8 August 2023

Power Supply Assessment in Tigray, Ethiopia using Night-time Light Imagery

Tigray Region, Ethiopia

Status: Power outage areas observed.

Further action(s): continue monitoring

Tigray, Ethiopia

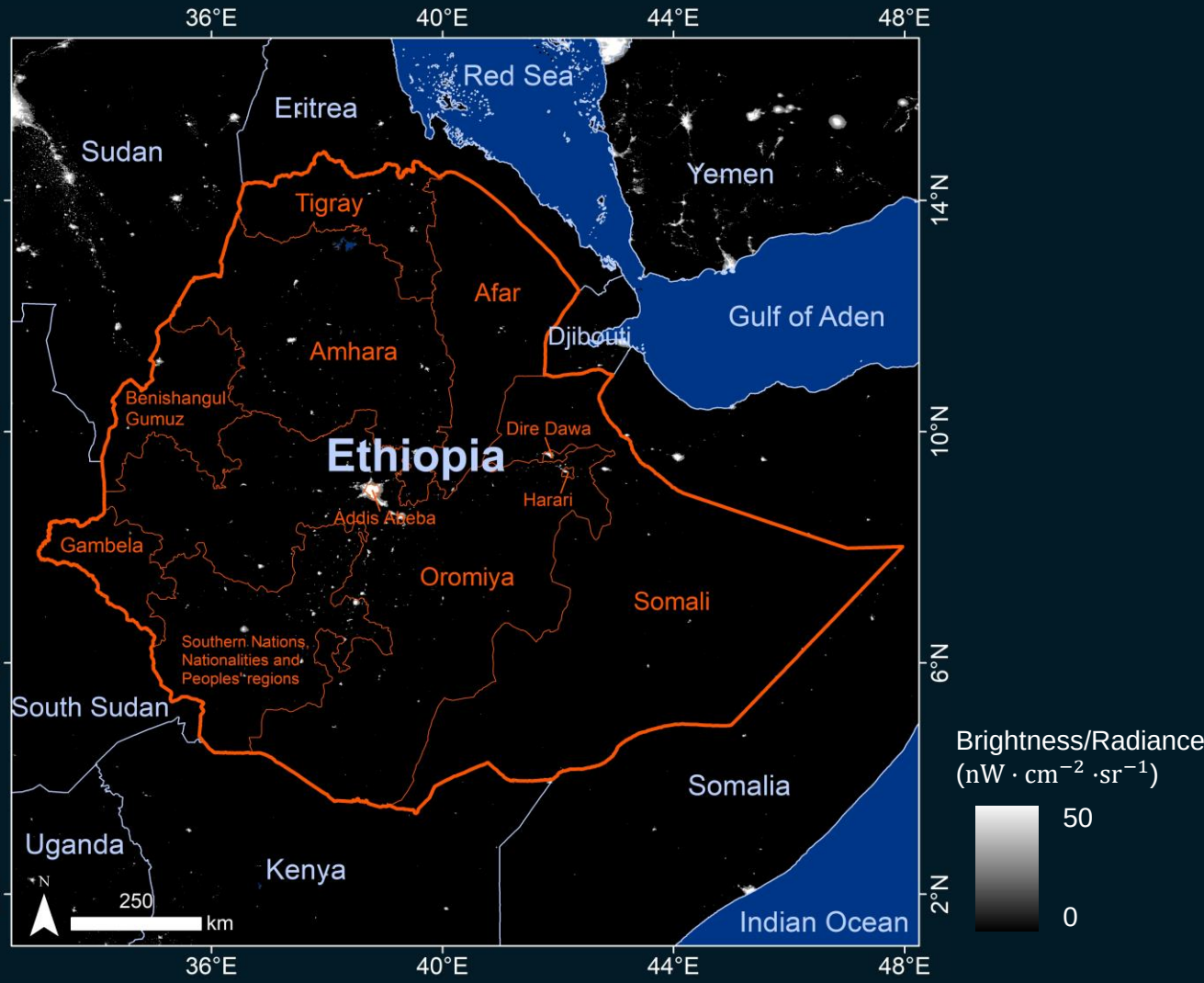
Night-time light imagery of Ethiopia

Image center:
08°57’26"N
40°23’29"E

UNOSAT
United Nations Satellite Centre

Night-time lights of Ethiopia are mainly distributed in Addis Abeba.

Latest Google Earth image



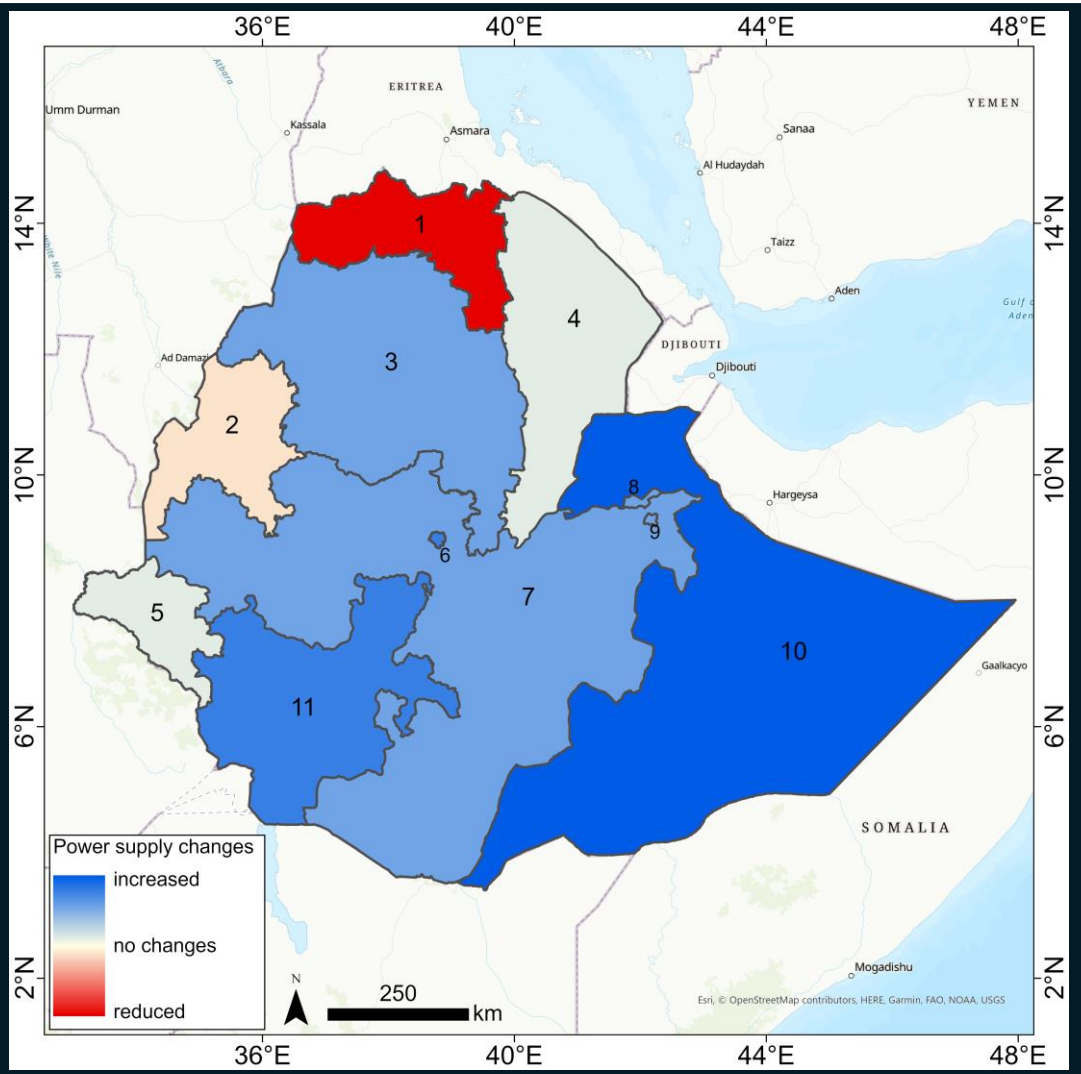
NPP/VIIRS night-time light image in 2022

Mapping power supply changes

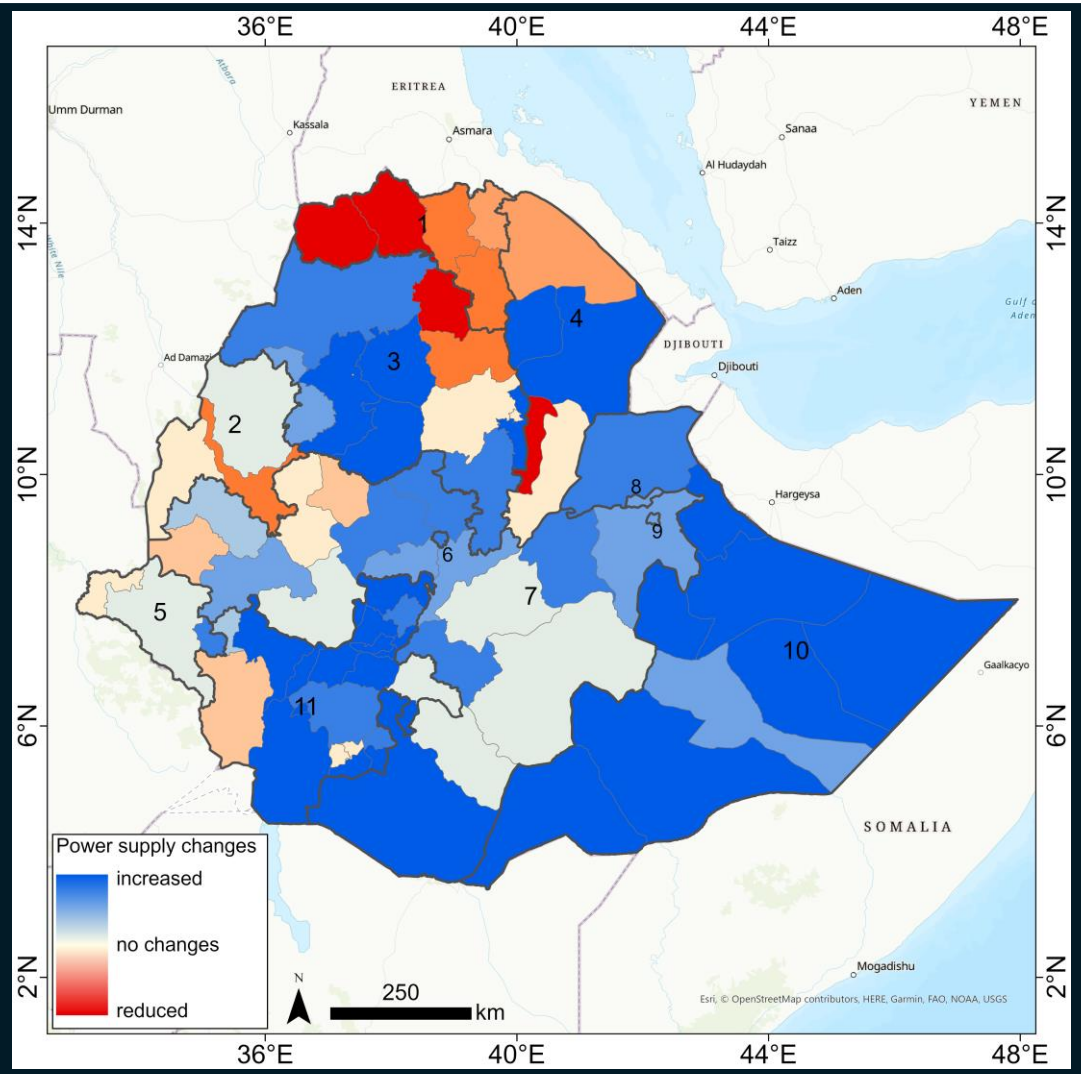
Since the start of the conflict in November 2020, Tigray suffered a significant power outage, while power supply increased in most other areas of Ethiopia.

Image center:
08°57'26"N
40°23'29"E

UNOSAT
United Nations Satellite Centre



Changes in power supply from 2019 to 2022 (region level)



Changes in power supply from 2019 to 2022 (zone level)

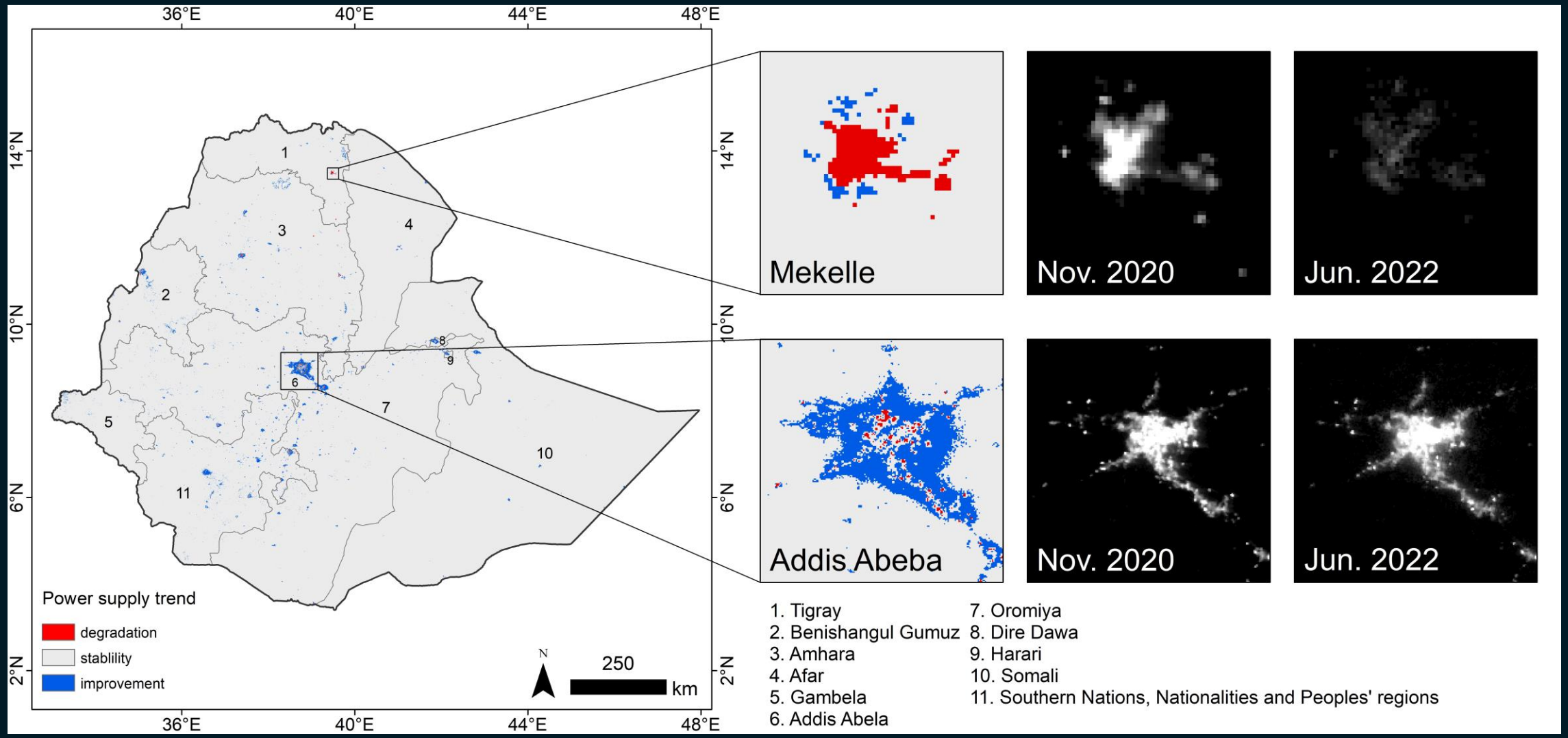
1. Tigray
2. Benishangul Gumuz
3. Amhara
4. Afar
5. Gambela
6. Addis Abela
7. Oromiya
8. Dire Dawa
9. Harari
10. Somali
11. Southern Nations, Nationalities and Peoples' regions

Power supply trends at pixel level

During the conflict, the power supply kept increasing in Ethiopian capital Addis Abela, while the power supply kept decreasing in Tigray region capital Mekelle.

Image center:
08°57’26"N
40°23’29"E

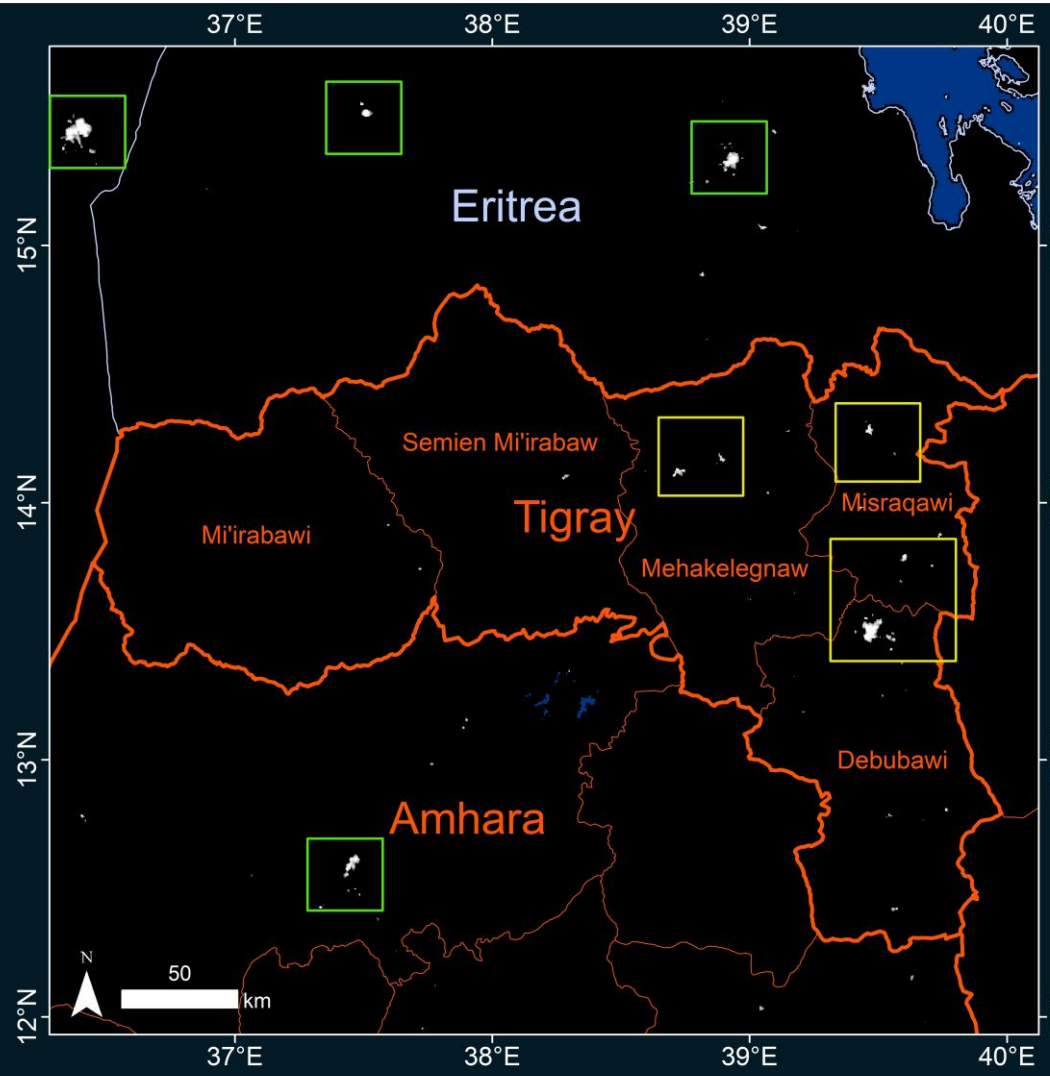
UNOSAT
United Nations Satellite Centre



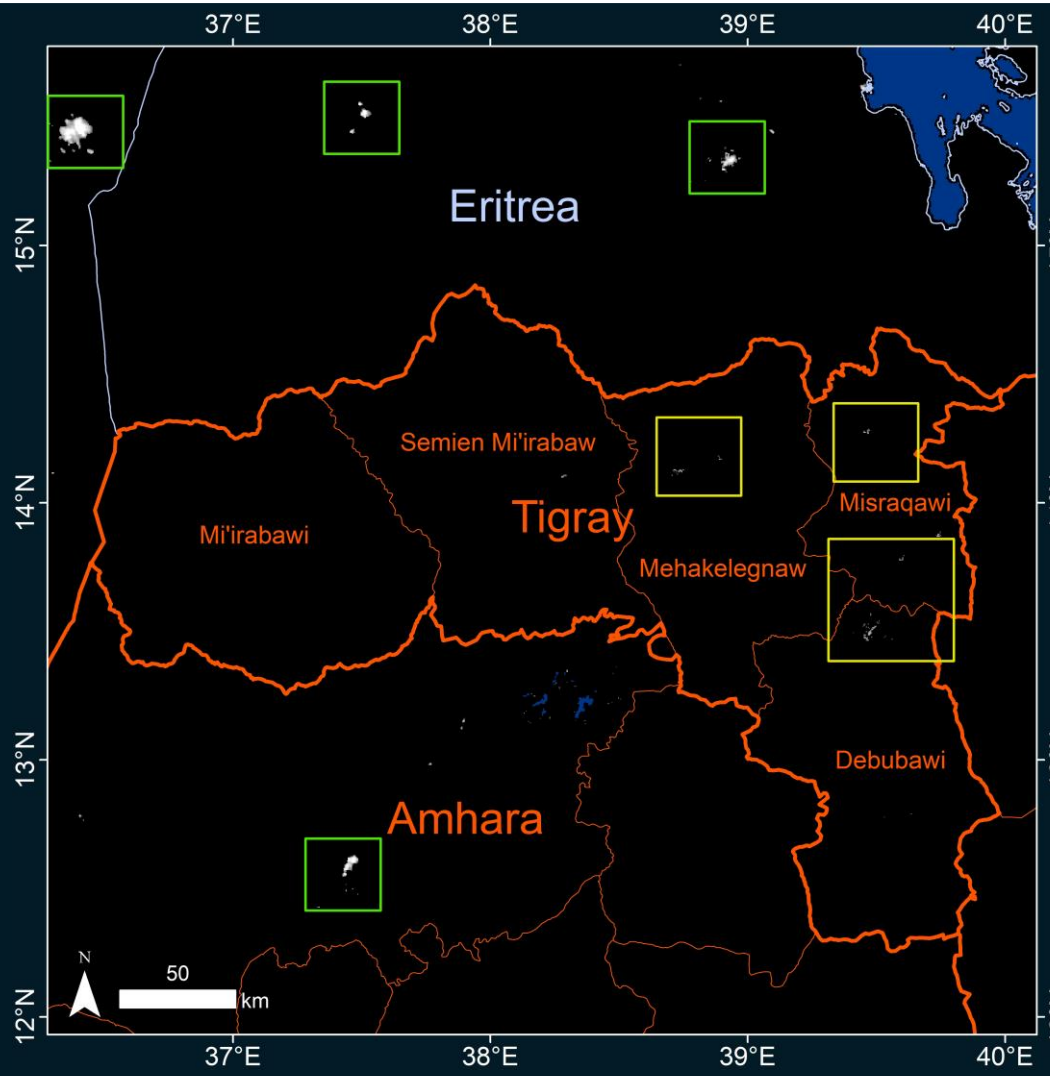
Night-time light imagery of Tigray

Cities in Tigray region had a significant power outage during the conflict, while power supply of cities outside the region remained stable.

Image center:
13°51’10"N
38°12’03"E



NPP/VIIRS night-time light image from November, 2020



NPP/VIIRS night-time light image from June, 2022

Areas with stable power supply

Areas with power outage

Brightness/Radiance
$(\mathrm{nW \cdot cm^{-2} \cdot sr^{-1}})$

50

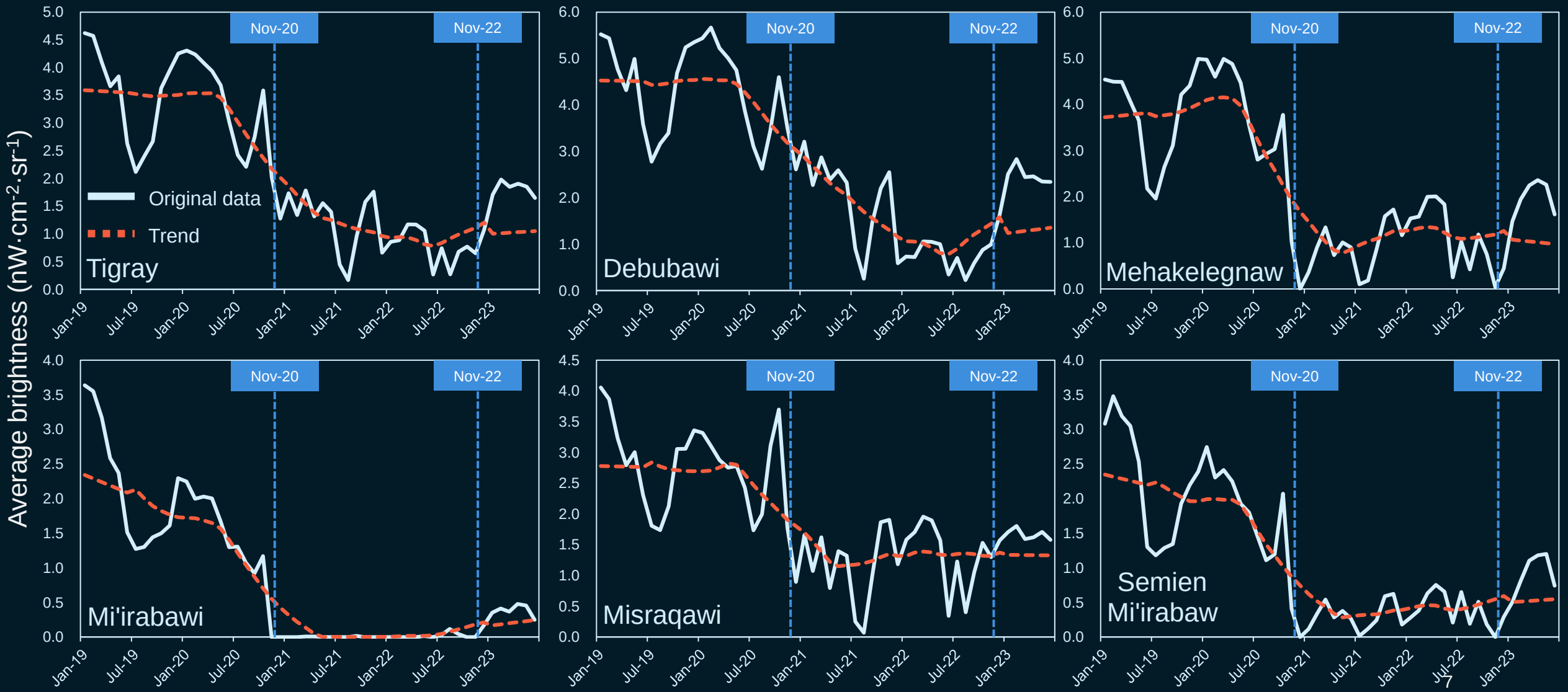
0

VIIRS night-time light time series

Power supply in Tigray declined by more than 70% during the conflict. Power supply in zones of Tigray is in recovery process, but has not yet returned to pre-conflict level by June 2023.

Image center:
13°51'10"N
38°12'03"E

UNOSAT
United Nations
Satellite Centre

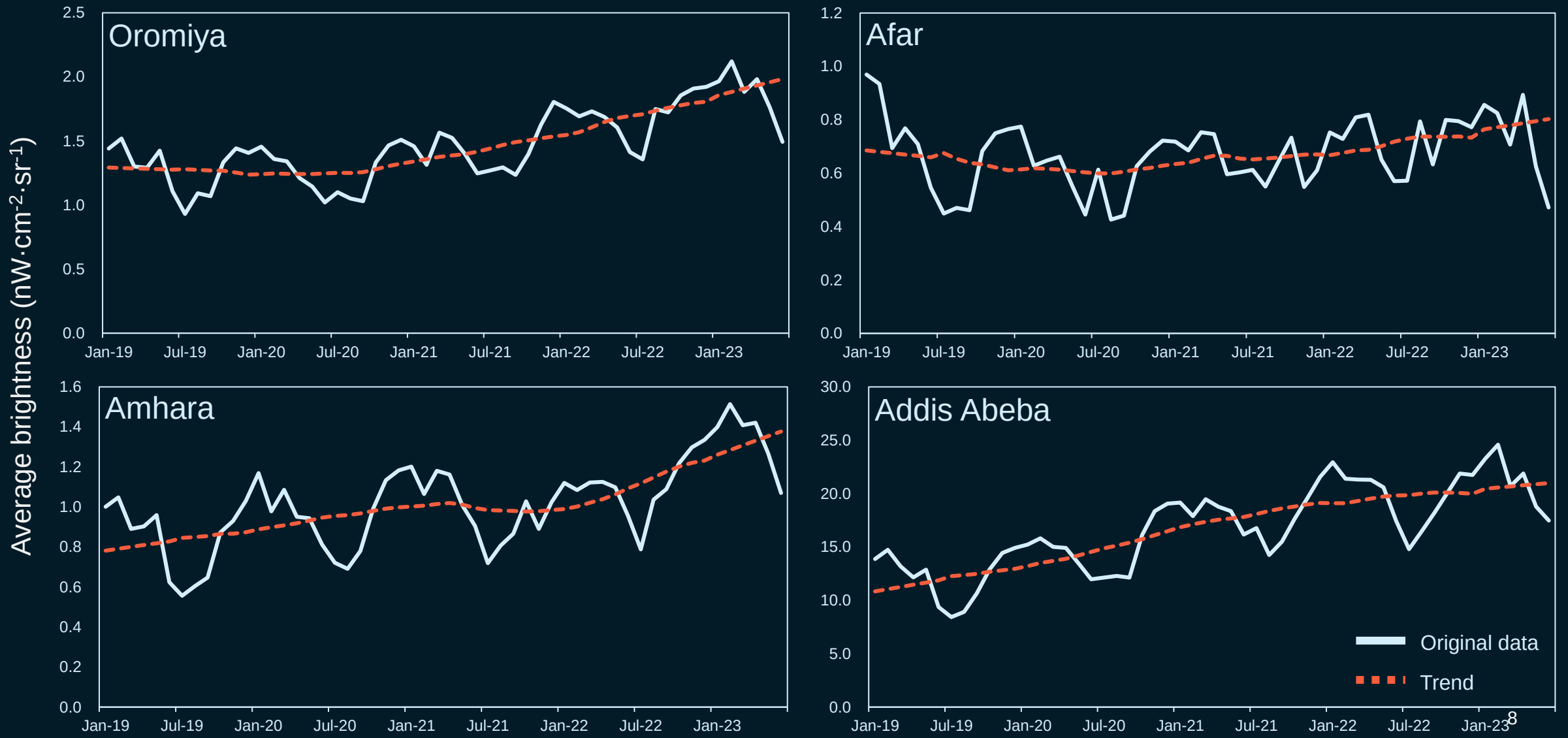


VIIRS night-time light time series

During the conflict, power supply kept increasing in most regions of Ethiopia except Tigray.

Image center:
08°57’26"N
40°23’29"E

UNOSAT
United Nations Satellite Centre

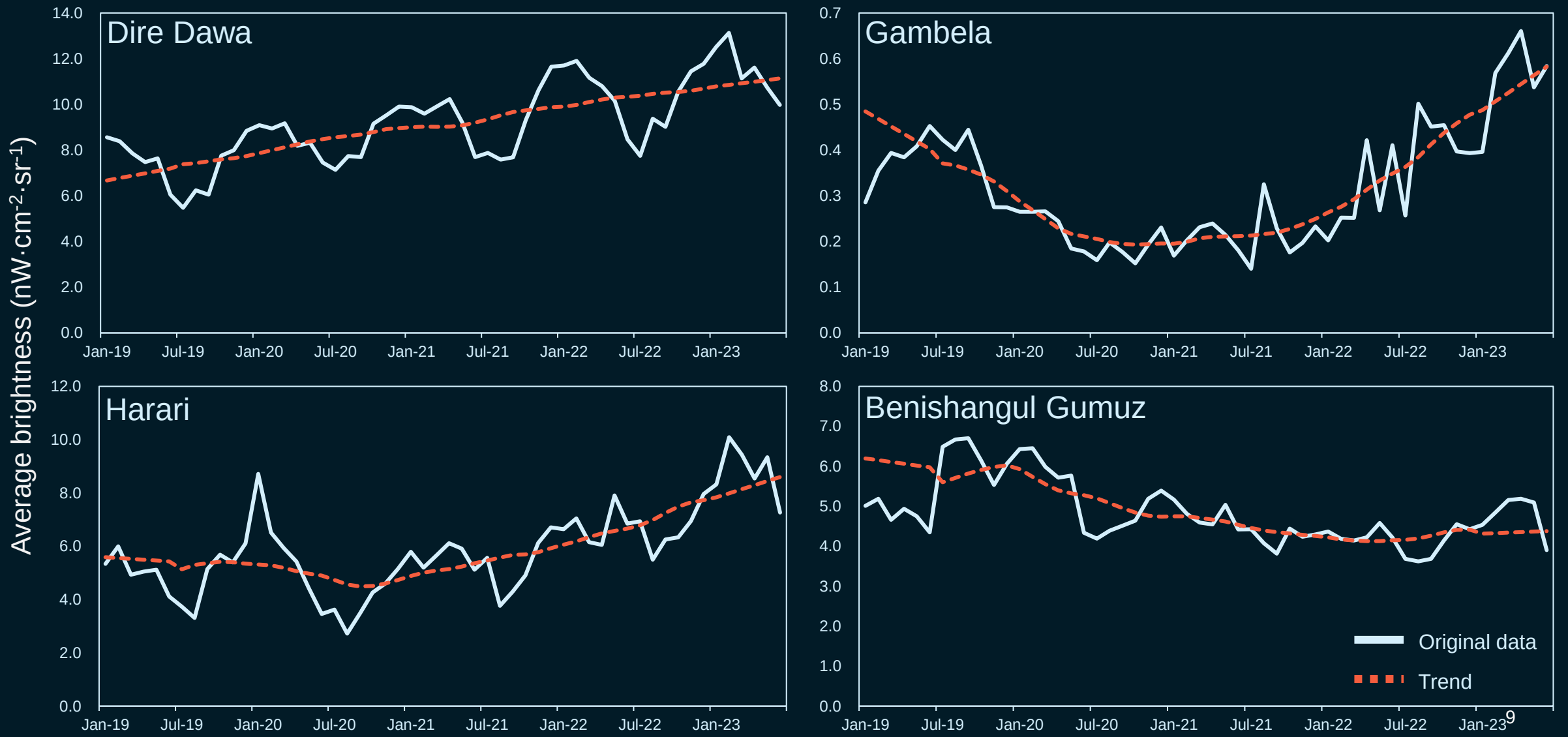


VIIRS night-time light time series

During the conflict, power supply kept increasing in most regions of Ethiopia except Tigray.

Image center:
08°57’26"N
40°23’29"E

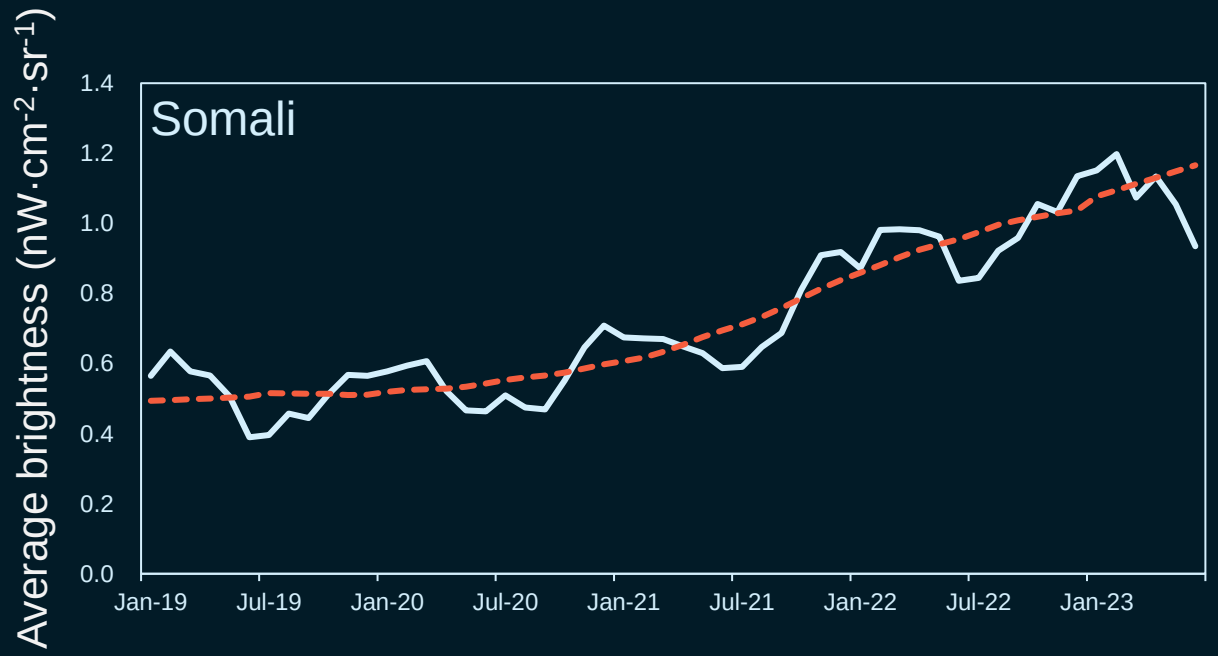
UNOSAT
United Nations Satellite Centre

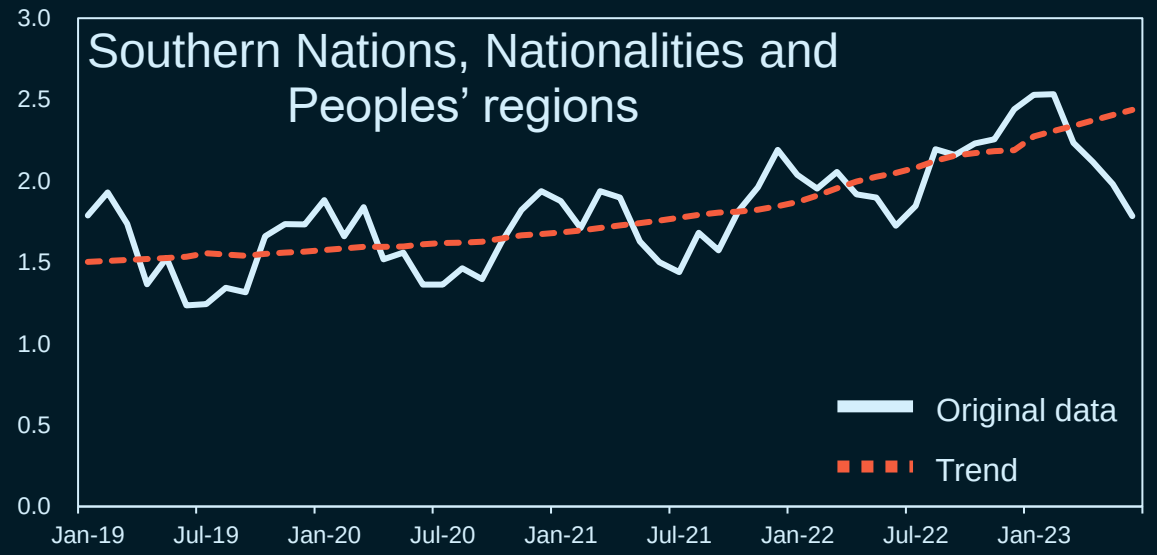


VIIRS night-time light time series

Image center:
08°57’26"N
40°23’29"E

During the conflict, power supply kept increasing in most regions of Ethiopia except Tigray.





SUMMARY OF FINDINGS

- Since the start of the conflict in November 2020, cities in Tigray region suffered a significant power outage. The power supply in Tigray declined by more than 70% during the conflict.
- Power supply in most regions outside Tigray kept increasing during the conflict;
- Since the end of the conflict in November 2022, power supply in Tigray was in recovery process, but has not yet returned to pre-conflict level by June 2023.

COPYRIGHTS & SOURCES

Data sources:

(1) Satellite Images

Satellite Data : VIIRS VNP46A3
Acquisition date: 01 January 2019 - 31 June 2023 (UTC)
Resolution: 500 m
Copyright: NASA
Source: NASA

Satellite Data : VIIRS VNP46A4
Acquisition date: 01 January 2019 - 31 June 2023 (UTC)
Resolution: 500 m
Copyright: NASA
Source: NASA

(2) Ancillary data

Landcover data: GlobeLand30 2020
Ministry of Natural Resources of the People's Republic of China

Administrative boundaries: Database of Global Administrative Areas (GADM) Verision4.1 & Esri, OpenStreetMap contributors, HERE, Garmin, FAO, NOAA, USGS

Analysis: Wuhan University & United Nations Satellite Centre (UNOSAT)
Production: United Nations Satellite Centre (UNOSAT) & Wuhan University

This work is supported by Pilot Initiative "Night-Time Light Remote Sensing for Sustainable Development Goals" under Work Programme 2023-2025 of Group on Earth Observations (GEO).

@UNOSAT

@UNITAR.unosat

/UNOSAT

UNOSAT, United Nations Institute for Training and Research (UNITAR)
7 bis, Avenue de la Paix, CH-1202 Geneva 2, Switzerland

T +41 22 917 4720
E unosat@unitar.org
www.unosat.org