

**Update: RSF Attacks on Zamzam IDP Camp,  
Widespread SAF Bombardment and RSF  
Targeted Razing in El-Fasher**

19 December 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) identifies ongoing shelling attacking Zamzam Internally Displaced Persons (IDP) Camp by Rapid Support Forces (RSF) and widespread bombardment across El-Fasher, North Darfur. Yale HRL identifies at least 160 instances of Sudan Armed Forces (SAF) aerial bombardment in El-Fasher between 5-18 December. RSF artillery bombardment on key SAF positions inside El-Fasher occurred between 14-17 December 2024. The first instances of individuated arson attacks have occurred in El-Fasher since July 2024 in southern neighborhoods known to have a large Zaghawa population.<sup>1</sup> Yale HRL also assesses airstrikes to the markets in Kabkabiya and Kuma, North Darfur.

### Zamzam Internally Displaced Persons (IDP) Camp

Yale HRL has identified at least five instances of damaged structures or munition impacts consistent with artillery shelling in Zamzam IDP camp between 14-18 December 2024. These artillery attacks have damaged buildings across Zamzam including near a mosque. *Radio Dabanga* reported ongoing shelling as of 18 December.<sup>2</sup>

Vehicle activity and crowds of people on foot are visible on the roads outside of Zamzam in satellite imagery on 18 December 2024. This activity corroborates reports of ongoing civilian displacement from Zamzam IDP Camp. The International Organization for Migration (IOM) reported that over 150 households in Zamzam fled to areas across El-Fasher and Tawilah localities on 14 and 15 December 2024 following attacks on the camp.<sup>3</sup> Yale HRL reported largescale evacuation of displaced people from Zamzam IDP camp in satellite imagery analysis on 12 December 2024.<sup>4</sup>

### El-Fasher, North Darfur

#### *Widespread SAF Airstrikes across El-Fasher*

Yale HRL assesses at least 160 munition impacts from aerial bombardment consistent with both air-to-surface missiles (ASM) and aerial bombs in El-Fasher between 5-18 December 2024. This aerial bombardment is likely a result of SAF air activity. This aerial bombardment is concentrated in the southern and southeastern neighborhoods of El-Fasher which includes areas along western and southwestern defensive mounds (berms). This corroborates reports by local news organizations of multiple rounds of airstrikes in the same areas and time period.<sup>5</sup> RSF has had significant activity in the southeastern and southern neighborhoods of El-Fasher.

#### *Razing in Abu Shenibat Neighborhood, El-Fasher*

Intentional razing of individual structures is visible in satellite imagery analysis in predominantly Zaghawa neighborhoods of southern El-Fasher. Yale HRL assesses that this razing is likely attributable to RSF based on RSF's previous pattern of attack in known Zaghawa areas. This is the first instance of intentional destruction of

individuated houses by forces on the ground since RSF targeted Zaghawa neighborhoods in El-Fasher in July 2024.<sup>6</sup>

Yale HRL identifies thermal scarring consistent with intentional razing to structures in the Abu Shenibat neighborhood in southern El-Fasher between 10 – 11 December and again between 14-17 December 2024. Visible Infrared Imaging Radiometer Suite (VIIRS) also indicated thermal detections around the Abu Shenibat neighborhood on 12 and 16 December 2024.<sup>7</sup> Yale HRL also identifies a similar pattern of thermal scarring to a community 3km north of El-Fasher through analysis of satellite imagery between 14 - 18 December 2024.

In both locations, the thermal pattern shows selective destruction of structures with unburned areas between the houses. These phenomena, known as “selection,” are forensically consistent with armed actors moving structure-to-structure, burning each structure individually.<sup>8</sup> This pattern of selective razing is consistent with RSF targeted razing of predominantly Zaghawa communities previously identified by Yale HRL in southern neighborhoods of El-Fasher, more than 40 communities west of El-Fasher, and more than 40 communities north of Kutum.<sup>9</sup> Local news and social media accounts have reported RSF shelling and clashes between RSF and Joint Forces in Abu Shenibat and other southern neighborhoods on 9, 12, and 16 December 2024.<sup>10</sup>

#### *Bombardment to Key SAF Structures*

Yale HRL identifies conflict-related damage from artillery and airstrikes across El-Fasher between 11 and 17 December 2024. Yale HRL assesses damage from likely RSF artillery attacks to structures at the El-Fasher airfield and other nearby structures used by SAF 6<sup>th</sup> Division and Joint Forces between 14-17 December 2024. Structures along the southern axis of the B-26 road inside El-Fasher are also damaged from likely shelling between 12-13 December 2024.

#### **SAF Airstrikes on Markets in Kabkabiya and Kuma, North Darfur**

Yale HRL assesses conflict-related damage consistent with SAF airstrikes to markets in Kabkabiya and Kuma, North Darfur through satellite imagery analysis.

Local media and rights groups reported that airstrikes on 9 December 2024 hit the Kabkabiya market on its weekly market day, resulting in the deaths of more than 100 people.<sup>11</sup> Yale HRL corroborates damage to structures in the Kabkabiya market through satellite imagery analysis between 6-13 December 2024. The UN Office of the High Commissioner for Human Rights condemned the attack, and Amnesty International described the airstrike as a “flagrant war crime.”<sup>12</sup>

Kuma has been attacked multiple times between October and December 2024. Through analysis of satellite imagery, Yale HRL assesses that the Kuma market was likely attacked between 16-21 November. These findings corroborate local media reports that an airstrike on 19 November 2024 resulted in the deaths of at least five people and damaged the city market.<sup>13</sup> Yale HRL also assesses damage to structures in Kuma between 6-11 November 2024. Local media reported that an airstrike on 8

November 2024 in Kuma injured at least seven people and destroyed a water source, an IDP shelter, and multiple houses.<sup>14</sup>

Attacks on markets, especially on market days, increase the chances of civilian casualties and likely destroy food stores and other critical goods. Yale HRL previously corroborated reports of airstrikes damaging Kuma market on 4 October 2024 and the Kutum market on 30 September 2024.<sup>15</sup>

## II. Human Security

RSF, based on this report, is currently engaged in at least two incidents that may violate international humanitarian and human rights law (IHL and IHRL):

- (1) Indiscriminately attacking an IDP camp in a manner that disproportionately targets civilians. The presence of any armed actors in Zamzam IDP Camp does not justify RSF's indiscriminate artillery strikes on Zamzam IDP camp in any way, and
- (2) Alleged targeting individual civilian structures in El-Fasher. These razings appear to be ethnically targeted and are consistent with RSF's past patterns of attack.

SAF is engaged in widespread, often indiscriminate bombardment in civilian areas of El-Fasher. This bombardment may fail to distinguish between combatants and non-combatants, as well as fail to take necessary precautions to prevent civilian harm. Recent SAF airstrikes on Kuma and Kabkabiya appear to have no clear military necessity and appear to target civilians and civilian infrastructure, which may constitute violations of the Geneva Conventions.<sup>16</sup>

## III. Methodology

Yale HRL utilizes data fusion methodologies of open source and remote sensing data analysis. Yale HRL produced this report through the cross-corroboration of open source data, including social media, local news reporting, multimedia, and other reports, and remote sensing data, including satellite imagery and thermal sensor data. Researchers analyzed open source data across social media, news reports, and other publicly available sources to identify, chrono- and geolocate, and verify incidents. Analysts assess the credibility and reliability of open source data based on a source's level of detail, past credibility, and the corroboration of other independent sources. Remote sensing and satellite imagery analysis relies on multi-temporal change detection, which involves the comparison of two or more satellite images of the same area captured at different times to detect differences in coloration, visual properties, and presence, absence, or positional change of objects across the images.

Place names were identified using UN P-codes obtained via the United Nations Humanitarian Data Exchange (HDX) and International Organization for Migration (IOM)'s Displacement Tracking Matrix (DTM) Sudan. This baseline was then verified and informed through open source analysis by Yale HRL's analysts with relevant cultural and linguistic skills.

## Limitations

There are significant limitations to the data fusion methodology. The information environment in Sudan does not have the breadth of data available in other locations and there is likely a significant reporting bias for those who provide open source reporting. The tools and techniques present significant challenges to assess activities such as extrajudicial detention, conflict-related sexual violence (CRSV), and conflict-related casualties, particularly in environments with limited data. Satellite imagery analysis is limited by available imagery over time and space. Available nadir angles of satellite imagery can produce challenges to assess structural damage, until multiple angles and ground-level photographic and video materials emerge to help inform the analysis. Image resolution level can also limit the analyst's ability to perceive the full extent of damage present.

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<sup>1</sup> Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. "SPECIAL REPORT El-Fasher: State of Crisis." 5 June 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Sudan Transparency and Policy Tracker, "Field Dispatch from El Fasher," November 12, 2024, <https://sudantransparency.org/field-dispatch-from-el-fasher/>, archived at <https://perma.cc/UNC6-2PJC>; African Arguments, "Land and Power: The Case of the Zaghawa", May 28, 2008, <https://africanarguments.org/2008/05/landand-power-the-case-of-the-zaghawa/>, archived at <https://perma.cc/2WFZ-SL9C>

<sup>2</sup> Radio Dabanga, "مقتل 10 أشخاص وإصابة 20 آخرين في قصف مدفعي بالفاشر," December 18, 2024, <https://www.dabangasudan.org/ar/all-news/article/%D9%85%D9%82%D8%AA%D9%84-10-%D8%A3%D8%B4%D8%AE%D8%A7%D8%B5-%D9%88%D8%A5%D8%B5%D8%A7%D8%A8%D8%A9-20-%D8%A2%D8%AE%D8%B1%D9%8A%D9%86-%D9%81%D9%8A-%D9%82%D8%B5%D9%81-%D9%85%D8%AF%D9%81%D8%B9%D9%8A-%D8%A8>, archived at <https://perma.cc/6AE8-KT4R>; HRL MMC\_062 is withheld for protection concerns; @Sudan\_war on X (formerly known as Twitter), "," December 18, 2024, [https://x.com/sudan\\_war/status/1869309438747898285](https://x.com/sudan_war/status/1869309438747898285), archived at <https://perma.cc/7ENX-JM6N>.

<sup>3</sup> International Organization for Migration (IOM), "DTM Sudan Flash Alert: Conflict in Al Fasher (Zamzam IDP Camp), North Darfur," December 16, 2024 <https://mailchi.mp/iom/dtm-sudan-flash-alert-conflict-in-al-fasher-zamzam-idp-camp-north-darfur-update-066>, archived at <https://perma.cc/T2JM-9XDA>.

<sup>4</sup> Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. "SPECIAL REPORT: RSF Heavy Artillery in Range of Zamzam IDP Camp As Civilians Flee." 13 December 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven.

<sup>5</sup> Radio Dabanga, "مقتل 7 أشخاص جراء تجدد القصف المدفعي في الفاشر," December 6, 2024, <https://www.dabangasudan.org/ar/all-news/article/%d9%85%d9%82%d8%aa%d9%84->

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<sup>6</sup> Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. “SPECIAL REPORT El-Fasher: State of Crisis.” 5 June 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven.

<sup>7</sup> NASA Fire Information for Resource Management System (FIRMS), <https://firms.modaps.eosdis.nasa.gov/>, archived at <https://perma.cc/T4XF-AQW5>.

<sup>8</sup> Brittany Card, Ziad Al Achkar, Isaac L. Baker, and Nathaniel A. Raymond. 9/2015. Satellite Imagery Interpretation Guide: Intentional Burning of Tukul, <https://hhi.harvard.edu/publications/satellite-imagery-interpretation-guide/intentional-burning>, archived at <https://perma.cc/87WA-QW4Y>.

<sup>9</sup> Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. “SPECIAL REPORT El-Fasher: State of Crisis.” 5 June 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. “SPECIAL REPORT El-Fasher: State of Crisis.” 5 June 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. “Fourteen Arson Attacks on Villages, North Darfur 02-12 October 2024,” 16 October 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. “TwentySix Arson Attacks on Villages in Kutum Locality, North Darfur 12 October – 6 November 2024,” 7 November 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven

<sup>10</sup> Alrakoba, “مقتل 11 مدنيا في قصف مدفعي لـ”الدعم السريع” على الفاشر,” December 10, 2024, <https://www.alrakoba.net/32015633/%D9%85%D9%82%D8%AA%D9%84-11-%D9%85%D8%AF%D9%86%D9%8A%D8%A7-%D9%81%D9%8A-%D9%82%D8%B5%D9%81-%D9%85%D8%AF%D9%81%D8%B9%D9%8A-%D9%84%D9%80%D8%A7%D9%84%D8%AF%D8%B9%D9%85-%D8%A7%D9%84%D8%B3%D8%B1/>, archived at <https://perma.cc/J92P-X23S>; Radio Dabanga, “استمرار العمليات القتالية على عدد من الجبهات,” December 17, 2024, <https://www.dabangasudan.org/ar/all-news/article/%D8%A7%D8%B3%D8%AA%D9%85%D8%B1%D8%A7%D8%B1-%D8%A7%D9%84%D8%B9%D9%85%D9%84%D9%8A%D8%A7%D8%AA-%D8%A7%D9%84%D9%82%D8%AA%D8%A7%D9%84%D9%8A%D8%A9-%D8%B9%D9%84%D9%89-%D8%B9%D8%AF%D8%AF-%D9%85%D9%86-%D8%A7>, archived at <https://perma.cc/U2J4-R5KG>; HRL\_MMC\_063 has been withheld for protection concerns.

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- <sup>12</sup> United Nations Human Rights Office of the High Commissioner, “Sudan: Alarm as civilians killed in attacks on markets”, December 13, 2024, <https://www.ohchr.org/en/statements/2024/12/sudan-alarm-civilians-killed-attacks-markets>, archived at <https://archive.ph/2VIZr>; Amnesty, “Sudan: SAF airstrike on crowded market a flagrant war crime”, December 12, 2024, <https://www.amnesty.org/en/latest/news/2024/12/sudan-armed-forces-saf-killed-dozens-in-an-air-strike-on-a-crowded-market-in-the-rapid-support-forces-rsf-controlled-town-of-kabkabiya-in-north-darfur/>, archived at <https://perma.cc/R3BD-3Q9C>
- <sup>13</sup> Alsudania, “مواطنو الكومة (شمال دارفور) يطالبون المجتمع الدولي بوقف الفوري للقصف الجوي في المناطق المأهولة بالسكان المدنيين,” November 21, 2024, <https://alsudania.news/%D9%85%D9%88%D8%A7%D8%B7%D9%86%D9%88-%D8%A7%D9%84%D9%83%D9%88%D9%85%D8%A9-%D8%B4%D9%85%D8%A7%D9%84-%D8%AF%D8%A7%D8%B1%D9%81%D9%88%D8%B1-%D9%8A%D8%B7%D8%A7%D9%84%D8%A8%D9%88%D9%86-%D8%A7%D9%84%D9%85/>, archived at <https://perma.cc/9CD3-YX3E>; Sudan War Monitor, “مقتل ٥ اشخصا على الأقل بطيران الجيش السوداني بولاية” November 21, 2024, <https://sudanwarmonitor.com/p/b93>, archived at <https://perma.cc/JTC6-U35Z>
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- <sup>16</sup> International Committee of the Red Cross, “Article 57,” Geneva Conventions of 1949, Additional Protocols and their Commentaries, accessed December 19, 2024, <https://ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-57>, archived at <https://perma.cc/8G2T-HKD5>; International Committee of the Red Cross, “Rule 12. Definition of Indiscriminate Attacks,” accessed December 19, 2024, <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule12>, archived at <https://perma.cc/QK7T-VHZT>; International Committee of the Red Cross, “Practice relating to Rule 15. Principle of Precautions in Attack,” accessed December 19, 2024, <https://ihl-databases.icrc.org/en/customary-ihl/v2/rule15>, archived at <https://perma.cc/DW3F-SEMJ>



# Zamzam IDP Camp

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN  
14-17 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 18 December 2024 of Zamzam IDP camp shows the damage from likely shelling to structures in the camp.



14 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement



18 December 2024 © 2024 Maxar Technologies  
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# Zamzam IDP Camp

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN  
14-17 DECEMBER 2024



14 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement

Analysis of satellite imagery collected between 14 and 18 December 2024 of Zamzam IDP Camp shows a munition impact and the damage to structures from likely shelling in the central sector of the camp.



18 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement

# Zamzam IDP Camp

## MUNITION IMPACT AND STRUCTURAL DAMAGE OBSERVED BETWEEN 14-18 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 18 December 2024 of Zamzam IDP Camp shows a munition impact and damage to structures in the camp.



14 December 2024 © 2024 Maxar, USG-Plus



18 December 2024 © 2024 Maxar, USG-Plus

# Zamzam IDP Camp

MUNITION IMPACT OBSERVED OBSERVED BETWEEN  
14-18 DECEMBER 2024



14 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement

Analysis of satellite imagery collected between 14 and 18 December 2024 of Zamzam IDP Camp shows a munition impact crater affecting perimeter walls near a mosque in the camp.



18 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement

El-Fasher, 18 December 2024

Analysis of satellite imagery collected between 05 and 18 December 2024 shows the presence of approximately 160 munition impacts from aerial bombardment, consistent with those from both air-to-surface missiles (with distinctive oblong craters) and aerial bombs (with larger diameter circular impacts with a raised rim). The majority of impacts are located in the southern and southeastern districts of the city.



● Aerial munition impacts observed between 05-18 December 2024



# SAF 6<sup>th</sup> Division Airbase, El-Fasher

## IMPACT AND CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 14-17 DECEMBER 2024

Analysis of satellite imagery collected between 14-17 December shows structural damage to the roof of a building at the SAF 6<sup>th</sup> Division Airbase in El-Fasher and the new presence of an impact consistent with that from artillery shelling.



14 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement



17 December 2024 © 2024 Maxar Technologies  
Image enhanced with MGP Pro HD image enhancement

# Southern El-Fasher

SMOKE OBSERVED BETWEEN 11-12 DECEMBER 2024

Analysis of satellite imagery collected between 11 and 12 December 2024 of El-Fasher shows smoke emanating from a building in southern El-Fasher due to a munition impact



11 December 2024 © 2024 Maxar, USG-Plus



12 December 2024 © 2024 Maxar, USG-Plus

# Western El-Fasher

SMOKE OBSERVED BETWEEN 17-18 DECEMBER 2024

Analysis of satellite imagery collected between 17 and 18 December 2024 of El-Fasher shows smoke due to munitions impact emanating from buildings in western El-Fasher



17 December 2024 © 2024 Maxar, USG-Plus



18 December 2024 © 2024 Maxar, USG-Plus



# Western El-Fasher

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN  
12-13 DECEMBER 2024

Analysis of satellite imagery collected between 12 and 13 December 2024 shows the damage to structures from likely shelling along the B26 road in western El-Fasher.



12 December 2024 © 2024 Maxar, USG-Plus



13 December 2024 © 2024 Maxar, USG-Plus

## Abu Shenibat Neighborhood, El-Fasher

THERMAL SCARRING AND DAMAGE TO STRUCTURES  
OBSERVED BETWEEN 10-11 DECEMBER 2024

Analysis of satellite imagery collected between 10 and 11 December 2024 of the Abu Shenibat neighborhood shows thermal scarring and damage to structures consistent with intentional razing.



10 December 2024 © 2024 Maxar, USG-Plus



11 December 2024 © 2024 Maxar, USG-Plus

# Abu Shenibat Neighborhood, El-Fasher

THERMAL SCARRING AND DAMAGE TO STRUCTURES  
OBSERVED BETWEEN 14-17 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 17 December 2024 of the Abu Shenibat neighborhood shows thermal scarring and damage to structures consistent with intentional razing.



14 December 2024 © 2024 Maxar, USG-Plus



17 December 2024 © 2024 Maxar, USG-Plus

# Abu Shenibat Neighborhood, El-Fasher

THERMAL SCARRING AND DAMAGE TO STRUCTURES  
OBSERVED BETWEEN 14-17 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 17 December 2024 of the Abu Shenibat neighborhood shows thermal scarring and damage to structures consistent with intentional razing.



14 December 2024 © 2024 Maxar, USG-Plus



17 December 2024 © 2024 Maxar, USG-Plus

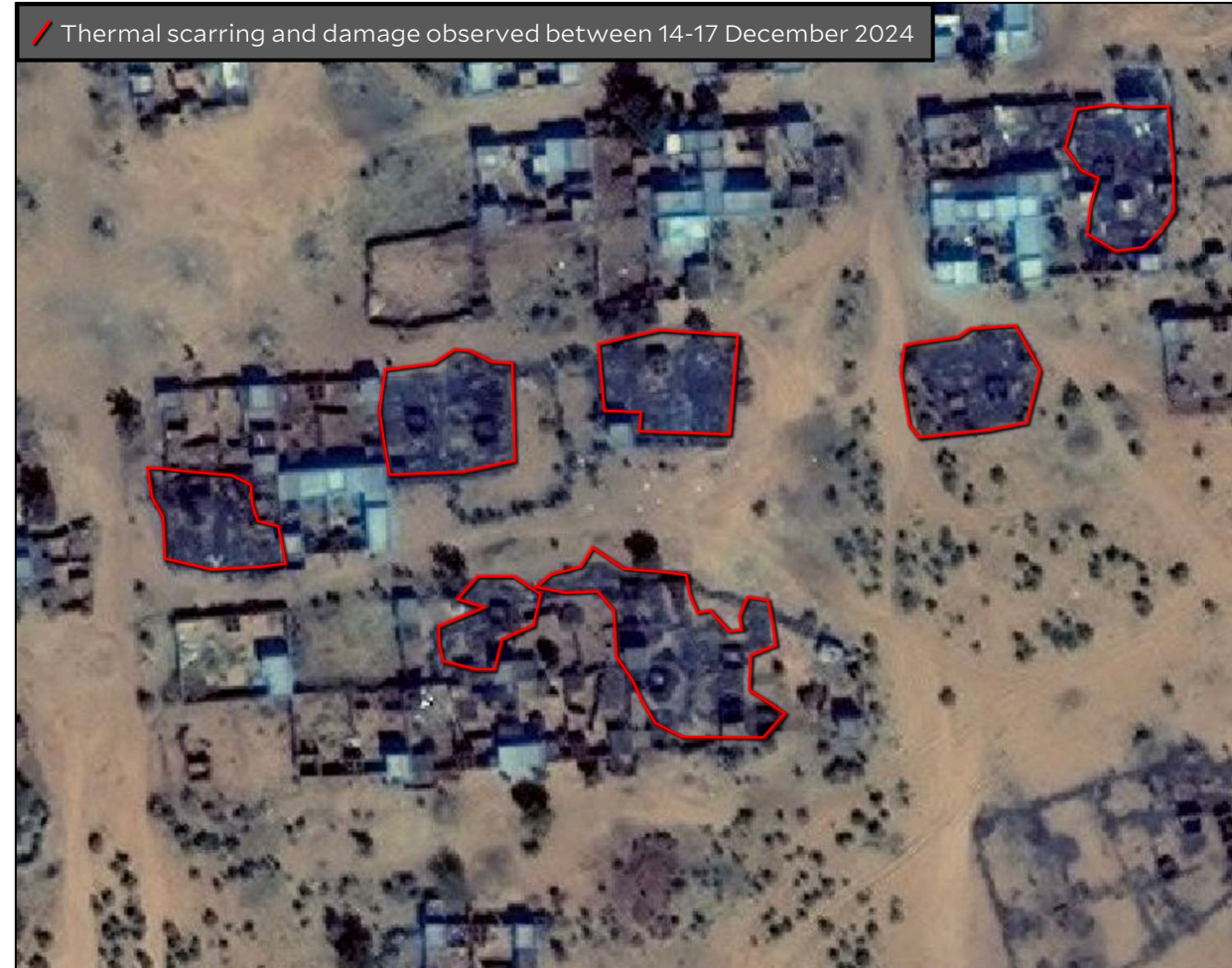
# Abu Shenibat Neighborhood, El-Fasher

THERMAL SCARRING AND DAMAGE TO STRUCTURES  
OBSERVED BETWEEN 14-17 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 17 December 2024 of the Abu Shenibat neighborhood shows thermal scarring and damage to structures consistent with intentional razing.



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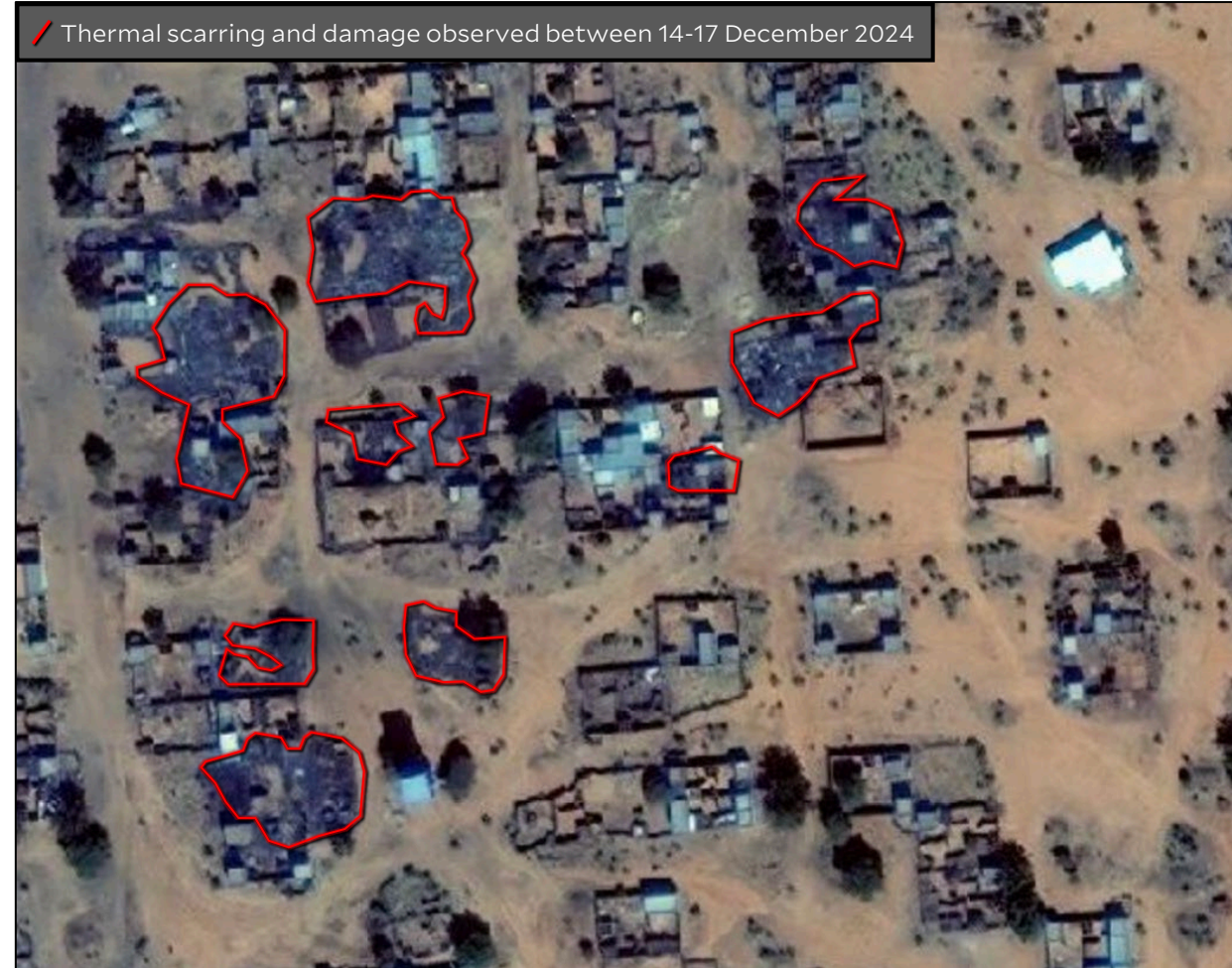
# Abu Shenibat Neighborhood, El-Fasher

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## North of El-Fasher

THERMAL SCARRING AND DAMAGE TO STRUCTURES  
OBSERVED BETWEEN 14-19 DECEMBER 2024

Analysis of satellite imagery collected between 14 and 18 December 2024 of a village approximately 3 km north of El-Fasher shows thermal scarring and damage to structures consistent with intentional razing.



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18 December 2024 © 2024 Maxar, USG-Plus

# Kabkabiya Market

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN  
06-13 DECEMBER 2024



06 December 2024 © 2024 Maxar, USG-Plus

Analysis of satellite imagery between 06-13 December 2024 shows damage to structures at Kabkabiya Market.



13 December 2024 © 2024 Maxar, USG-Plus



# Kuma

## CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 05 OCTOBER AND 09 DECEMBER 2024

Analysis of satellite imagery between 05 October and 09 December 2024 damage of structures at Kuma. Assessing low resolution Sentinel imagery, the timeframe of damage can be narrowed down to 06-11 November 2024.



05 October 2024 © 2024 Skyfi



09 December 2024 © 2024 Skyfi

# Kuma Market

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 05 OCTOBER AND 09 DECEMBER 2024

Analysis of satellite imagery between 05 October and 09 December 2024 damage of structures at Kuma Market. Assessing low resolution Sentinel imagery, the timeframe of damage can be narrowed down to 16-21 November 2024.



05 October 2024 © 2024 IMPRO via Skyfi



09 December 2024 © 2024 IMPRO via Skyfi

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