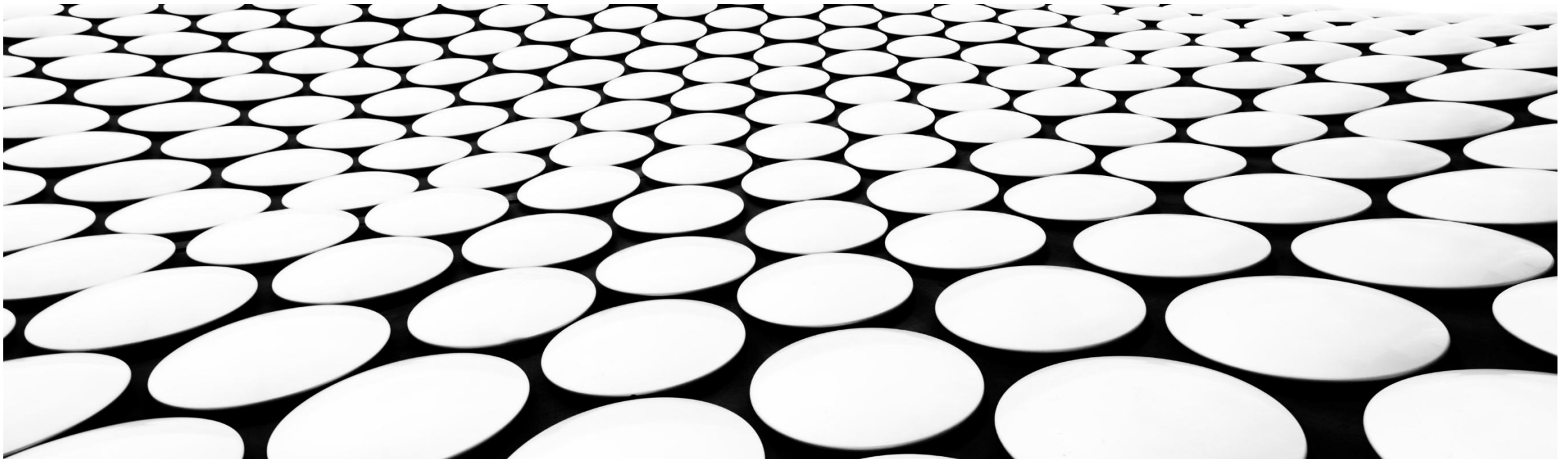


ASSESSMENT OF LIBYA FLOOD BASED ON HIGH SPATIAL NIGHTTIME LIGHT DATA FROM SDGSAT-1



INTRODUCTION

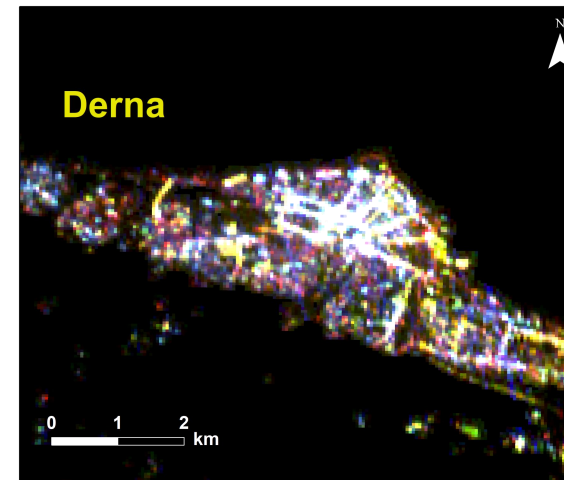
- Libya flooding of 2023, catastrophic flooding that struck eastern Libya on September 10 and 11, 2023. More than 4,000 people were killed and some 10,000 were missing after heavy rains generated by Storm Daniel (a strong Mediterranean cyclone) drenched the area and brought flooding to the region.
- About 25 percent of the Libyan port city of Derna was destroyed by a massive torrent of water and mud after two dams located upstream from the city collapsed from pressure brought on by the heavy rains.



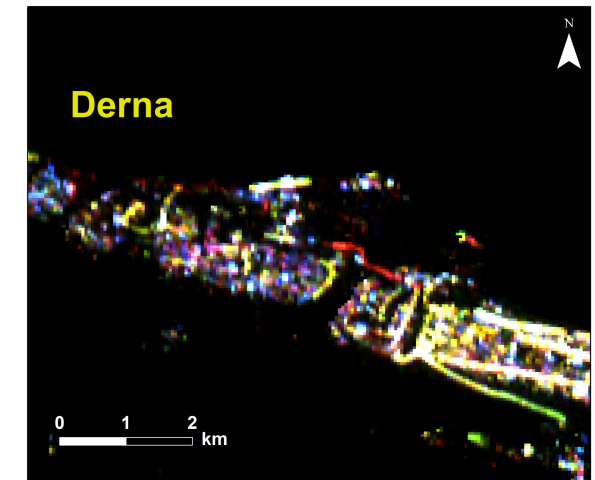
**Pre-Flood
Daytime-Maxar**



**Post-Flood
Daytime-Maxar**



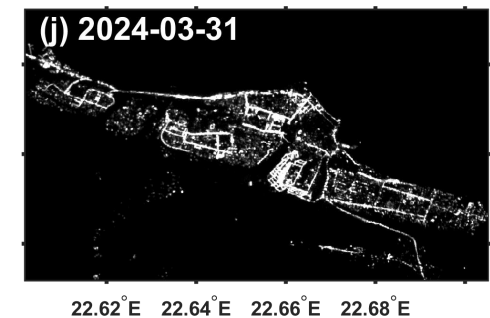
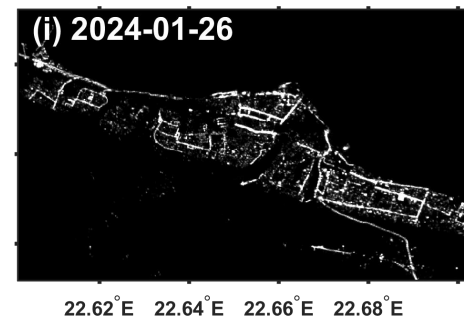
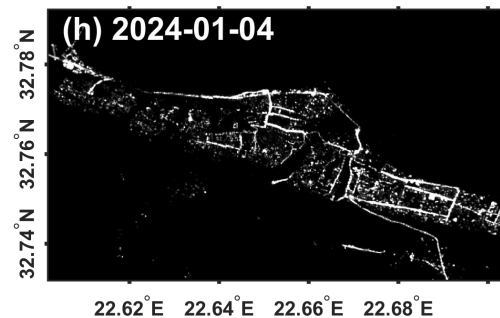
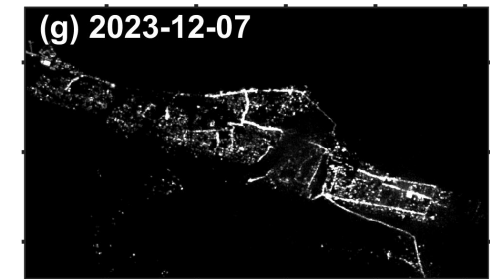
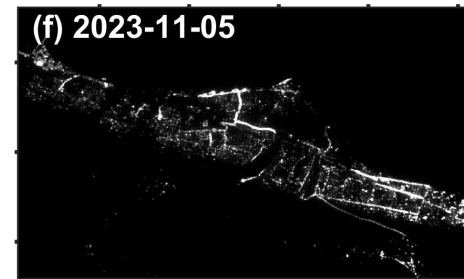
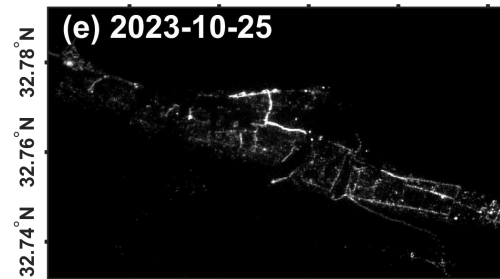
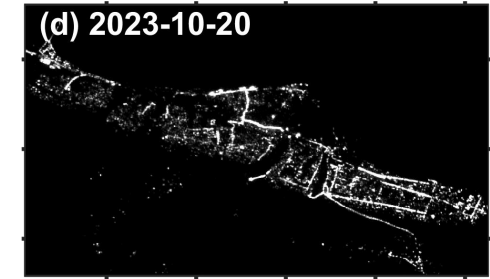
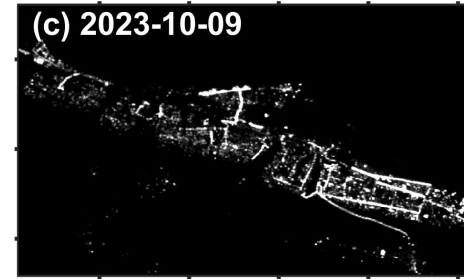
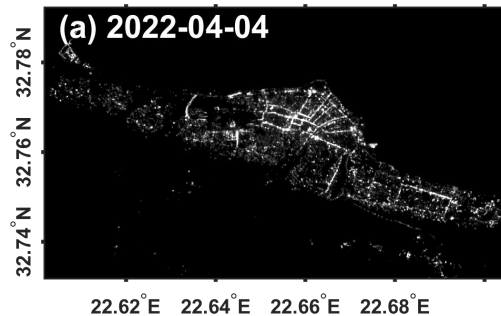
**Pre-Flood
Nighttime-SDGSAT-1**



**Post-Flood
Nighttime-SDGSAT-1**

ANALYSIS

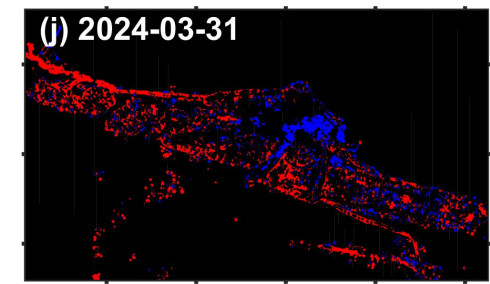
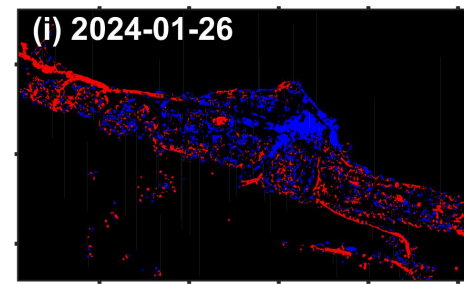
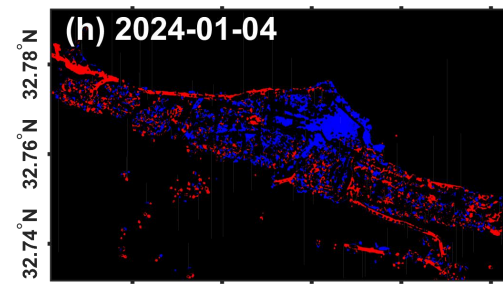
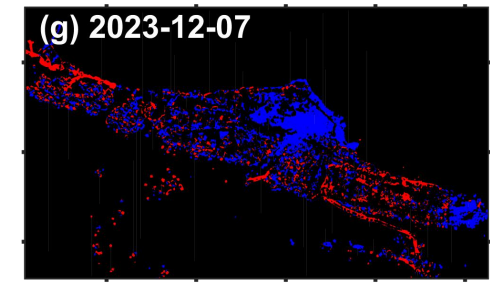
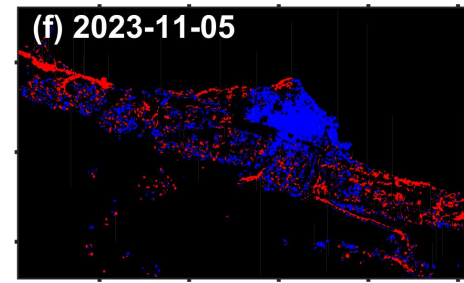
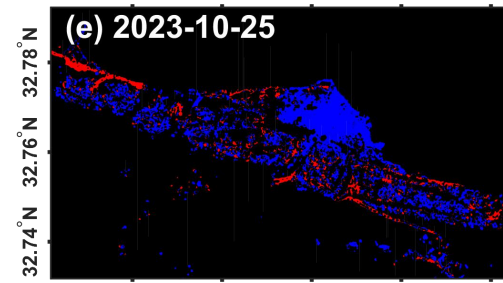
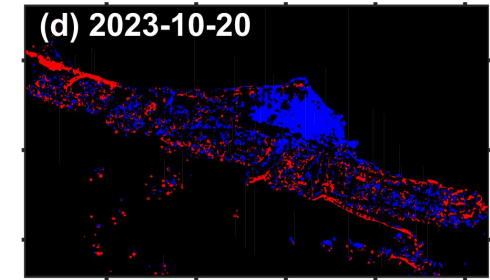
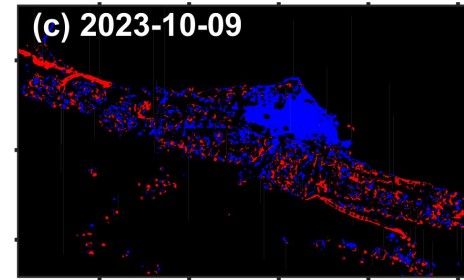
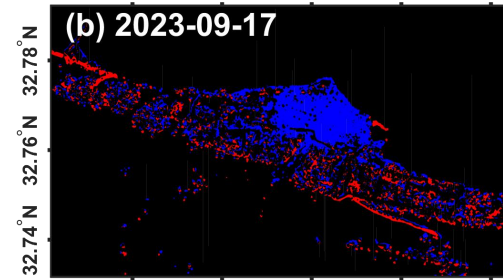
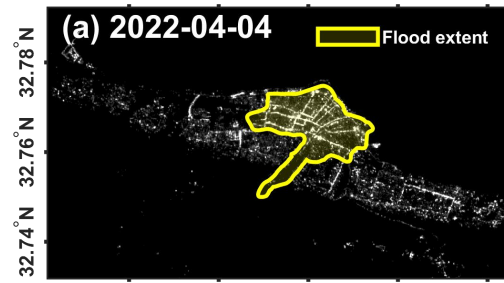
- 10 imageries of SDGSAT-1 Glimmer Imager (GLI), including 1 Pre-Flood imagery, and 9 Post-Flood image



The massive flooding on September 11, 2023 caused the lights to drop significantly in Derna, Libya.

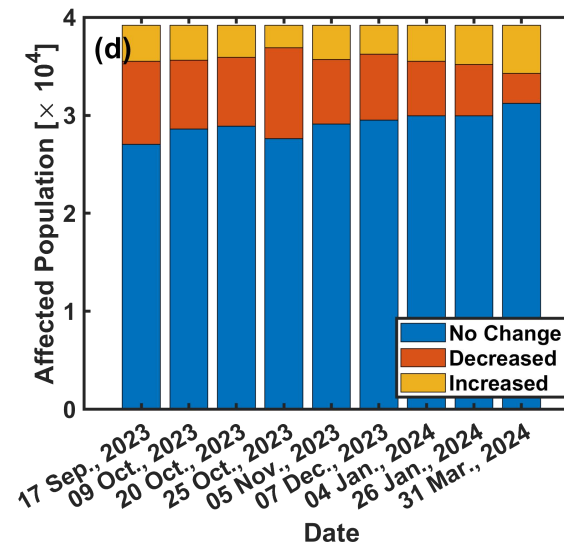
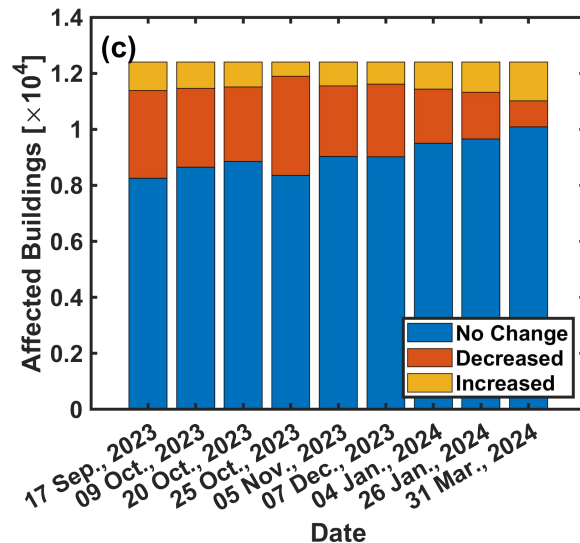
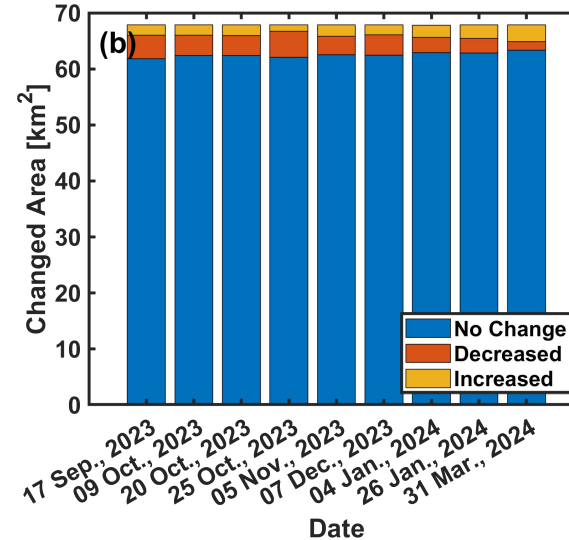
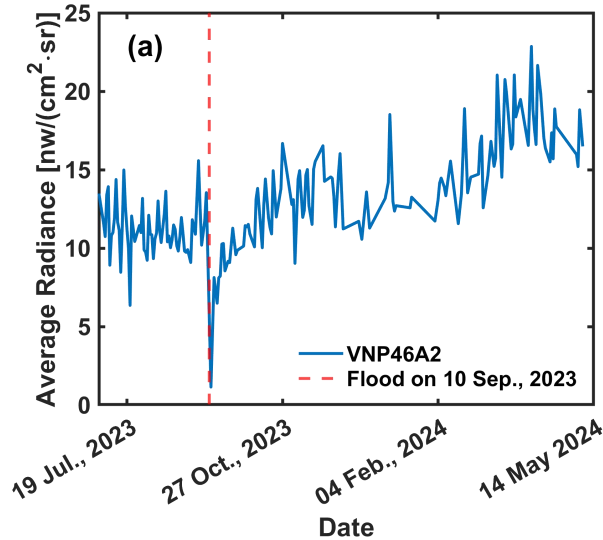
ANALYSIS

- 10 imageries of SDGSAT-1 Glimmer Imager (GLI), including 1 Pre-Flood imagery, and 9 Post-Flood image



With the deepening of post-disaster reconstruction, the main roads have basically restored power and even increased lights. But the eastern side of the main city recovered more slowly.

ANALYSIS



- (a) Average radiance of Derna city based on VIIRS/DNB dataset at 500 m spatial resolution
- (b) Changed area of Derna based on SDGSAT-1 GLI
- (c) Affected buildings of Derna based on SDGSAT-1 GLI and OSM building shapefile
- (d) Affected population of Derna based on SDGSAT-1 GLI and WorldPoP dataset

The area of light, the number of buildings and the number of people caused by the power shortage have gradually decreased, and have not yet recovered to the pre-disaster level. At present, Derna city is still in the process of recovering from the disaster.

SUMMARY



- The massive flooding on September 11, 2023 caused the lights to drop significantly in Derna, Libya.
- With the deepening of post-disaster reconstruction, the main roads have basically restored power and even increased lights. But the eastern side of the main city recovered more slowly.
- The area of light, the number of buildings and the number of people caused by the power shortage have gradually decreased, and have not yet recovered to the pre-disaster level. At present, Derna city is still in the process of recovering from the disaster.
- Continuous observations have been planned for full assessment of power recovery.

SOURCES



(1) Satellite Images

Satellite Data: SDGSAT-1 GLI

Imagery Date: 04 Apr., 2022 & 17 Sep., 2023 & 09 Oct., 2023 & 20 Oct., 2023 & 25 Oct., 2023 & 05 Nov., 2023 & 07 Dec., 2023 & 04 Jan., 2024 & 26 Jan., 2024 & 31 Mar., 2024

Resolution: 10 m

Copyright: International Research Center of Big Data for Sustainable Development Goals (CBAS)

Source: International Research Center of Big Data for Sustainable Development Goals (CBAS)

Satellite Data: VIIRS VNP46A2

Imagery Date: from 01 Jul., 2023 to 07 May, 2024

Resolution: 500 m

Copyright: NASA

Source: NASA

Satellite Data: MAXAR GE01

Imagery Date: 01 July 2023 & 13 September 2023

Resolution: ~1.6 m

Copyright: MAXAR

Source: MAXAR

(2) Ancillary Data

Administrative boundaries: Database of Global Administrative Areas Version: 4.10

Buildings polygon: Open Street Map

Population: WorldPoP

(3) Analysis & Production

Analysis: International Research Center of Big Data for Sustainable Development Goals (CBAS)

Production: International Research Center of Big Data for Sustainable Development Goals (CBAS) & Integrated Research on Disaster Risk (IRDR)

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