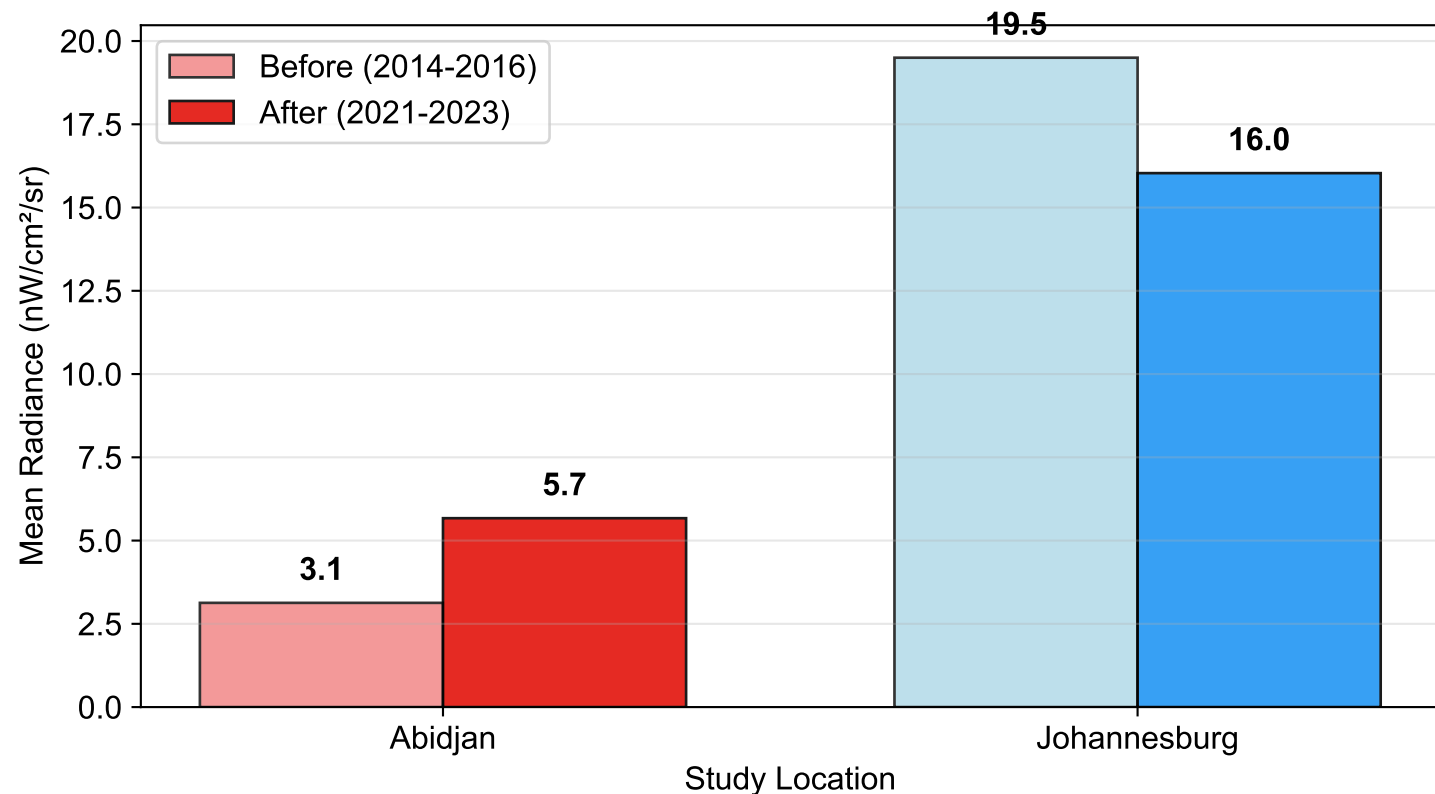


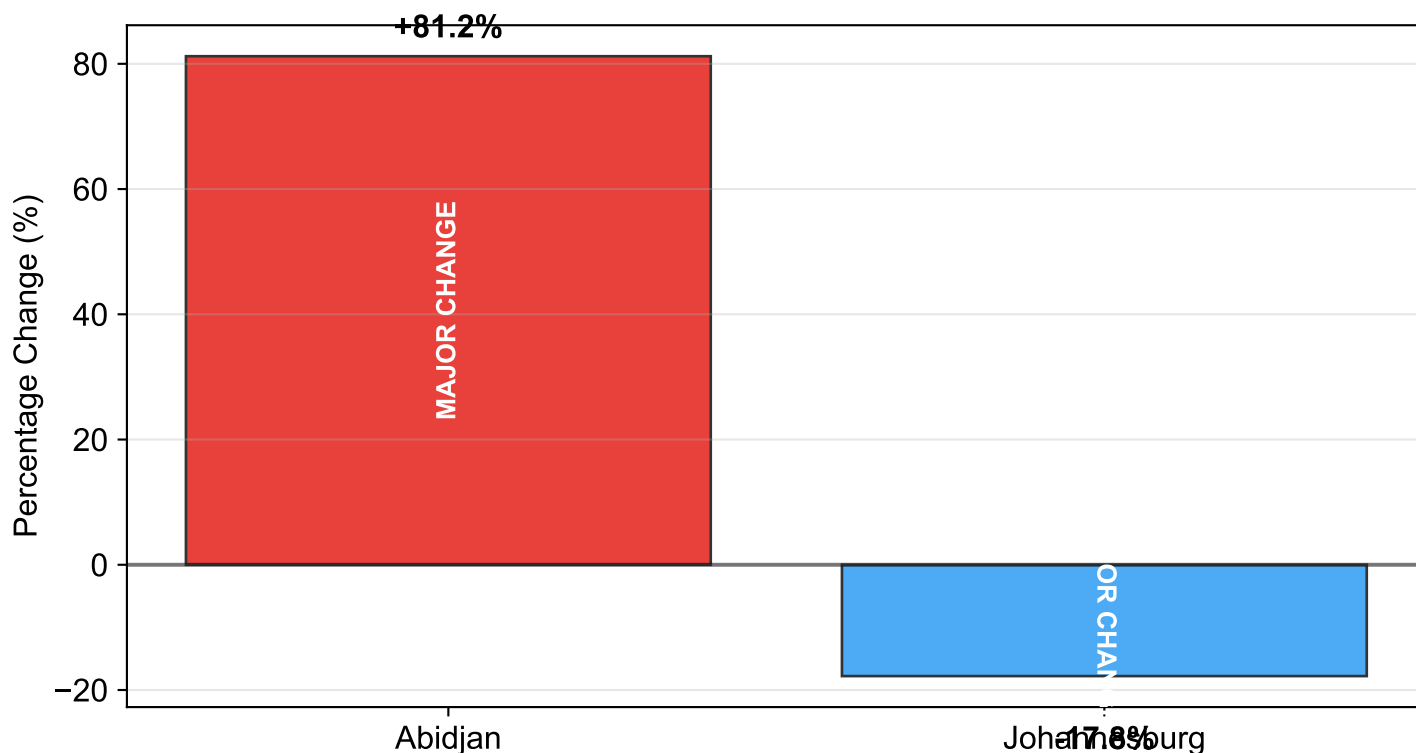
Nighttime Lights Analysis: Environmental Change Evidence

Google Earth Engine + VIIRS Satellite Data

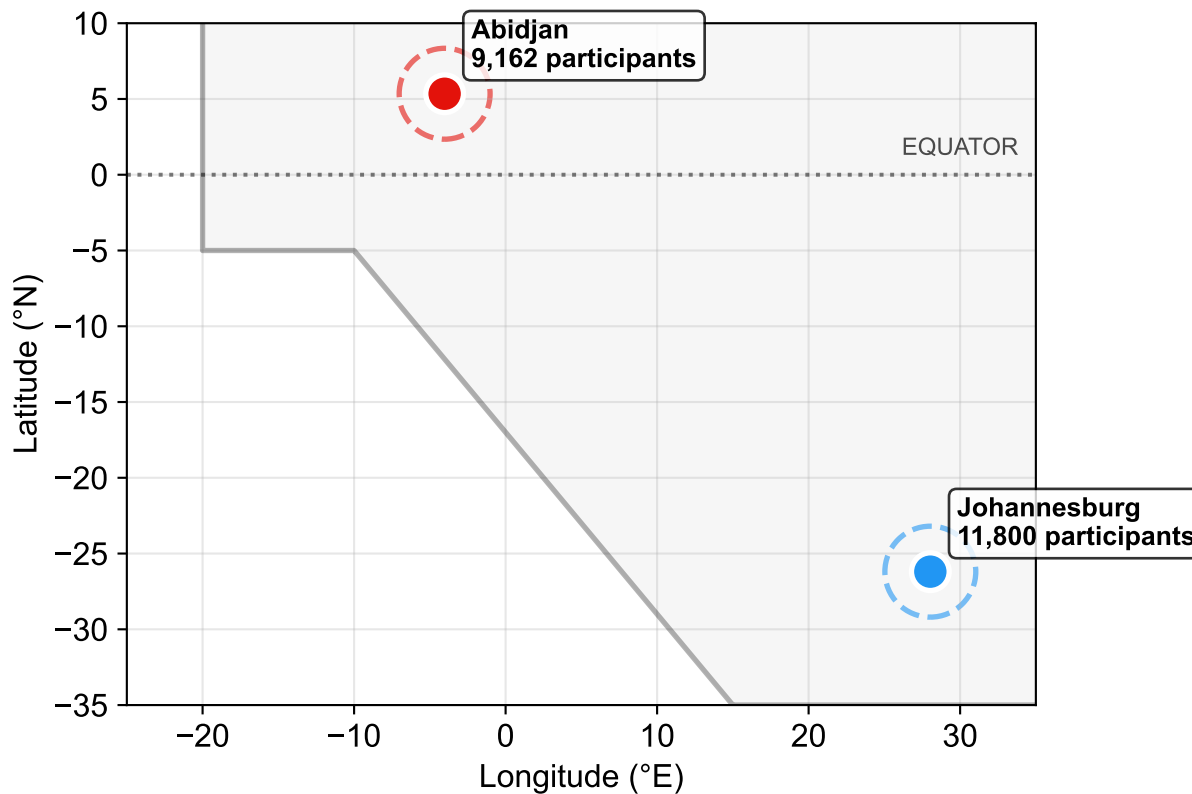
Nighttime Light Intensity Comparison
Satellite-Confirmed Urbanization Changes



Urbanization Growth Rate
(% Change in Light Intensity)



Study Locations in Africa
Satellite Monitoring Areas



SATELLITE DATA VALIDATION

DATA SOURCE:

- NOAA VIIRS DNB Monthly Composites
- 1km spatial resolution
- Weather-corrected radiance
- Study area: 30km radius per city

ANALYSIS PERIODS:

- Before: 2014-2016 (Early study period)
- After: 2021-2023 (Recent period)
- Time span: ~7-9 years

STUDY LOCATIONS:

ABIDJAN (Côte d'Ivoire):

- Coordinates: -4.02°, 5.35°
- Study participants: 9,162
- Climate: Tropical monsoon (Am)
- Context: Post-conflict recovery
- Economic growth period

JOHANNESBURG (South Africa):

- Coordinates: 28.03°, -26.20°
- Study participants: 11,800
- Climate: Humid subtropical (Cwa)
- Context: Established urban center
- Infrastructure maturation

VALIDATION SIGNIFICANCE:

- Objective environmental measurement
- Quantified urbanization evidence
- Supporting health study context
- Infrastructure development proxy
- Population density indicator