

Confirmation of Sudan Armed Forces Bombardment Consistent with Rapid Support Forces Present in El-Fasher

19 April 2024

Yale SCHOOL OF PUBLIC HEALTH
Humanitarian Research Lab

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I. Key Findings

The Yale School of Public Health's Humanitarian Research Lab (HRL) confirms reports that Sudan Armed Forces (SAF) have engaged in artillery bombardment and at least one airstrike in areas with civilians of the city of El-Fasher between 01 March and 15 April 2024. This combat activity by SAF indicates that Rapid Support Forces (RSF) personnel are either close to the city or inside the eastern and northeast neighborhoods of El-Fasher.

Yale HRL assesses that SAF artillery have been likely targeting locations on the east and northeast of El-Fasher. According to analysis of satellite imagery, munition impact points were observed between 01 March and 15 April 2024 at the eastern edge of El-Fasher. Yale HRL has not yet visually identified RSF forces in that section of the city, but this activity is consistent with SAF responding as if they are in or around this location in recent days. According to Visible Infrared Imagery Radiometer Suite (VIIRS) detection data between 10 and 15 April 2024, thermal signals have been observed on the eastern edges of El-Fasher near the newly observed munition impact points.

Additional munition impact points have been observed to the North-east section of El-Fasher near Swellina and north of the Al-Salaam and Abu Shouk IDP camps. The impact craters are consistent with D-30 Howitzers, which Yale HRL confirmed deployed by SAF at its base with artillery line of sight and azimuth angle are consistent with ability to hit location where munition craters are visible in the city. This targeted bombardment by SAF suggests that RSF fighters may be in or near the areas that have sustained bombardment. Yale HRL is not providing full telemetry on these artillery strikes given the sensitivity of this information.

Yale HRL assesses that SAF has conducted aerial bombardments on the central-eastern Masnaa neighborhood in El-Fasher. Open sources reported state that SAF conducted airstrikes on the evening of 14 April 2024 in the Masnaa neighborhood located in the central-eastern area of El-Fasher, a reported RSF controlled area.ⁱ Yale HRL imagery analysts observed thermal scarring within the Masnaa neighborhood in El-Fasher which corroborates open source reports of aerial strikes. Through imagery comparison, the time of scarring can be narrowed down between 10 and 15 April 2024. Yale HRL imagery analysts also identified VIIRS detections in the Masnaa neighborhood on 18 April 2024. In the area of alleged airstrike, burned buildings are visible in a tight cluster. Yale HRL can not at present identify the ordnance used in that reported strike, nor can it confirm that those buildings burned are a direct result of an aerial munition being deployed. Yale HRL, however, does assess that the available data is consistent with reports of said strike having occurred.

Yale HRL analysis indicates that SAF have significantly hardened their positions inside El-Fasher. These defensive improvements indicate that SAF expects encountering a ground assault and prolonged siege by RSF from multiple directions in the near future. RSF likely controls the north, east and west roads into El-Fasher at present. Additionally, RSF is known to have forces to the South in Nyala. RSF current tactical disposition gives them the capability to launch a multidirectional attack on El-Fasher at the time of their choosing. According to people displaced from communities west of

El-Fasher, RSF forces have controlled a number of rural communities since this April 2024 assault.ⁱⁱ The combination of SAF's current posture, the Joint Forces' recent call to arms, and the mobilization of government aligned militias indicates SAF aligned forces in El-Fasher are in a state of high alert. Recent reports of SAF airdropping supplies to its forces in El-Fasher indicates that logistic resupply is no longer possible by road.ⁱⁱⁱ Yale HRL is not publicly releasing details on SAF defensive measures given the sensitivity of this information in an ongoing conflict zone.

Yale HRL has also corroborated the burning of two additional communities to the west of El-Fasher, which HRL has not been able to confirm the names of. These attacks are consistent with the 16 April 2024 report confirming the other nine burned communities, bringing the total number of communities west of El-Fasher razed since 31 March to eleven.^{iv} According to VIIRS sensor data, these arson attacks occurred on or around 8 April 2024. Approximately 50,000 internally displaced persons (IDPs) reportedly have been displaced from the communities burned west of El-Fasher and have moved to camps near to the city.^v

Methodology

Yale HRL utilizes data fusion methodologies of open source and public and commercially available remote sensing data. Yale HRL produced this report through the cross-corroboration of open source and remote sensing data, including satellite imagery and thermal sensor data. Human security concerns were accounted for as part of the decision to release specific coordinates; potential civilian risk was rated minimal because these villages have been confirmed as having been attacked.

II. Human Security Analysis

Yale HRL assesses that fighting is occurring inside El-Fasher currently. Even without RSF force movements and attacks from other directions towards El-Fasher, which Yale HRL believes is imminently possible, there will likely be continued civilian casualties as a result of the current situation even if the battle does not escalate from its current level. Yale HRL assesses that there is no clear escape or resupply route for SAF or civilians.

At this time there are reportedly not enough ambulances to transport people wounded, particularly between Abu Shouk in the north of El-Fasher to El-Fasher Southern Hospital and medical supplies are low.^{vi} There are also reports of property damage and civilian casualties in Abu Shouk IDP camp following clashes near Mellit gate in north El-Fasher.^{vii}

RSF has typically attacked through ground siege by encircling and engulfing communities from all sides. To date, every RSF siege of SAF forces in Darfur regional capitals since the start of the current conflict on 15 April 2023 has resulted in an RSF victory. Both during and after these sieges, RSF has allegedly committed systematic and targeted mass atrocities, including targeted extrajudicial killings, widespread SGBV, destruction of property, and forced displacement. These alleged crimes have targeted Masalit, Fur, Zaghawa, and other non-Arab communities. Civilian and IDP

communities who have been reported to assist SAF forces have been allegedly subject to mass atrocities, including the alleged massacre in Hasaheisa Camp.^{viii}

El-Fasher, the capital of North Darfur, has an estimated over two million civilians living there.^{ix} This includes 500,000 civilians in IDP camps, which include large Zaghawa, Masalit, and other non-Arab populations.^x A ground assault by RSF or sustained combat in civilian areas or IDP camps will result in a humanitarian emergency and highly likely widespread mass atrocities including mass killings, SGBV, and razing communities. If civilians find a way out of El-Fasher, which is increasingly unlikely given RSF's unfolding encirclement of the city, these people will have to traverse approximately 400km to the east through open desert to reach any potential safe haven.

ⁱ Darfur Victims Support (@dvs2030), "تجدد الاشتباكات بين RSF and SAF," Twitter, April 14, 2024, <https://twitter.com/dvs2030/status/1779566397351191028>, archived at <https://perma.cc/4M9E-BP7N>.

ⁱⁱ Radio Tamazuj, "الحرب في الفاشر: حركات الكفاح تزعم تكبد الدعم السريع خسائر فادحة," April 17, 2024, <https://radiotamazuj.org/ar/allnews/article/lhrb-fy-lfshr-hrkt-lkfh-tz-m-tkbd-ld-m-lsry-khsyr-fdh>, archived at <https://perma.cc/V95M-SLFN>.

ⁱⁱⁱ Alyaum Tv, "الجيش السوداني والدعم السريع يحشدان في دارفور غربي البلاد," April 17, 2024, <https://alyaumtv.net/%d8%a7%d9%84%d8%ac%d9%8a%d8%b4-%d8%a7%d9%84%d8%b3%d9%88%d8%af%d8%a7%d9%86%d9%8a-%d9%88%d8%a7%d9%84%d8%af%d8%b9%d9%85-%d8%a7%d9%84%d8%b3%d8%b1%d9%8a%d8%b9-%d9%8a%d8%ad%d8%b4%d8%af%d8%a7%d9%86-%d9%81/>, archived at <https://perma.cc/WB47-TUCH>; 3Ayin, "الفاشر.. آخر المدن الآمنة بدارفور," April 18, 2024, <https://3ayin.com/el-fasher-9/>, archived at <https://perma.cc/VL7M-V62S>.

^{iv} Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al., "Confirmation of Nine Arson Attacks West of El-Fasher, Sudan." April 16, 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven. https://medicine.yale.edu/lab/khoshnood/publications/2024-04-16-yale-hrl-eif-report_476783_284_26865_v1.pdf, archived at <https://perma.cc/CAO3-EDRT>.

^v Sudan Tribune, "نزوح ما لا يقل عن 50 الف شخص بسبب هجمات الدعم السريع غرب الفاشر," April 18, 2024, <https://sudantribune.net/article284606/>, archived at <https://perma.cc/S3KC-85XM>.

^{vi} Sudan Tribune, "قتلى و45 مصاباً في اشتباكات عنيفة شمال شرق الفاشر," April 16, 2024, <https://sudantribune.net/article284550/>, archived at <https://archive.ph/C2wz4:HRL MMC ID 0002>.

^{vii} Sudan Tribune, "Heavy clashes erupt in North Darfur, civilians caught in crossfire," April 16, 2024, <https://sudantribune.com/article284573/>, archived at <https://archive.ph/FWK83>.

^{viii} Radio Dabanga, "Central Darfur Displacement camp 'encircled' by SAF-RSF clashes," October 15, 2023, <https://www.dabangasudan.org/en/all-news/article/central-darfur-displacement-camp-encircled-by-saf-rsf-clashes>, archived at <https://perma.cc/SX6R-56GK>.

^{ix} "Darfur network reports alarming humanitarian situation in El Fasher," 24 February 2024, Dabanga Sudan, <https://www.dabangasudan.org/en/all-news/article/darfur-network-reports-alarming-humanitarian-situation-in-el-fasher>, archived at <https://perma.cc/3E9M-JKNN>; "Sudan Displacement Data," 21 September 2023, IOM HDX, <https://data.humdata.org/dataset/sudan-displacement-data-idps-iom-dtm>, archived at <https://perma.cc/4DS6-S9DB>.

^x "Darfur network reports alarming humanitarian situation in El Fasher," 24 February 2024, Dabanga Sudan, <https://www.dabangasudan.org/en/all-news/article/darfur-network-reports-alarming-humanitarian-situation-in-el-fasher>, archived at <https://perma.cc/3E9M-JKNN>; "Sudan Displacement Data," 21 September 2023, IOM HDX, <https://data.humdata.org/dataset/sudan-displacement-data-idps-iom-dtm>, archived at <https://perma.cc/4DS6-S9DB>.

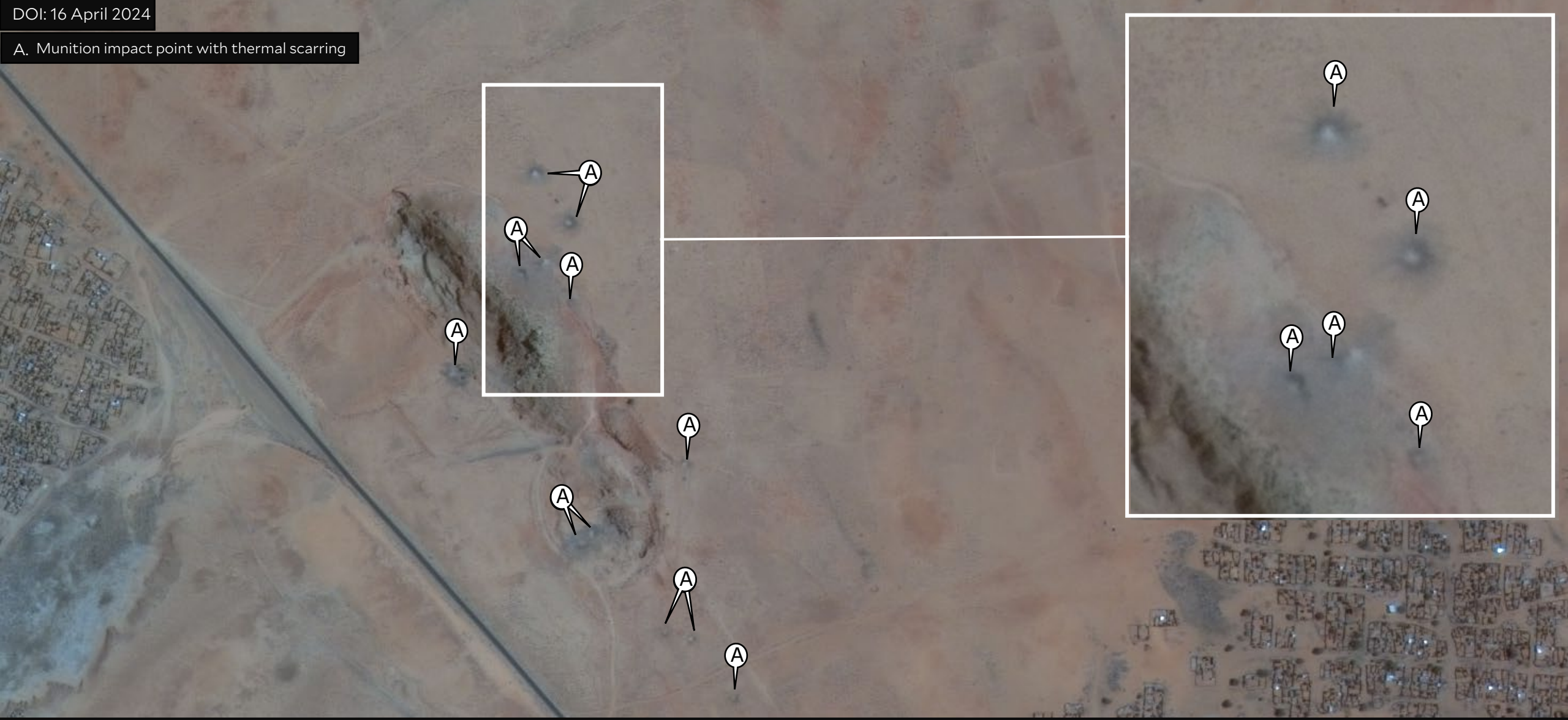
Munition Impact Points and Thermal Scarring Observed Northeast of El-Fasher

According to analysis of satellite imagery, probable munition impact points were observed between 01 March and 15 April on the northeastern section of El-Fasher.



DOI: 16 April 2024

A. Munition impact point with thermal scarring



Munition Impact Points and Thermal Scarring Observed East of El-Fasher

According to analysis of satellite imagery, probable munition impact points were observed between 01 March and 15 April on the eastern section of El-Fasher.



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A, Munition impact point with thermal scarring



Masnaa Neighborhood, El-Fasher

THERMAL SCARRING OBSERVED BETWEEN 10 AND 15 APRIL 2024

According to analysis of satellite imagery, thermal scarring was observed in the central-eastern Masnaa neighborhood in El-Fasher on 16 April 2024. Through comparison with Sentinel imagery the time of scarring can be narrowed down to time between 10 and 15 April 2024.

Additional VIIRS detections are present in this area on 18 April 2024.

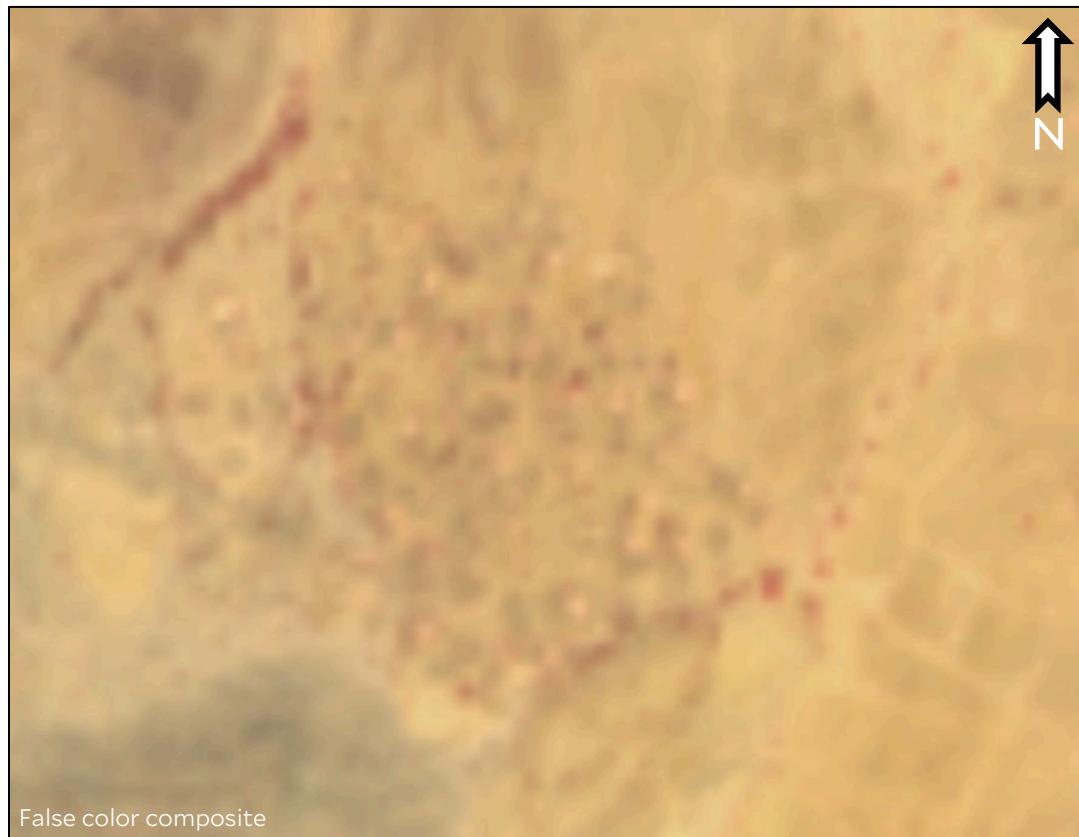


Unidentified Community 2

THERMAL SCARRING OBSERVED BETWEEN 05 AND 10 APRIL 2024

According to analysis of satellite imagery, thermal scarring was observed within this North Darfur community west of El-Fasher between 05 and 10 April 2024.

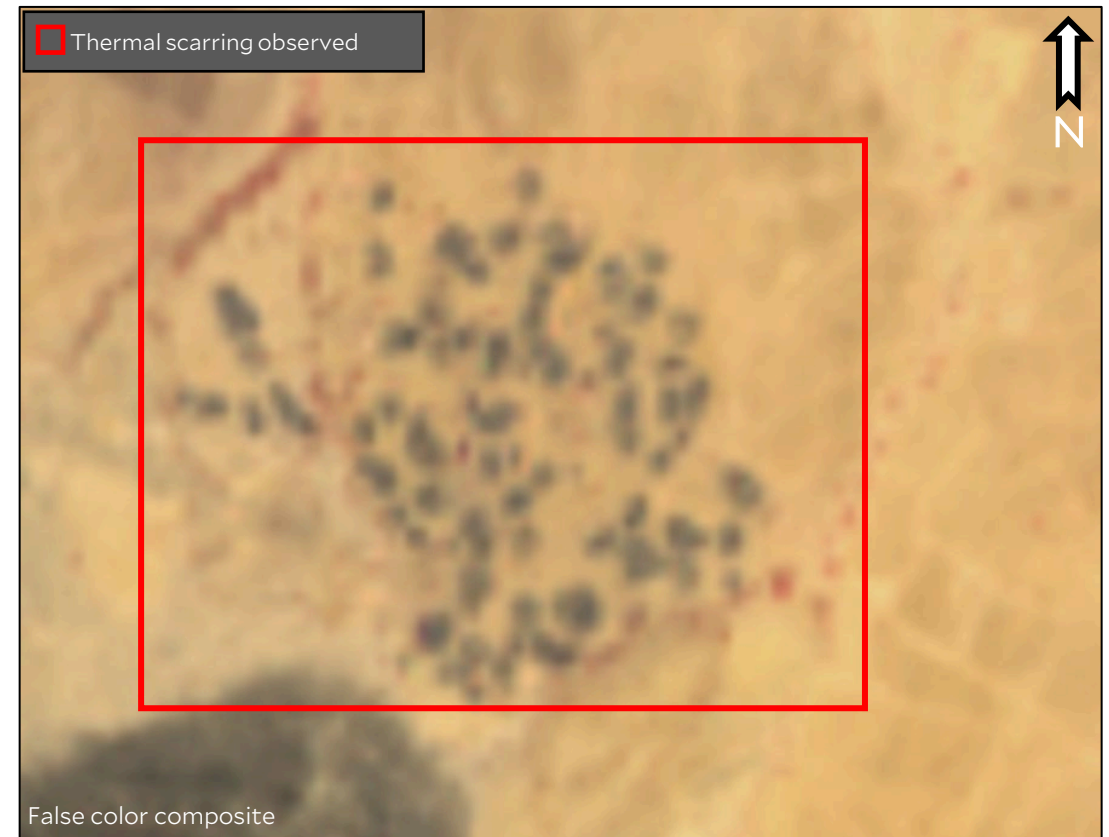
According to analysis of VIIRS data, the time of thermal scarring is proximate to 08 April 2024.



False color composite

25.0477445°E 13.8122770°N

05 April 2024 © 2024, Sentinel



False color composite

25.0477445°E 13.8122770°N

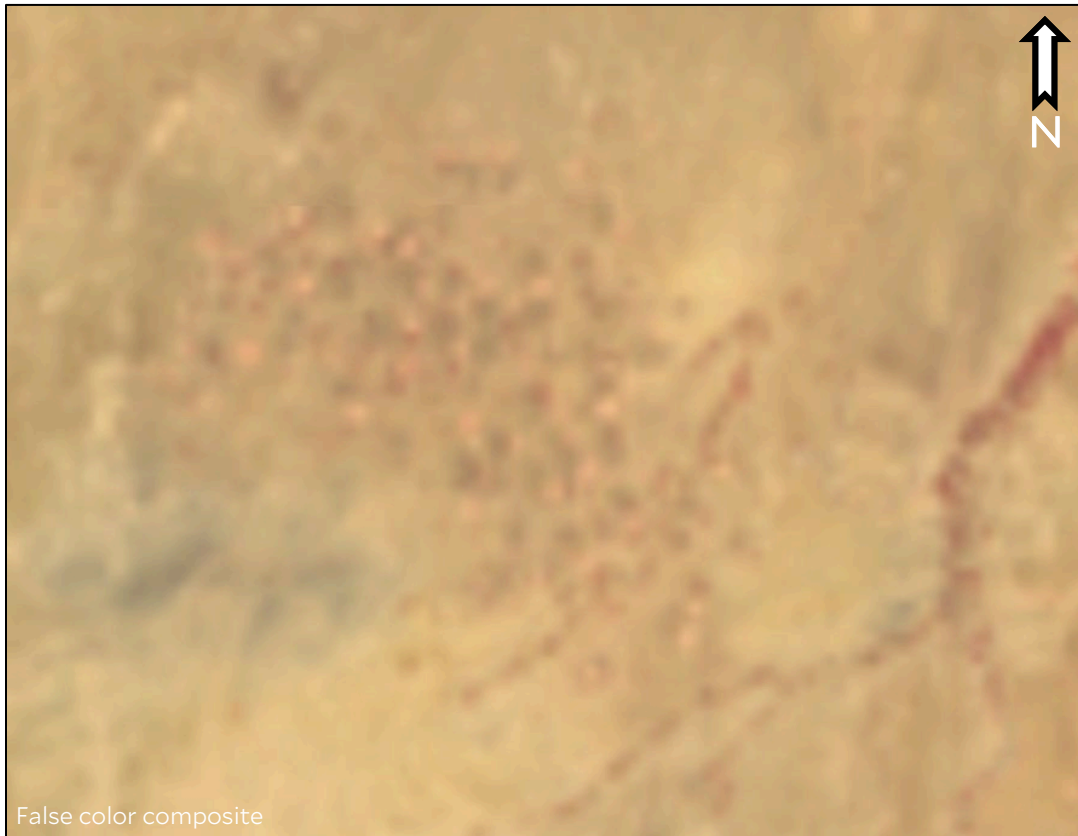
10 April 2024 © 2024, Sentinel

Unidentified Community 3

THERMAL SCARRING OBSERVED BETWEEN 05 AND 10 APRIL 2024

According to analysis of satellite imagery, thermal scarring was observed within this North Darfur community west of El-Fasher between 05 and 10 April 2024.

According to analysis of VIIRS data, the time of thermal scarring is proximate to 08 April 2024.



25.0339068°E 13.8158047°N

05 April 2024 © 2024, Sentinel



25.0339068°E 13.8158047°N

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