

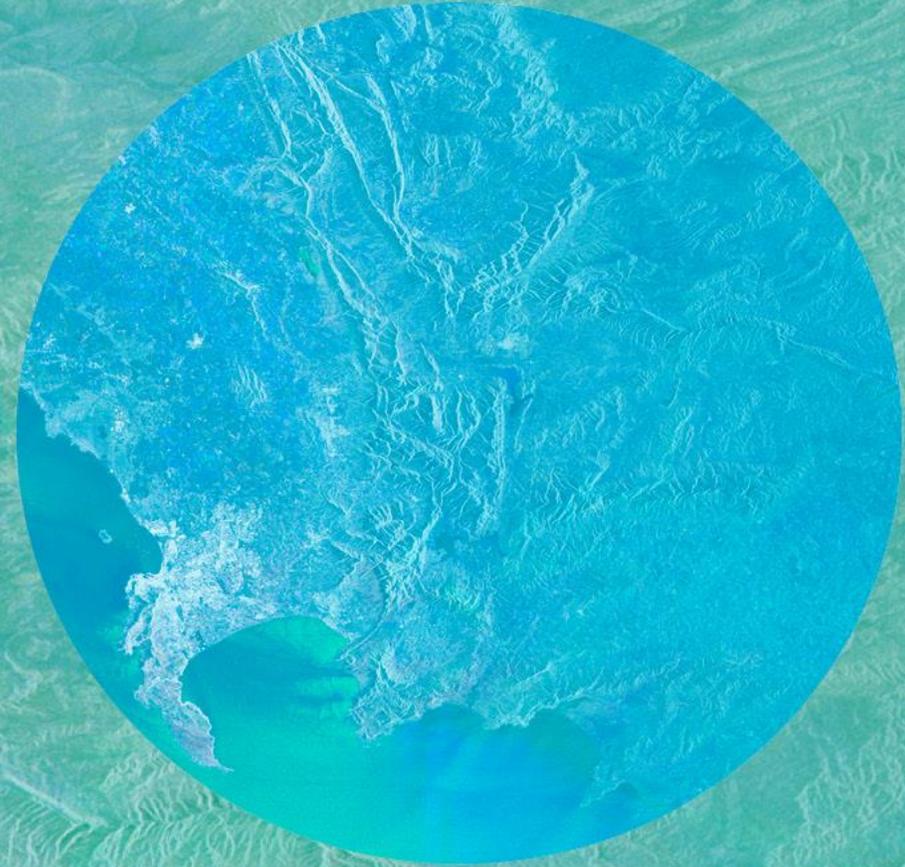
# GEO WEEK & MINISTERIAL SUMMIT 2023

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Flashtalk

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#TheEarthTalks



science & innovation

Department:  
Science and Innovation  
REPUBLIC OF SOUTH AFRICA



GEO WEEK  
2023 MINISTERIAL  
SUMMIT

GEO GROUP ON  
EARTH OBSERVATIONS

# Humanitarian Mapping using Night-time Light Imagery

Highlighted Use Cases of GEO Night Light

06.11.2023, 11:30 - 11:40



Xi Li





#TheEarthTalks GEO WEEK & Ministerial Summit 2023

# OUTLINE

About GEO Night Light

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Use Cases

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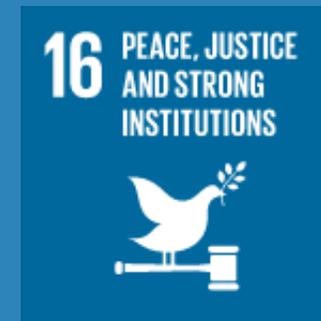
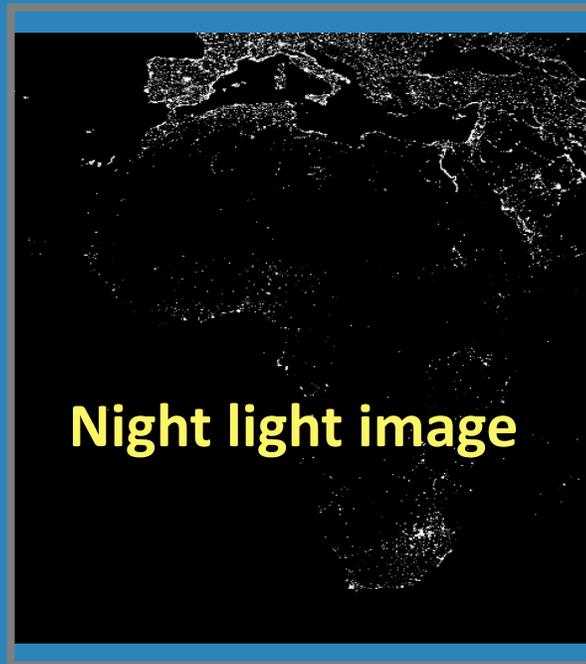
Impacts

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Lesson Learned

## About GEO Night Light

Night light is related to >20 SDG indexes



## About GEO Night Light

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### *Full name*

Night-time light remote sensing for sustainable development goals

### *Participants*

China, United Nations Satellite Centre (UNOSAT) and Uzbekistan

### *Purpose*

GEO Night Light is a GEO Pilot Initiative to track SDG indexes using night light imagery

## About GEO Night Light

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Collaboration between Wuhan University and UNOSAT is the foundation



GEO Night Light participants from UNSOSAT and Wuhan University



UNOSAT intern from Wuhan University

## Use cases

Abrupt decline of night-time light can reflect humanitarian disasters  
 GEO Night Light has delivered 14 products for humanitarian mapping

Event	Users of requests	Number of Products
<b>D.R. Congo Conflict</b>	MONUSCO (UN Peacekeepers in D.R. Congo)	1
<b>Türkiye/Syria Earthquake</b>	IFRC, UNOCHA, UNHCR	2
<b>Sudan Conflict</b>	ICRC, UNOCC	1
<b>WAP Complex (Benin)</b>	UNOCHA	1
<b>Tigray Conflict (Ethiopia)</b>	OHCHR	1
<b>Morocco Earthquake</b>	IFRC	1
<b>Libya Flood</b>	UNOCHA	2
<b>Afghanistan Earthquake</b>	UNOCHA	1
<b>Pakistan Flood</b>	UNOCHA	1
<b>Humanitarian Disasters in Palestine</b>	UNICEF, UNOCC, WFP	3

# User-activated Humanitarian Mapping by GEO Night Light



## Use cases

# Emergency mapping for Türkiye/Syria Earthquake



14 February 2023



### Light loss assessment following the Marash / Antep Earthquake (6 February 2023, Mw 7.8) using Night-time Light Imagery

Türkiye & Syrian Arab Republic

📍 Status: Significant light loss observed.

☰ Further action(s): full assessment to be conducted

<https://unosat.org/products/3497>

20 April 2023



### Power Supply Recovery Assessment following the Marash / Antep Earthquake (6 February 2023, Mw 7.8) using Night-time Light Imagery



Türkiye & Syrian Arab Republic

📍 Status: Different recovery pattern observed.

☰ Further action(s): full assessment to be conducted

<https://unosat.org/products/3565>



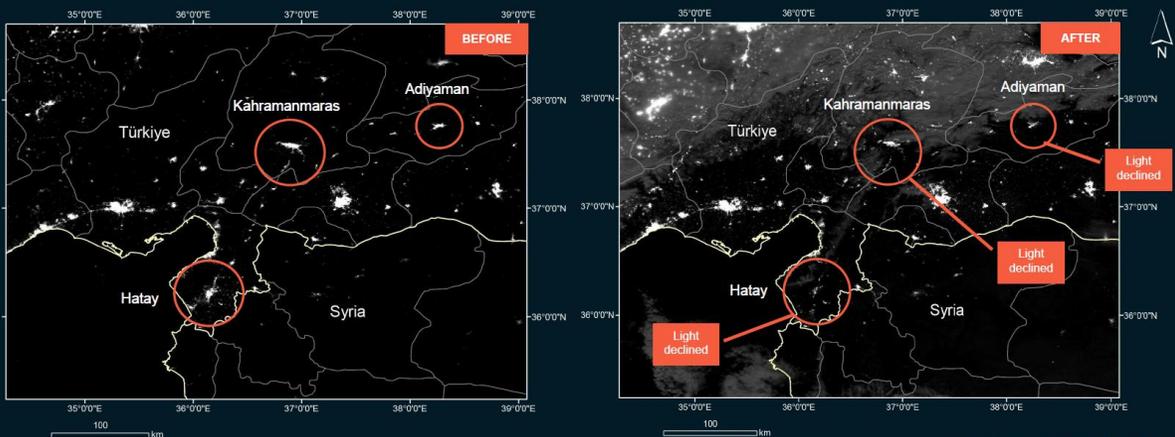
# Use cases

## Emergency mapping for Türkiye/Syria Earthquake

### Light before and after the earthquake

Several urban areas located in different provinces, including Hatay, Kahramanmaraş and Adiyaman, became darker after the earthquake.

Image centre:  
36°12'15.1"N  
36°09'28.7"E



VIIRS VNP46A1 / 24 Jan. 2023

VIIRS VNP46A1 / 08 Feb. 2023

International boundary Province/Governorate boundary

4

### Light loss after the earthquake

Significant light losses are observed in several Districts affected by the earthquake(s).

Image centre:  
36°12'15.1"N  
36°09'28.7"E



Data source: VIIRS VNP46A2 [24 Jan. 2023] Vs. [08 Feb. 2023]

International boundary Province/Governorate boundary Place of interest

3

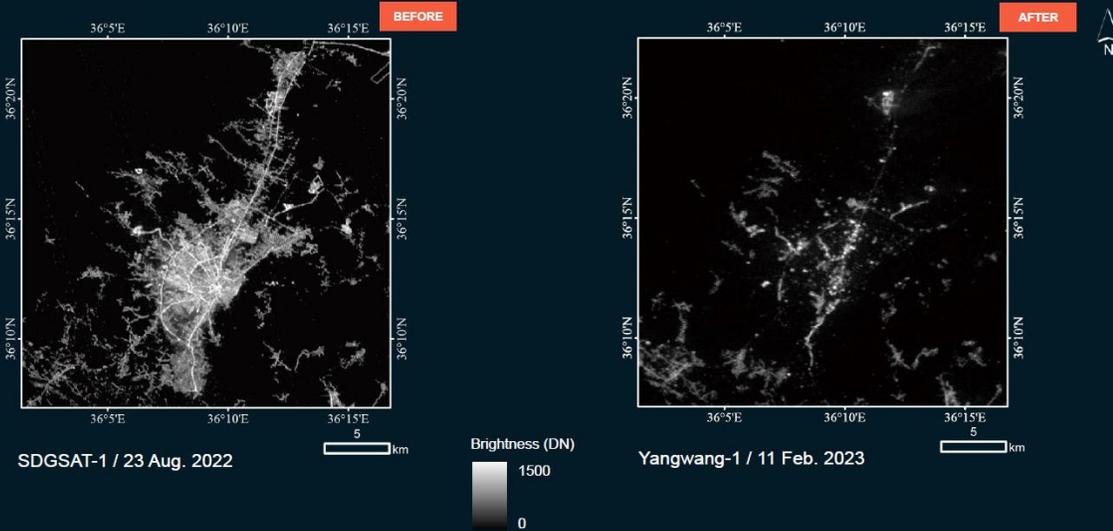
# Use cases

## Emergency mapping for Türkiye/Syria Earthquake

### Night-time Light in Antakya, Hatay

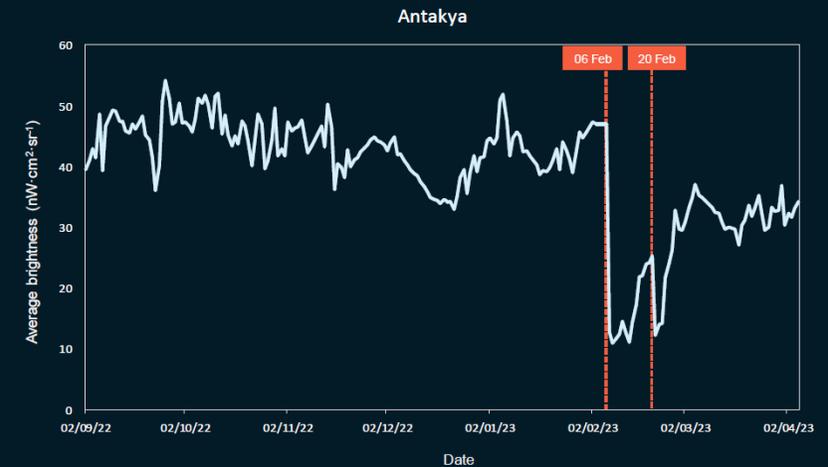
Most areas in Antakya city suffer from significant power outages.

Image centre:  
36°12'45.1"N  
36°09'28.7"E



### VIIRS night-time light time series

Image centre:  
36°12'20.5"N  
36°09'13.0"E



- In Antakya, significant power outage and recovery are observed after two earthquakes on 6 Feb and 20 Feb, but the power has not returned to normal level by 5 April.

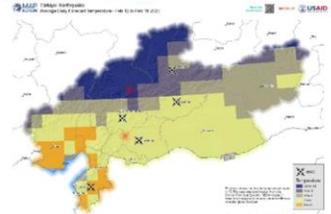
# Impacts

Reflecting the destruction of buildings, the departure of people from their homes, and the disruption of basic utilities, **a preliminary light-loss assessment issued by the UN Satellite Centre (UNOSAT) and Wuhan University** on 14 February shows that many urban areas in affected areas became darker after the earthquake, with power outage areas mainly distributed along the plate junction of Kahramanmaras and Hatay, and significant light loss particularly observed in Hatay, Kahramanmaras and Adiyaman. In many sectors of Hatay City, night-time light declined by more than 90 per cent; in Adiyaman, eastern sectors of the city lost more light than western sectors; and downtown Hatay city (areas with higher light density) lost significant light post-earthquake.

← ↻ 🔒 https://data.unhcr.org/en/documents/details/98891

**OPERATIONAL DATA PORTAL** REFUGEE SITUATIONS MENU

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**TÜRKIYE: 2023 Earthquakes**  
Situation Report No. 1  
As of 16 February 2023

**HIGHLIGHTS**

- 216K people affected from affected areas
- 36K people killed
- 55 USAR teams necessary
- 244 lives rescued

## Türkiye - OCHA: 2023 Earthquakes Situation Report No. 1, As of 16 February 2023

Document Type: Situation Reports / Updates , Situation Reports  
Document Language: English

This report is produced by the UNDAC mission in Türkiye in collaboration with humanitarian partners and covers the period from 6 to 16 February 2023. It succeeds the joint Türkiye and northwest Syria Flash Updates; separate updates are issued covering the humanitarian impacts and response in Syria.

**Partners**

 **United Nations Office for the Coordination of Humanitarian Affairs**

UNOCHA and UNHCR cited the Türkiye/Syria Earthquake report

# Impacts

15 June 2023



## Power Outage Assessment in Sudan using Night-time Light Imagery

Sudan

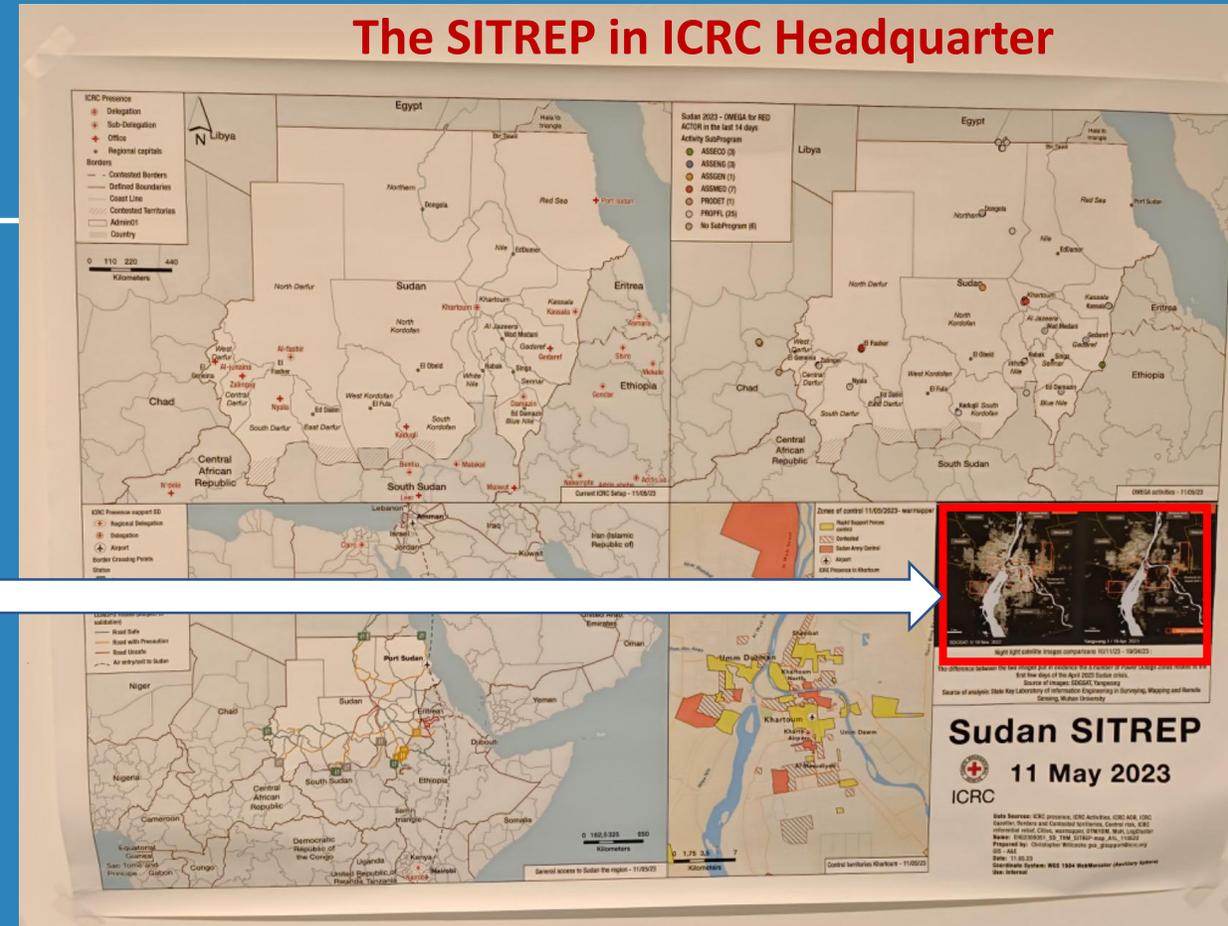
Status: Power outage areas observed.

Further action(s): full assessment to be conducted

<https://unosat.org/products/3625>



## The SITREP in ICRC Headquarter



International Committee of Red Cross (ICRC) used the Sudan Report to support aid activities

# Impacts

21 October 2023

**Power Supply Assessment and Evolution in Gaza Strip (Occupied Palestinian Territory) using VIIRS Nighttime Light Imagery as of 19 October 2023**

Gaza Strip (Occupied Palestinian Territory)

Status: Power outage observed

Further action(s): Continue monitoring with next VHR images

<https://unosat.org/products/3699>



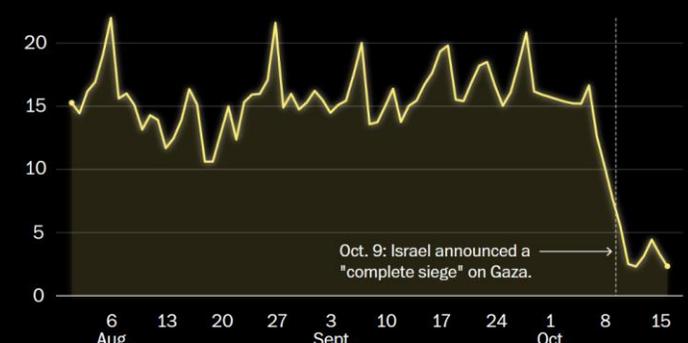

https://www.washingtonpost.com/world/2023/10/26/gaza-israel-siege-black... 

The Washington Post  
*Democracy Dies in Darkness*

**Power supply in the Gaza Strip plummeted**

By Oct. 16, most sectors in the Gaza Strip had experienced a 90 percent drop in power availability compared with Oct. 6.

— Average nighttime brightness of Gaza measured in units of radiance



Lighting lost in the Gaza Strip



The report for recent conflict in Middle East has been widely reported by international media

## Lesson Learned

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International organizations are main users of the products  
Funding from China GEO is the key support for GEO Night Light  
GEO provides an inclusive platform for multilateral collaboration

#TheEarthTalks



6-10 NOVEMBER

CAPE TOWN, SOUTH AFRICA

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