a6aac9916e076d6	
210	**WV02**	2017-04-19T07:29:56.654Z	Pan Sharpened Natural Color	**19.8**	27.5	62.7	64.2	0.5	dca7b892a67260952114e15c216a00b1	
211	**WV02**	2017-04-19T07:29:37.404Z	Pan Sharpened Natural Color	**13.5**	28.8	62.9	64.1	0.5	c334456e8387253f5be7f15baa535cb3	
212	**WV01**	2017-03-31T10:34:15.468Z	Panchromatic	**1.4**	25.1	69.7	287.2	0.5	0e03d2af9f3d0826e8b6cf45881dec33	
213	**WV01**	2017-03-31T10:33:42.519Z	Panchromatic	**6.1**	28.2	69.6	283.5	0.5	7a81e71d25b86007d7a8b093eee833f5	
214	**WV02**	2017-03-31T07:31:48.626Z	Pan Sharpened Natural Color	**5.7**	25.4	63.3	77.2	0.5	9a19fe554be3059164e9410c2b6653e2	
215	**WV02**	2017-03-31T07:31:28.026Z	Pan Sharpened Natural Color	**11.9**	26.5	63.1	77.3	0.5	06abb9fe91e7f3a3565117fd3cf8bda3	
216	**WV02**	2017-02-21T07:34:21.749Z	Pan Sharpened Natural Color	**7.3**	22.7	60.7	108.7	0.5	4ca535b5041b6999dc861c1a9c54199f	
217	**WV02**	2017-02-21T07:34:21.749Z	Pan Sharpened Natural Color	**7.3**	22.7	60.7	108.7	0.5	4ca535b5041b6999dc861c1a9c54199f	
218	**WV02**	2017-02-13T07:29:29.788Z	Pan Sharpened Natural Color	**36.2**	26.4	58.8	115.8	0.5	677bbdd6691a1fe56bafaab25aa34ae4	
219	**WV02**	2017-02-13T07:29:29.788Z	Pan Sharpened Natural Color	**36.2**	26.4	58.8	115.8	0.5	677bbdd6691a1fe56bafaab25aa34ae4	

220	**WV03_VNIR**	2017-02-10T07:53:07.868Z	Pan Sharpened Natural Color	**36.3**	28.1	63.4	120.5	0.39	c0ff87bf43530488d7bb26db033bda0d	
221	**WV01**	2017-01-22T10:31:40.163Z	Panchromatic	**12.4**	25.9	64.2	220.8	0.5	61e44965bf08b4e66aa2b00d334f462d	
222	**WV01**	2017-01-09T10:35:20.745Z	Panchromatic	**6.9**	24.2	61.6	219.4	0.5	2bf8a611f48351cc75e559c2b7ea9d89	
223	**WV02**	2017-01-06T07:33:20.033Z	Pan Sharpened Natural Color	**29.8**	27.6	56.8	131.0	0.5	6dea8ce4cbe1e940c0e6a68b8993c986	
224	**WV02**	2017-01-06T07:32:54.832Z	Pan Sharpened Natural Color	**32.0**	25.0	56.5	133.4	0.5	292fd30d4aa93628de94203d000efbd9	
225	**WV01**	2016-12-27T10:37:51.877Z	Panchromatic	**0.8**	20.1	58.9	221.0	0.5	6f881fc2854982cd63046cb6a0f2b9a6	
226	**WV01**	2016-12-23T10:32:06.787Z	Panchromatic	**0.0**	29.2	60.5	219.8	0.5	38dc749ec218b62ced713be367f6c98a	
227	**WV02**	2016-11-26T07:46:06.202Z	Pan Sharpened Natural Color	**22.4**	16.1	62.8	141.7	0.5	3320a389e568093c035fd0e2dca4460e	
228	**GE01**	2016-11-26T07:44:06.885Z	Pan Sharpened Natural Color	**5.7**	16.1	62.5	141.0	0.5	f06e239b37789939c67d2ad25a026dae	
229	**WV03_VNIR**	2016-11-09T07:50:58.865Z	Pan Sharpened Natural Color	**3.0**	26.5	67.5	134.3	0.38	cbd2a542f4e678e4a553cd3f34a9e310	
230	**WV01**	2016-11-06T10:34:09.005Z	Panchromatic	**20.9**	19.9	60.7	236.2	0.5	09b80269d761decf17f188474f1f03fe	
231	**WV02**	2016-10-25T07:27:25.803Z	Pan Sharpened Natural Color	**39.5**	26.7	65.2	120.5	0.5	8f03ace4ec74db5258b9277f142dfbee	
232	**WV02**	2016-10-25T07:27:08.004Z	Pan Sharpened Natural Color	**39.9**	24.3	65.3	120.6	0.5	0c2a84fa7983d7d905ae10bce19972b2	
233	**WV02**	2016-10-22T07:38:20.150Z	Pan Sharpened Natural Color	**20.9**	27.0	68.6	125.8	0.5	8e70ba8600bacaa920c443dc0fa87143	
234	**WV02**	2016-10-19T07:48:04.145Z	Pan Sharpened Natural Color	**24.9**	22.3	70.6	116.7	0.5	d16f041ddca81c5942b9a03cc03e1f98	
235	**WV02**	2016-10-19T07:48:04.145Z	Pan Sharpened Natural Color	**24.9**	22.3	70.6	116.7	0.5	d16f041ddca81c5942b9a03cc03e1f98	
236	**WV02**	2016-10-14T07:32:57.438Z	Pan Sharpened Natural Color	**5.0**	9.2	68.6	116.6	0.5	709c2598c0292e3048a6880ad1f6379a	
237	**WV03_VNIR**	2016-10-09T07:49:15.098Z	Pan Sharpened Natural Color	**20.9**	26.9	71.7	105.8	0.37	afdf47226e1244130ef47093a3caddc9	
238	**WV01**	2016-10-03T10:30:10.415Z	Panchromatic	**4.3**	27.9	66.8	260.4	0.5	76cf87bd1653469edbac79342b77a34d	
239	**WV03_VNIR**	2016-09-21T07:57:06.267Z	Pan Sharpened Natural Color	**16.9**	6.4	72.9	84.9	0.31	4da43deaf5277150d814a7b37922b30f	
240	**WV02**	2016-09-09T07:25:12.587Z	Pan Sharpened Natural Color	**20.0**	27.5	63.9	77.6	0.5	07944f7b2e35d9250189ff3fae0c00a6	
241	**WV03_VNIR**	2016-09-08T07:45:34.031Z	Pan Sharpened Natural Color	**39.6**	18.2	70.7	77.7	0.33	2f8cdba3de5d32d8deb208a9cfe508c6	
242	**WV01**	2016-09-07T10:34:11.805Z	Panchromatic	**1.8**	23.9	67.9	288.4	0.5	36b9401bd71335a67529823374555219	
243	**WV02**	2016-09-03T07:47:18.979Z	Pan Sharpened Natural Color	**17.1**	26.5	66.9	67.0	0.5	b5f8b34c63cd241fbd69042c94f8165c	

244	**WV02**	2016-08-29T07:31:27.972Z	Pan Sharpened Natural Color	**12.1**	22.9	62.7	67.5	0.5	54a0a954f4bb8bb508130146d0e21395	
245	**WV02**	2016-07-25T07:22:23.820Z	Pan Sharpened Natural Color	**8.5**	27.9	55.8	53.0	0.5	d0f853f6a772508ce49f995807c67ccc	
246	**WV01**	2016-06-30T10:28:46.479Z	Panchromatic	**10.0**	28.6	60.1	323.7	0.5	be742894023b72e5542de3af779ebb47	
247	**WV02**	2016-06-17T07:24:53.594Z	Pan Sharpened Natural Color	**23.7**	27.2	53.5	45.0	0.5	86e71ea2d55befc32583cc6a24c82677	
248	**WV02**	2016-06-17T07:24:53.594Z	Pan Sharpened Natural Color	**23.7**	27.2	53.5	45.0	0.5	86e71ea2d55befc32583cc6a24c82677	
249	**WV02**	2016-06-17T07:24:27.243Z	Pan Sharpened Natural Color	**24.8**	26.2	55.4	46.2	0.5	9016d83afa660e3410e2ea3e192f7b6c	
250	**WV01**	2016-05-31T10:24:07.479Z	Panchromatic	**3.3**	29.0	60.5	323.9	0.5	3551f2139acf59f6fc1aa09965d91936	
251	**WV01**	2016-05-31T10:24:07.479Z	Panchromatic	**3.3**	29.0	60.5	323.9	0.5	3551f2139acf59f6fc1aa09965d91936	
252	**WV02**	2016-05-29T07:25:53.966Z	Pan Sharpened Natural Color	**6.3**	25.4	55.5	45.9	0.5	180558491a81c310d8c89832d59b2635	
253	**WV02**	2016-05-29T07:25:53.966Z	Pan Sharpened Natural Color	**6.3**	25.4	55.5	45.9	0.5	180558491a81c310d8c89832d59b2635	
254	**WV03_VNIR**	2016-05-19T07:44:25.647Z	Pan Sharpened Natural Color	**49.1**	23.5	61.6	43.7	0.36	a34e1a8be9e7fd81ef2ffbbf2e41a7fc	
255	**WV01**	2016-05-14T10:19:27.948Z	Panchromatic	**10.0**	27.7	63.4	320.4	0.5	5bd20866ea9ad24a7d5c0511d9855b8d	
256	**WV01**	2016-05-14T10:19:27.948Z	Panchromatic	**10.0**	27.7	63.4	320.4	0.5	5bd20866ea9ad24a7d5c0511d9855b8d	
257	**WV02**	2016-04-13T07:22:18.399Z	Pan Sharpened Natural Color	**20.7**	25.2	61.5	69.8	0.5	188571082c2b49b46613316719f64eb1	
258	**WV01**	2016-03-20T10:11:56.110Z	Panchromatic	**1.6**	4.0	76.3	271.6	0.5	a0c3b51ba3a0c099d8c8b8ef9c14ea49	
259	**WV02**	2016-02-21T07:39:36.625Z	Pan Sharpened Natural Color	**1.1**	7.6	61.8	112.0	0.5	d6f12a8afc16ff5fe8dbed2869c5f7f0	
260	**WV01**	2016-02-19T10:13:42.485Z	Panchromatic	**2.2**	21.2	74.9	229.1	0.5	3aafde3736e9fe72d619d4e99a34d57b	
261	**WV01**	2016-01-17T09:55:15.570Z	Panchromatic	**0.0**	15.7	67.8	202.4	0.5	3ecbc1ce557ed5c71c6cede1ca588ffd	
262	**WV01**	2015-12-23T09:41:41.583Z	Panchromatic	**30.0**	24.1	65.6	198.5	0.5	455e38980b5ccd041bdc8fd1b14043fe	
263	**WV03_VNIR**	2015-12-19T07:43:39.004Z	Pan Sharpened Natural Color	**16.2**	22.4	59.7	137.8	0.35	583275030993f6a5d19d63c3062009e2	
264	**WV02**	2015-11-24T07:21:16.774Z	Pan Sharpened Natural Color	**49.5**	23.2	59.2	136.0	0.5	efd054b6dddf0406476e3056535382f5	
265	**WV01**	2015-11-02T09:40:14.115Z	Panchromatic	**6.3**	16.4	71.6	218.4	0.5	ab0205a2e3e3c050aaa641348800cb06	
266	**WV01**	2015-10-20T09:44:07.374Z	Panchromatic	**1.0**	26.1	75.6	231.9	0.5	816f8dcb2c4933fbc1947449e193f9da	
267	**GE01**	2015-09-16T07:34:43.285Z	Pan Sharpened Natural Color	**23.3**	21.6	67.3	82.0	0.5	d7052a264048ef586419c9729309a583	
268	**WV03_VNIR**	2015-09-03T07:50:11.814Z	Pan Sharpened Natural Color	**0.0**	19.6	67.7	66.2	0.34	2c670f7d5dc35ff3dea122e664d740c1	

269	**WV02**	2015-08-31T07:52:45.329Z	Pan Sharpened Natural Color	**49.9**	26.8	68.6	64.5	0.5	2caa3d5f35776ceaa039e8555e444d21	
270	**WV01**	2015-06-17T08:54:22.091Z	Panchromatic	**15.3**	29.5	64.6	10.8	0.5	bc0ca487a2b4ad55e5e9e0c43547e6a4	
271	**WV02**	2015-04-26T07:39:49.504Z	Pan Sharpened Natural Color	**0.0**	25.0	63.4	56.2	0.5	83ee459434ac731a7aa5a3a488d394b6	
272	**WV03_VNIR**	2015-04-10T07:37:02.858Z	Pan Sharpened Natural Color	**7.0**	23.1	63.8	68.6	0.36	e11943577fb281f0be9cf9345b05e62e	
273	**WV02**	2015-04-07T07:41:44.126Z	Pan Sharpened Natural Color	**6.7**	23.7	66.3	71.8	0.5	84710d1761d9daaea68e1a83c4246f57	
274	**WV01**	2015-04-06T08:37:53.350Z	Panchromatic	**1.4**	28.9	78.0	50.5	0.5	aa409f4299cfe930f128e1aa442cae53	
275	**WV02**	2015-03-27T07:48:06.209Z	Pan Sharpened Natural Color	**5.3**	21.2	67.9	82.3	0.5	4c87e9adccf9be7bafeedb7e40bb0d3f	
276	**WV02**	2015-03-24T07:58:04.755Z	Pan Sharpened Natural Color	**0.0**	20.4	69.8	83.2	0.5	48c1ad36ef578899687db7a827f15b64	
277	**WV01**	2015-03-20T08:40:44.793Z	Panchromatic	**27.4**	21.8	80.2	85.7	0.5	8d810a340bf72adf53f165f34234b068	
278	**WV02**	2015-03-16T07:52:53.593Z	Pan Sharpened Natural Color	**2.1**	24.4	67.8	92.9	0.5	7460b1f8e2daa74849b645c0ca50fd64	
279	**WV01**	2015-03-04T08:20:24.182Z	Panchromatic	**0.0**	29.1	74.3	118.9	0.5	306abcc10f780194433daee53629518f	
280	**WV01**	2015-02-19T08:25:38.843Z	Panchromatic	**7.0**	21.7	71.9	127.8	0.5	fec1938e5ca7a16d42223261ad8df1fa	
281	**WV01**	2015-02-15T08:19:02.052Z	Panchromatic	**11.3**	23.6	69.9	133.8	0.5	ee429a130ab822f99824f6ef6e7f5267	
282	**WV03_VNIR**	2015-02-06T07:33:46.768Z	Pan Sharpened Natural Color	**17.4**	15.0	58.6	118.3	0.4	15617ac227cfbbc8eb6b21ae6e48c225	
283	**WV02**	2015-01-29T07:52:49.004Z	Pan Sharpened Natural Color	**0.4**	28.3	61.9	133.6	0.5	b5957405c321b255d4f59d7ec6574034	
284	**WV01**	2015-01-11T08:29:30.942Z	Panchromatic	**24.4**	25.3	66.2	149.5	0.5	6755040973edc64da04218aaee53c910	
285	**WV01**	2015-01-11T08:29:30.942Z	Panchromatic	**24.4**	25.3	66.2	149.5	0.5	6755040973edc64da04218aaee53c910	
286	**WV01**	2015-01-11T08:29:14.792Z	Panchromatic	**3.5**	28.6	65.5	152.0	0.5	0c03b520af9843d5ecaa74dacef898a7	
287	**WV02**	2015-01-07T08:04:39.723Z	Pan Sharpened Natural Color	**11.7**	25.1	62.5	140.0	0.5	36e06f8dccb5f5c526ce3b322907c41e	
288	**WV03_VNIR**	2014-12-24T07:27:20.511Z	Pan Sharpened Natural Color	**29.0**	22.0	56.5	132.9	0.5	e984806c1f6dcb8c6f371b90315584b7	
289	**WV02**	2014-12-03T07:58:12.024Z	Pan Sharpened Natural Color	**14.2**	27.5	64.1	143.6	0.5	d149d979a282505ccedd0877e0213ba9	
290	**WV02**	2014-10-24T07:35:39.842Z		**2.6**	28.4	67.8	126.3	0	0e95d70858f503c83e451d6d6caa8cdc	d15174ade1d4745606de03bb6410a38f
291	**WV02**	2014-06-02T07:49:25.015Z	Pan Sharpened Natural Color	**49.8**	26.6	60.0	39.7	0.5	8d9ce214c0b007acf7808c4ecc3832bc	
292	**WV02**	2013-09-28T07:46:06.594Z	Pan Sharpened Natural Color	**5.4**	27.3	70.8	92.2	0.5	c650169e0c0e63e8cf03ccceefc35362	

293	**WV02**	2013-09-28T07:46:06.594Z	Pan Sharpened Natural Color	**5.4**	27.3	70.8	92.2	0.5	c650169e0c0e63e8cf03ccceefc35362	
294	**WV02**	2013-08-29T07:49:49.403Z	Pan Sharpened Natural Color	**42.7**	26.7	67.1	64.3	0.5	029da416782505bad56f01d5cecf4221	
295	**WV02**	2012-12-25T07:53:27.804Z		**0.0**	27.2	60.9	139.8	0	2d07a756d5a8a9dd2100642d2e09e3f1	6d4c61a84fcd07a7dc20a1a17148cd44
296	**WV02**	2012-12-22T08:03:43.060Z		**16.5**	23.7	62.0	147.0	0	171c8f5a6b9b3a967b754cb8977f1e68	97965bd3e44d03837d352c4da72c9fc0
297	**WV01**	2012-12-17T07:41:48.168Z		**2.1**	25.9	59.6	137.3	0	480210d624d67257a76fc423115f1e56	3a0e4939a48af0ec79f1df223b68bb81
298	**WV02**	2012-12-14T07:58:35.189Z		**5.8**	16.5	62.6	143.4	0	c199c7448b6b4bdf0edbf74b320aba10	6d4c61a84fcd07a7dc20a1a17148cd44
299	**WV01**	2012-04-23T07:43:02.079Z		**3.7**	28.3	64.0	56.7	0	dbb8b016644184b0f15afcd1f7738dd3	44355bd775e1783abd8ae6dc998919fe
300	**WV01**	2012-02-02T07:47:40.058Z		**2.9**	19.8	61.2	124.4	0	8de935026fc3d19fab133d004ff6965a	44355bd775e1783abd8ae6dc998919fe
301	**WV01**	2012-02-02T07:47:40.058Z		**2.9**	19.8	61.2	124.4	0	8de935026fc3d19fab133d004ff6965a	44355bd775e1783abd8ae6dc998919fe
302	**GE01**	2012-01-30T07:33:32.885Z	Pan Sharpened Natural Color	**4.0**	7.5	57.7	124.1	0.5	be221bb6dc13691a1bb9079735cf00a6	
303	**WV01**	2012-01-29T07:42:24.039Z		**1.2**	27.5	59.7	127.4	0	70306baa30b078f3ffc822ca947fb21e	841cac592854497246c0e048f0ae3d84
304	**GE01**	2011-10-23T07:26:28.285Z	Pan Sharpened Natural Color	**0.7**	23.5	65.7	115.8	0.5	7e75842f6dc5b7143329edeb8a88fe89	
305	**WV01**	2011-09-02T07:47:10.218Z	Panchromatic	**3.8**	27.1	66.8	65.2	0.5	e654a974eb92f5fed7af2971655d8de1	
306	**WV01**	2011-03-20T07:50:34.618Z	Panchromatic	**4.1**	25.6	67.3	86.7	0.5	47ed7d2d101332aead119fd0c2e68866	
307	**WV01**	2011-03-20T07:50:34.618Z	Panchromatic	**4.1**	25.6	67.3	86.7	0.5	47ed7d2d101332aead119fd0c2e68866	
308	**WV01**	2011-03-07T07:56:30.406Z	Panchromatic	**1.1**	10.8	67.7	100.6	0.5	911bef83a130d5f2294ac04a2d886632	
309	**WV01**	2011-03-03T07:50:40.953Z	Panchromatic	**10.4**	3.3	67.0	111.7	0.5	aedc89b74e11cdb4d74f66da5d6c54d4	
310	**WV01**	2011-02-18T07:56:19.222Z	Panchromatic	**7.9**	12.4	65.2	115.4	0.5	b4b5b362306318008b626ee2d00b0565	
311	**WV01**	2011-02-18T07:56:19.222Z	Panchromatic	**7.9**	12.4	65.2	115.4	0.5	b4b5b362306318008b626ee2d00b0565	
312	**WV01**	2011-01-15T07:56:50.838Z	Panchromatic	**8.4**	15.1	61.2	134.6	0.5	a12cc080e5bc931d46482529d567a331	
313	**WV01**	2011-01-15T07:56:50.838Z	Panchromatic	**8.4**	15.1	61.2	134.6	0.5	a12cc080e5bc931d46482529d567a331	
314	**WV01**	2011-01-15T07:55:48.942Z	Panchromatic	**5.1**	13.1	60.6	136.1	0.5	0d4e76c12e984e3591208f4fc3806079	
315	**WV02**	2010-02-16T07:42:37.421Z		**1.8**	9.1	62.7	121.0	0	7ea1503c98266324246d529ee790f093	2d4eae4da76f014994f1e448df3d0120
316	**QB02**	2008-12-20T07:51:48.444Z	Pan Sharpened Natural Color	**4.9**	14.1	60.6	141.1	0.6	ce08d887b55ab62923d0f18c29d34528	