SPECIAL REPORT

Zamzam IDP Camp Attacked: Confirmation of Munition Impacts Between 1-3 December 2024

3 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) corroborates reports that Zamzam Internally Displaced Persons (IDP) Camp in North Darfur was attacked by Rapid Support Forces (RSF) through satellite imagery analysis. Yale HRL has identified a munition impact and smoke visible outside two internally displaced persons (IDP) shelters in Zamzam using satellite imagery analysis between 1 – 3 December 2024. Yale HRL also identifies conflict-related damage to structures in Zamzam and corroborates reports of civilian displacement from the camp during the same time period.[1] Internally displaced persons appear to have deconstructed temporary shelters, likely in advance of departure, and additional temporary shelters consistent with IDPs are newly present outside Zamzam. The damaged locations are spread out over a large area, which may be consistent with indiscriminate fire disproportionately impacting civilians. Yale HRL is not releasing all satellite imagery due to human security concerns.

Local news and social media accounts reported that RSF shelling on 1 and 2 December 2024 damaged several locations in Zamzam IDP camp, including a market and an IDP shelter inside a school.[2] On 1 December 2024, Médecins Sans Frontières (MSF) teams received 8 injured people, including women and children as young as 4 years old "with severe injuries such as chest trauma and fractures."[3] Relief International has also reported patients with gunshot wounds and other critical injuries.[4]

The current population of Zamzam IDP camp is estimated to range between 500,000 to over 1 million people.[5] The population was estimated to be approximately 400,000, prior to April 2024, and the current population is believed to be far higher as people have fled conflict.[6] Since then, Yale HRL has corroborated reports of significant displacement from El-Fasher to Zamzam.[7] Famine (IPC-5) was declared in Zamzam IDP camp as of June 2024. As of 1 November 2024, MSF reports that acute malnutrition rates remain above the IPC-5 threshold.[8] Yale HRL has previously assessed that Zamzam IDP camp will be RSF's next target if El-Fasher falls. Rapid Support Forces has previously used the proximity of IDP camps to SAF bases as cover to conduct mass atrocities, including in Hasahisa Camp and Ardamata.[9]

II. 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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[2] Sudan Tribune, " https://sudantribune.net/article294099/, archived at https://perma.cc/P793-MMTV; https://sudantribune.net/article294146/, archived at https://perma.cc/2UPS-Q6DM; @Sudan_tweet on X (formerly known as Twitter), " تنسيقية لجان مقاومة" December 2, 2024, https://x.com/Sudan_tweet/status/1863622050256134392, archived at https://perma.cc/JX6N-55U3

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[4] Relief International, "Zamzam Camp comes under fire. Relief International clinic receives critical injuries and is forced to suspend activities in some health facilities." Reliefweb, 2 December 2024, https://reliefweb.int/report/sudan/zamzam-camp-comes-under-fire-relief-international-clinic-receives-critical-injuries-and-forced-suspend-activities-some-health-facilities, archived at https://perma.cc/H6T4-EV6S

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[7] Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. "Special Report: Cargo Plane over RSF Territory & Continued Civilian Displacement from El-Fasher" 12 June 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Caitlin N. Howarth, Danielle N. Poole, Kaveh Khoshnood, Nathaniel A. Raymond et al. "Flood Zone: Impact of Heavy Rains on Humanitarian and Human Security Situation in El-Fasher and Zamzam IDP Camp" 2 August 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven; Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. "El-Fasher Situation Report: RSF Advances on 6th Division as Zamzam Prepares for Attack." 11 November 2024. Humanitarian Research Lab at Yale School of Public Health: New Haven.

[8] FEWS NET, "Famine (IPC Phase 5) continues in part of Al Fasher amid conflict and flooding," September 5, 2024, https://fews.net/east-africa/sudan/alert/september2024, archived at https://perma.cc/QX9S-E6KE United Nations Office for the Coordination of Humanitarian Affairs, "Sudan Humanitarian Update," 1 November 2024, https://www.unocha.org/publications/report/sudan/sudan-humanitarian-update-1-november-2024, archived at https://perma.cc/LM7J-Z47Q

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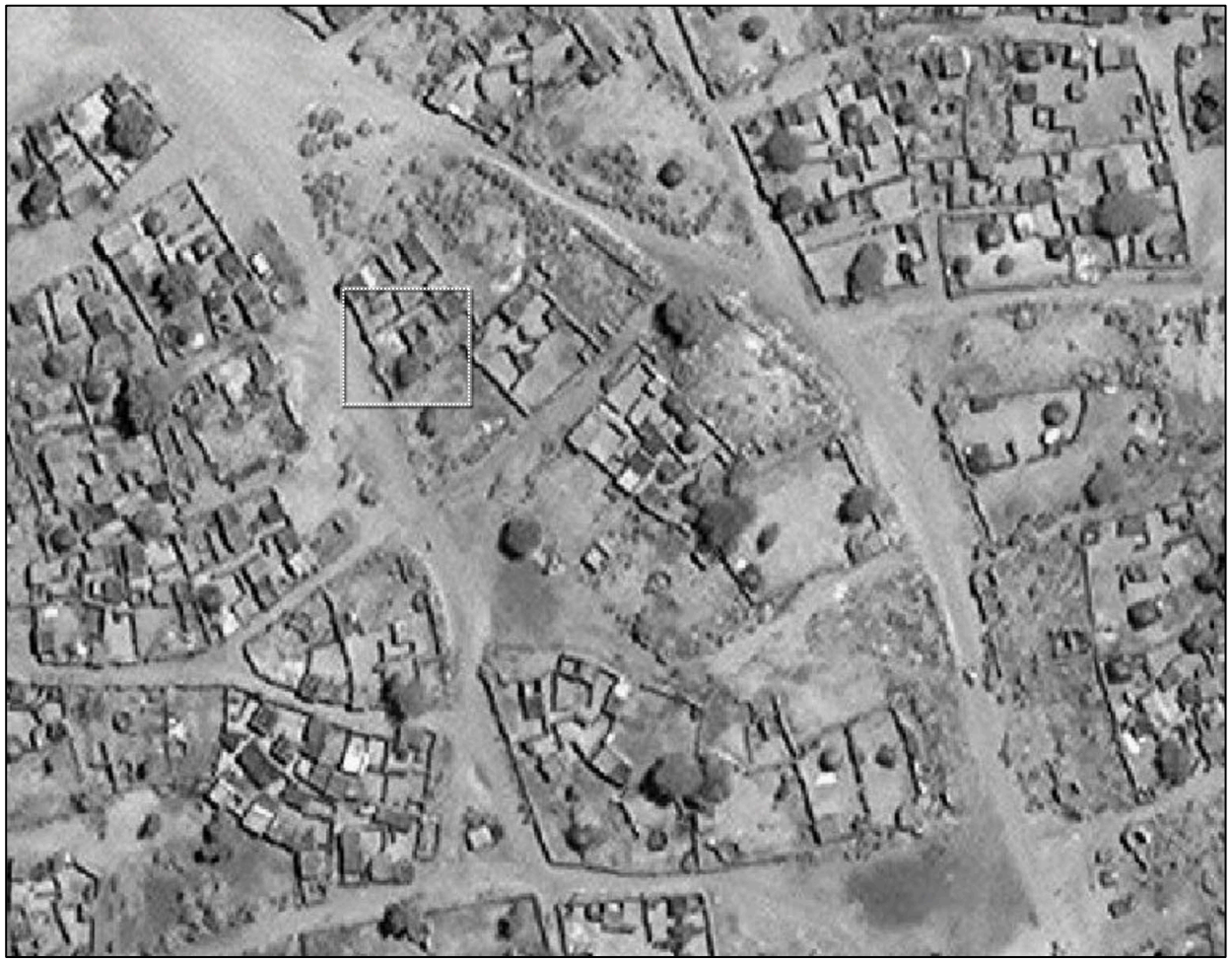
Zamzam IDP Camp

CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 01-03 DECEMBER 2024

Analysis of satellite imagery collected between 01 and 03 December 2024 of Zamzam IDP Camp shows the damage from likely shelling to structures within the camp.



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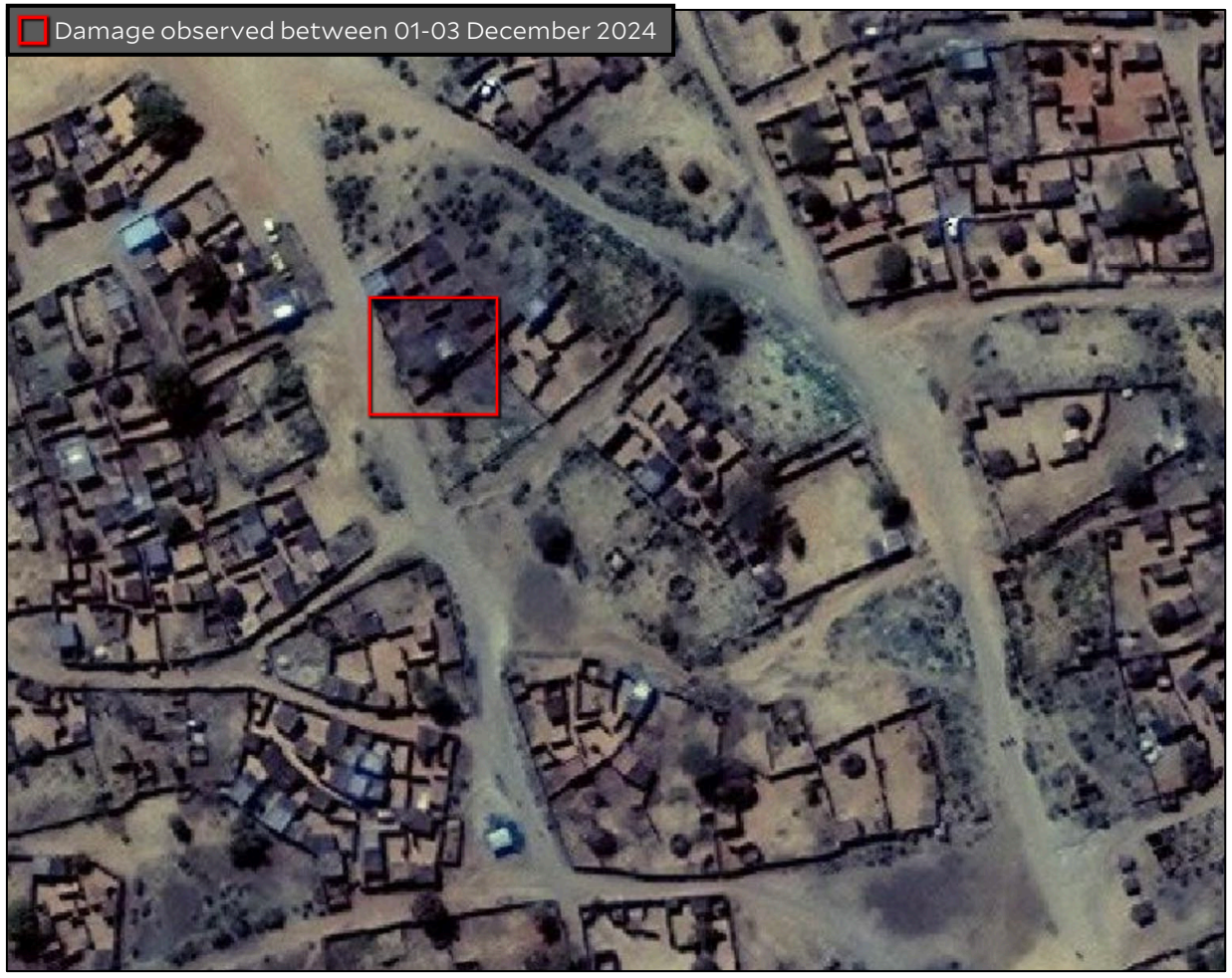

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Zamzam IDP Camp

SMOKE OBSERVED BETWEEN 01-03 DECEMBER 2024

Analysis of satellite imagery collected between 01 and 03 December 2024 of Zamzam IDP Camp shows smoke from a likely munition impact to the berm of an IDP compound.

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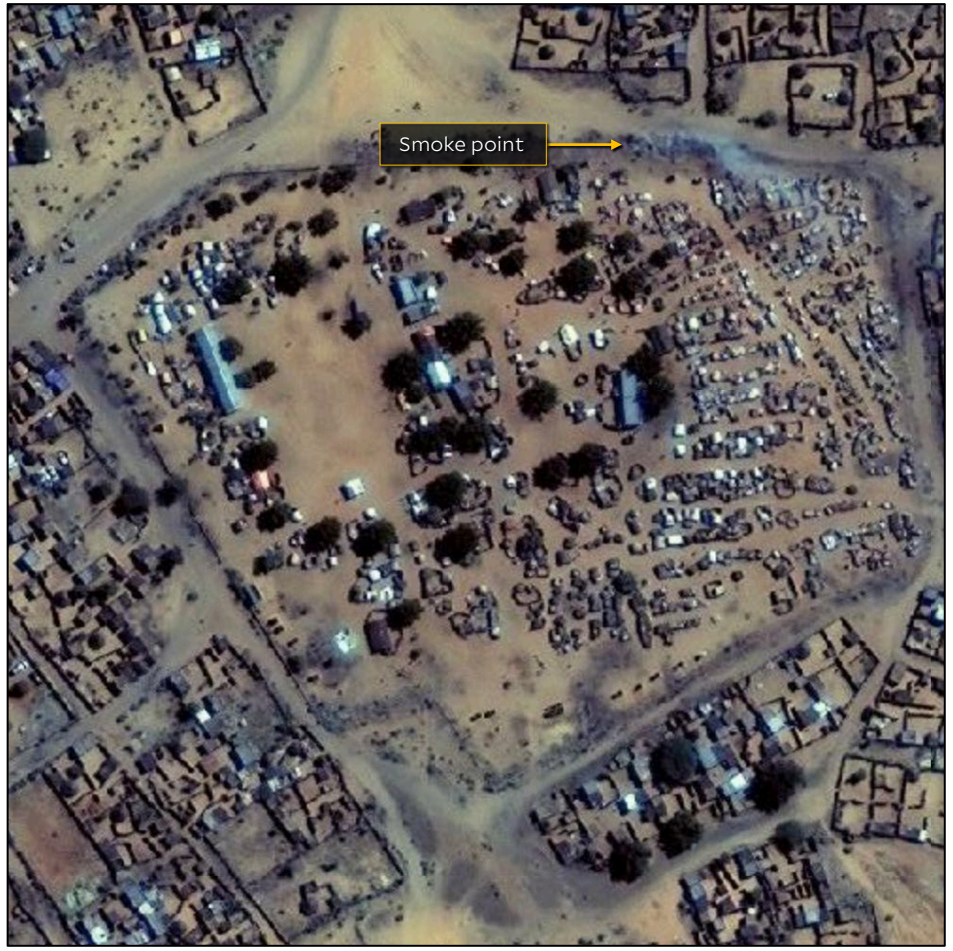

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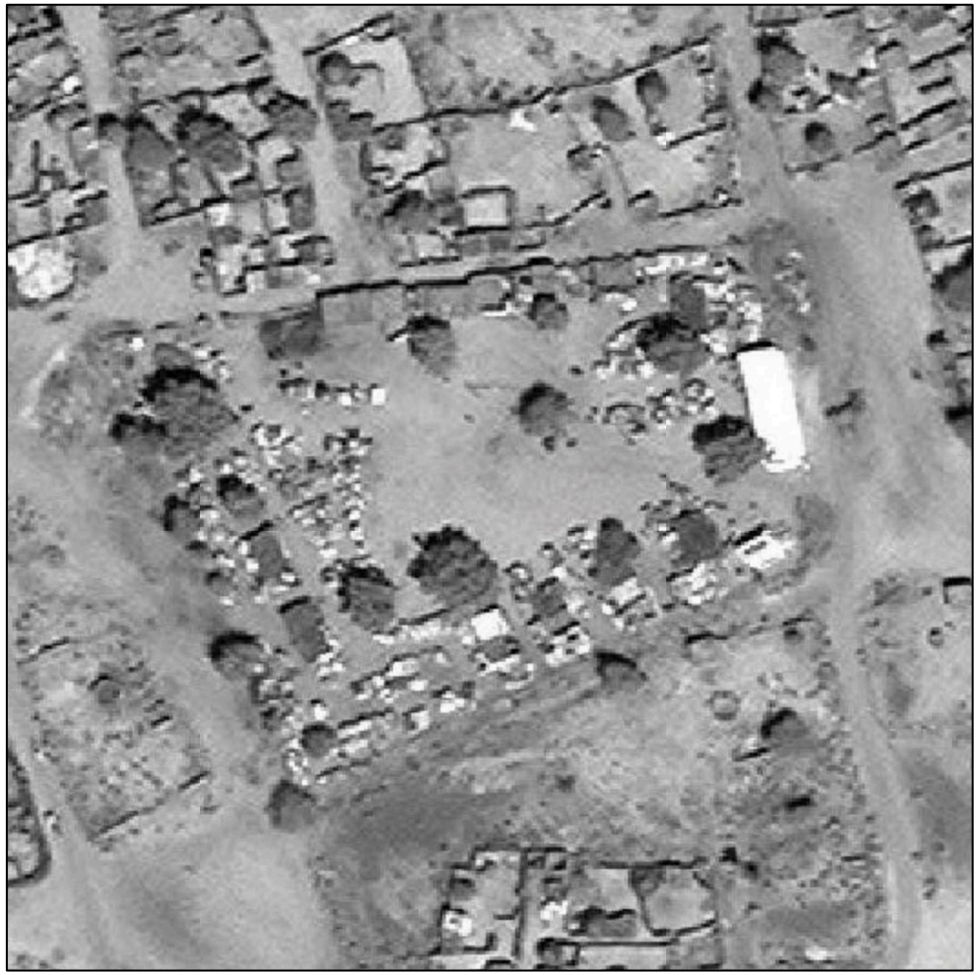
Zamzam IDP Camp

MUNITION IMPACT OBSERVED BETWEEN 01-03 DECEMBER 2024

Analysis of satellite imagery collected between 01 and 03 December 2024 of Zamzam IDP Camp shows a munition impact crater outside an IDP compound.



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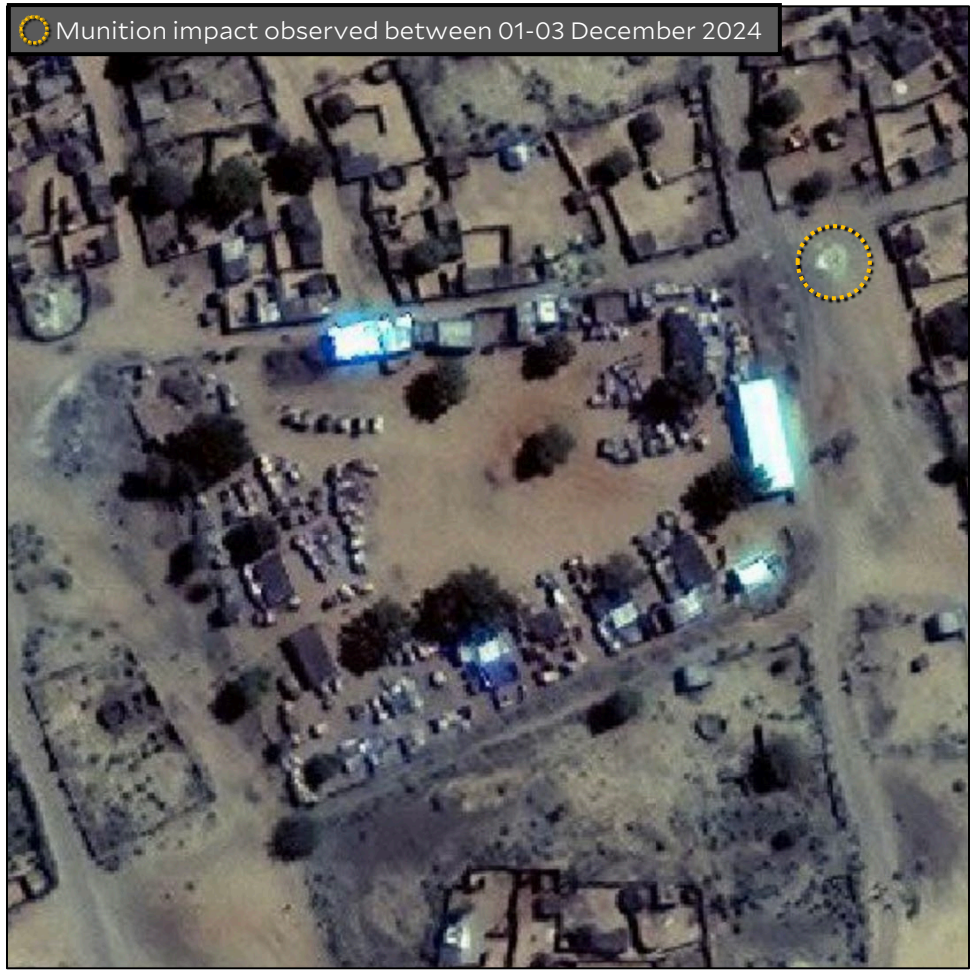

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